



## **Deliverable No 2.4 Recommendations for relevant policies being developed for EU 27.**

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# VISIONS OF LAND USE TRANSITIONS IN EUROPE

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## **Recommendations for relevant policies being developed for EU 27**

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## Executive summary

This VOLANTE Deliverable D2.4 gives a reflection on recommendations for European policy development, as far as relevant for land use at the European level. It summarises the main conclusions of the entire Work Package 2 (*Policy effects, interaction and institutions*) thus far. In the further course of the VOLANTE project these recommendations will still be refined and extended on the basis of stakeholder experiences and analysis of land use transition processes in other Work Packages, so as to optimally inform the VOLANTE Roadmapping Process.

The assessment of clear-cut cause-effect policy impacts on land use appears to be a very complex matter because of many interactions:

- EU policy interacts with national and regional policies;
- EU policy interacts with global, European, national and local market development and demographic dynamics;
- various EU policies may have counteracting or mutually amplifying effects on land use;
- policy effectiveness is to a large extent determined by compliance patterns in member states, and interactions of EU, national and local governance frameworks.

Moreover, astonishingly little research evidence is available on the effectiveness of policies in achieving land use transitions (Cosor et al., 2013). This can be understood from the fact that land use as such is not a well-defined policy competence at EU level, and neither in most member countries. For the same reason it seems also that research in this effectiveness is not widely advocated, because of lacking direct political implications. It is clear, however, that many policies have effects on land use.

VOLANTE Work Package 2 focusses on these Policy effects on the shorter term, and especially on the effects of the Habitat Directive and the Common Agricultural Policy. These have been studied in literature (VOLANTE Deliverables 2.1 and 2.2) and in a number of case studies (VOLANTE Deliverables 1.4 and 2.3). Additionally, for this deliverable we studied stakeholders' perceptions of the cause-effect relationships regarding land use transition, using Fuzzy Cognitive Mapping. This enhanced the proper interpretation of the land use transition processes not accounted for by literature.

This Deliverable concludes that institutional issues are important aspects to address, if real policy outcomes are to be expected. Also, it is apparent that the state of concern for policy integration at EU level needs further attention, as issues like nature conservation, water quality, climate mitigation and adaptation, as well as agricultural and forestry development need to be addressed in common, in order to ensure cost-efficient solutions to the land systems development. Well defined choices concerning the implementation structures of policies, taking into due consideration the legacy from existing policy implementation are crucial in the policy integration process. This can help assure that the policy integration is not just stated at EC level and then forgotten in the subsequent implementation of integrated policies at national, regional and local levels, but carried out in the local landscapes.

These conclusions are extrapolated into a number of preliminary policy recommendations.

# 1 Introduction

## 1.1 Objectives of this deliverable

The VOLANTE project mostly studies the land use change processes at European scale level. However, drivers of change operate differently at the local or regional level (Bürgi et al., 2004). The role of land owners and users can be more influential, but also local authorities will affect the outcome of the complex system of decision making regarding land use trajectories. Work Package 2 therefore also studies the local processes, for which case study areas are selected to study land use changes and decision making regarding land use in detail (Cosor et al., 2012). Also specific attention is paid to the issue of policy and governance (Frederiksen and Vesterager, 2013). The perspective provided in the WP 2 is connecting the current and past observed processes of policies development, and influence on land use, and the influence on these policies of existing (institutional) conditions, but it also serves as a description of mechanisms that should be taken into consideration when visions for the future development of the EC are formulated and assessed, since the likely outcomes of visions depend on the frame set in policy development, and the future development of institutions and policy changes is influenced by the over-all agenda for visions setting the frame for the future development of the EU. **The focal question for this Deliverable** is therefore: What conclusions of these studies on the cause-effect relationships between policies and land use transition be drawn and how can these be extrapolated into recommendations for policy development at a level of European relevance?

This deliverable is a summary, extrapolation and interpretation of the work presented in earlier deliverables.

## 1.2 Structure of this document

The present Chapter 1 introduces the context for this Deliverable. In Chapter 2 the case study areas are presented that were analysed in Work Packages 1 and 2 of the VOLANTE project, together with the drivers of change in the case study areas, the institutional diversity in the respective countries including a description of the very limited observed causal connections between policy and land use changes. Chapter 3 presents a general description of stakeholders' perceptions of the drivers of change in each of the geographical regions represented among the case study areas, based on workshops using a Fuzzy Cognitive Mapping procedure. Chapter 4 describes the policy drivers with regard to the Habitat Directive and Common Agricultural Policy, emphasising the type of policy and institutional implications on achieving policy effects in terms of land use. Finally in Chapter 5 preliminary policy recommendations are presented, with a particular focus on how EU policies can be developed, taking the institutional conditions into account.

## 1.3 Policy effects on land use: the context

Land use development is a phenomenon resulting from a large range of factors and drivers among other things related to the provision of landscape functions and associated services, as introduced by Costanza et al. (1997). Land use change is associated with these functions, and continuously changing in response to environmental conditions, socioeconomic and cultural factors, technological changes and policies (Bürgi et al., 2004; Primdahl et al., 2013a; Primdahl et al., 2013b; Veldkamp and Lambin, 2001). In land use planning the challenge posed by the inherent complexity of the governance processes involved is especially (Timmermans, 2013).

### **Major land use change processes**

The intensification or extensification processes (Verburg, 2009; Vos and Klijn, 2000) affect landscape identity but also character and biodiversity (Stanners and Bourdeau, 1995; Stobbelaar and Pedroli, 2011). Agricultural intensification is defined here as higher levels of inputs and increased output (in quantity or value) of cultivated areas or reared products per unit area and time (Lambin et al., 2001). Agricultural expansion often compromises biodiversity, and leads to encroachment on natural areas (Brussaard et al., 2010). Land use intensification is an important pressure which affects environmental quality and biodiversity often negatively (Petit and Elbersen, 2006). Environmental pressures like climate change and pollution add to this and lead to change of landscape character (Plieninger, 2006). Fragmentation as a result of transport infrastructure is another important change (Van Eetvelde and Antrop, 2009). To mitigate these negative impacts it is important to identify and determine the key elements of landscape change processes, and adjust policies where necessary (Plieninger et al., 2006). Also the type of farmers as well as the different socio-economic settings will define the outcome and may lead to different decisions regarding landscape management, and may thus have implications for these trajectories of landscape change (Kristensen et al., 2001; Primdahl et al., 2013b).

Different environmental processes lead to larger vulnerability, i.e. the degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including climate variability and extremes. In the context of the EU Framework Five Project ATEAM the vulnerability concept was developed especially to integrate results from a broad range of models and scenarios and make predictions for future land use (Schröter et al., 2005). In total seven scenarios were evaluated, with different degrees of climate change. A common trend found was that agricultural land is declining all over Europe, as well as land use intensity, and urbanisation was increasing in all scenarios. These scenarios may have limitations, but most scenarios show the same tendency. The outcome may not differ, but spatial patterns in which e.g. urbanisation occur can vary a lot (Rounsevell et al., 2006). The governance aspect, the way how Europe develops its policies and how they are implemented, will define the land use pattern of tomorrow. In Work Package 4 of the VOLANTE project the long term changes in land use are studied in more detail, whereas the impact on Ecosystem Services are assessed in Work Package 8.

### **Landscape and Land use change in Europe**

Major land use changes in Europe, identified on the basis of Corine Land Cover, for the period of 1990-2000, were: urbanisation, intensification of agriculture, extensification, afforestation, deforestation, and construction of water bodies. The change observed was on average 2.5% (Feranec et al., 2010). However, the overall rate of change seems to have slowed down to 1.3 % for the period 2000-2006 (EEA, 2010). Major processes observed in this study from the EEA (2010) is the land specialisation, which is described as urbanisation, agricultural intensification and abandonment plus natural afforestation. It is expected that this trend will continue. The increase in artificial surface is the largest change with 3.4%. Where in the past this mainly comprised urbanisation, for the last period this is more attributed to economic development sites and infrastructure. This increase in artificial surface has exceeded the growth in agricultural land. The forest area increased slightly (0.1%). Arable land and permanent crops decreased by 0.2%, pastures and mosaics by 0.3%. The natural habitats and wetlands declined further, whereas artificial water bodies increased (EEA, 2010).

It seems that these land use changes have not resulted from purposeful policies. At the most they can be considered side-effects from other policies, or effects of the lack of specific policies. It is this intriguing observation that is starting point for research in Work Package 2 (*Policy effects, interaction and institutions*), of which the preliminary recommendations are presented in this Deliverable.



## 2 Case study approach

This section presents the case study areas (par. 2.1), the drivers of change identified in the case study areas (par. 2.2) and the institutional diversity in relation to the Habitat Directive and Common Agricultural Policy in the countries studied (par. 2.3).

### 2.1 Case study areas

We selected 6 case study areas, in different regions and landscapes in Europe. The selection of sites was based on areas for which prior knowledge and research data regarding land use and policy impact was available. However, an extensive study of literature on land use change and policy (Cosor et al., 2012) revealed that such studies are rare. For that reason it was decided to study the case study areas which are also topic of research in Work Package 1, which studies processes of land use change at farm level (Kristensen et al., 2013). The 6 case study areas are: Roskilde (Denmark), Heerde (The Netherlands), Portofino (Italy), Lesvos (Greece), Reichraming (Austria) and Rătești and Stăncuța (Romania) (Figure 1).

The case study areas represent different landscape types in Europe. This is reflected in Table 1, which indicates the environmental zone and habitats which are present in the case study areas. The areas differ not only in environmental zone and dominant land use system, but also in the size of the case study area. The smallest area, Portofino, measures only 18 km<sup>2</sup> whereas the largest area, Lesvos, measures more than 1080 km<sup>2</sup>. Further, the dominant land use type (and often farming types) are different: Forests in Reichraming, Olives in Lesvos, Macchia and olives in Portofino, Cropland in Roskilde, Stăncuța & Rătești, and grassland in Heerde.



Figure 1: Location of the 6 case study areas

Table 1: Land use types recorded in the VOLANTE case study areas

	Lesvos, GR	Reichraming, AT	Roskilde, DK	Heerde, NL	Portofino, IT	Stăncuța & Rătești, RO
<b>Environmental Zone</b>	Mediterr. South	Alpine South	Atlantic North	Atlantic Central	Mediterr. North	Continental
<b>Size area (km<sup>2</sup>)</b>	1080	102	212	80	18	255 / 79
<b>Urban sealed</b>	x	x	x	x		x
<b>Urban mixed</b>	x	x	x	x	x	x
<b>Urban recreation</b>	x	x	x	x	x	x
<b>Crops</b>	x	x	x	x	x	x
<b>Woody crops</b>	x				x	
<b>Waterways</b>		x	x	x		x
<b>Wetlands</b>			x			x
<b>Coastal</b>	x				x	
<b>Geomorphologic features</b>	x				x	
<b>Grasslands</b>	x	x	x	x	x	x
<b>Native grasslands</b>	x	x			x	x
<b>Heathland</b>	x			x	x	
<b>Scrub</b>	x	x		x	x	x
<b>Forest</b>		x	x	x	x	x
<b>Woody landscape elements</b>	x		x	x	x	
<b>Stone walls &amp; terraces</b>	x				x	

## 2.2 Drivers of land use change

VOLANTE Deliverable D2.3 (*Landscape change processes in case study areas*) focusses at driving forces and their impact on landscape change in Europe. By ranking the drivers of change, insight is gained in the relative importance of different drivers and regional variation in landscape change processes (Soler et al., 2011). Its importance lies in the possibility to define how important political drivers are in comparison with e.g. environmental and economic drivers of change (Hersperger and Bürgi, 2010).

The drivers of change were identified by experts involved in this area that performed the farmers' interviews (VOLANTE Work Package 1) and were involved in assessments for Work Package 2. The assessment was supported by the background knowledge from the interviews, and, where possible, use was made of literature and other experts (Table 2).

Table 2: Drivers of change, processes behind land use change observed in the case study areas

Area	Drivers of change	Technology		Economy and market		Transport and infrastructure			Environmental policy and legislation			Environment				
		Processes	Land use type	Agro-technological Innovations	Globalisation	Market forces Food\Feed\Fibres	Urbanisation\sprawl	Roads \ infrastructure	Tourism	Protective designation (N2000, Forestry acts)	Zoning	RDP-schemes	Energy policy	Natural succession	Climate change	Land abandonment
Lesvos (Greece)	Olive groves		x	x	x	x	x	x	x	x	x	x	x			
	Forest				x				x			x	x		x	x
	Shrubs												x		x	
	Crops	x		x	x					x	x					x
	Grassland			x							x					x
	Build-up area		x		x	x	x	x	x	x	x					
	Trade / manufacture		x	x	x	x	x	x	x	x						
Bare ground												x		x		
Reichraming (Austria)	Forest		x					x	X			x				
	Crops	x		X					X		x					
	Grassland	x	x	X				x	X		X		X			
	Build-up area															
Roskilde (Denmark)	Forest			x	X				X	x	X					
	Crops	X		X	x					X		X			x	
	Grassland	x		x	x				X		x				x	
	Build-up area				X	X				X						
	Trade / manufacture				X	X				X						
	Wetland	x							X		x					x
Heerde (the Netherlands)	Forest							X	X	x		x				
	Crops	x		X	x						x					
	Grassland	X	x	X	x											
	Heather & moors							X	X	x		x	x			
	Build-up area		X		X	x	x	x	x	x						
	Trade / manufacture		X	x	x	x				X						
Portofino (Italy)	Olive groves		X	X	x	X	x									
	Forest			x					X	x		x	X	x		
	Macchia/shrubs		x										X			
	Crops		x	X				x								
	Built-up areas				X	x	x	X	x							
Stăncuța & Rătești (Romania)	Forest															
	Crops	X	x	X	x					x	x	x		x		
	Grassland		x		x					x			x			
	Build-up area		x		x					x						
	Wetland	X			x			x	x	x			x	x	X	

## 2.3 Institutional diversity

The VOLANTE Deliverable D2.1 (Cosor et al., 2012) provides an overview of institutions and governance structures regarding land use and landscape change, based on an explorative study of existing papers and reports on institutions and documented cases of land use and landscape change as a result of European (and national) policy. The study primarily included the countries involved in the WP2 case studies, i.e. in Denmark, Greece, Romania and the Netherlands, but, where possible, also covered other countries for relevant literature, e.g. Sweden, Belgium, Italy and Cyprus.

The results of the different country studies are rather diverse. The countries are in different stages in policy development, the governance systems differ, and political culture is quite diverse. This makes it hard to draw general conclusions. However, outstanding from these studies is:

- The publications which describe a link between land change dynamics and policy are very few. The quality of the identified studies is also limited due to the lack of in-depth spatial inventories of the policies impacts. However a small number of studies include detailed spatial inventories and are of good quality. These are mostly scientific articles.
- The overview of policies indicates that there is a knowledge gap concerning the impact of several policies. Some policies have been studied better; this is the case of the Common Agriculture Policy and Natura2000 legislation. Other policies are relatively rarely studied.
- Countries are in different stages of transposition of European policy and policy implementation. In particular in southern Europe progress is relatively limited, and policies tend to be overlapping, or sometimes contradictory.
- Considering the investment made in e.g. the CAP, it is rather surprising that so little result-oriented research takes place; the larger evaluation programs rather focus on 'output' measurement and evaluation than on real impact at a local or regional level.
- The link between policy and impact on landscape is not very well documented. It appears to be a sectoral approach, studies being focused on landscape or policy analysis. Cross-references are found, but usually in a general way, where the socio-economic and political issues are indicated as drivers for land-use / land-cover change, but without efforts to trace spatially explicit impacts of specific policies.
- In Romania, Malta and Cyprus the accession to the EU is fairly recent and the transposition of EU-law, the implementation of policies and enforcement of EU acquis are still in the initial stages, and therefore not well documented.

### 3 Stakeholder interpretation of drivers of land use change

#### 3.1 Processes of workshops using Fuzzy Cognitive Mapping methodology

Workshops were held in different areas with key-experts on landscape change (Van der Sluis et al., in prep.). The Fuzzy Cognitive Mapping (FCM) method was used for quantifying relationships in change processes (Soler et al., 2011). More importantly, these workshops allow to link European policy and land use change, based on this expert knowledge. Also, it allows for comparing processes in different parts of Europe. At the same time, the 'hard' information is derived from the analyses of the physical processes of change.

The workshops allow for a balanced review for all regions of Europe, and also a comparison of these regions. They were held in Bucharest (Central-Eastern Europe; par. 3.3), Grenoble (France, Alpine; par. 3.4), Roskilde (Denmark, North-Western Europe; par. 3.5), and Lesvos (Greece, Mediterranean; par. 3.6). Aim of the FCM workshops was:

- to learn what impacts policies have in the specific geographical setting, relative to other drivers of change;
- to characterise what local experts perceive as major drivers of change; and
- to differentiate environmental drivers from political drivers in the general evaluation of land use and landscape change.

#### 3.2 What are driving forces?

Driving forces (DF) are the forces that cause observed landscape changes, i.e. they influence the trajectories of landscape development (Bürgi et al., 2004).

Main Driving Forces:

- Political DF (e.g. policies, regulations)
- Economic DF (market prices, subsidies)
- Cultural DF (farmer traditions, religion)
- Technological DF (new technologies, mechanization, irrigation)
- Natural and spatial DF (climate change, floods, fires)



Figure 2: Location of FCM workshops

Also, these driving forces operate (and differ) at various levels: international, national, regional (districts), local (municipalities).

In the workshops the drivers at National scale level were discussed with experts with a wider overview within their country, which could be considered national experts. The period of change which was considered was the past 25 years, i.e. from 1990 onwards.

#### 3.3 Processes of change in Central/Eastern Europe

##### Case study background

There are two case study areas in Romania, Rătești and Stăncuța. A common denominator for land use (change) in the two areas is the history of the landscape. The agricultural policies in the Romanian Socialist Republic before 1989 were focused on gaining more land for crop production by conversion of natural and semi-natural areas into mono-functional agro-ecosystems (Vadineanu, 2004). After the revolution in 1989 this changed.

In Rătești municipality land use is predominantly agricultural, with over 80% of the area used for cereal and vegetable crops. There are still some cultivated pastures for small animal production, as over the years the stocking rate decreased. Forest cover is about 8% of the area. The total change observed between 1980 and 2003 was some 13%, so 87% remained stable over this period. Most change involved change into cropland, which involved large extended fields, mostly along the river. Some forest was planted, and a limited expansion of grassland took place. Almost no change towards built-up area was detected. The changes occurred mainly in the structure and management of the agricultural ecosystems due to the change of ownership of the land after 1990, when large state owned farms were replaced by small subsistence farms.

In Stăncuța land use changes mostly near settlements in the centre and west. In total 11% of the land use changed between 1980 and 2003, while 89% was stable. Also here it is some large arable fields that were established, and along the Danube river some forests and few grasslands in the west.

### Workshop Bucharest

A workshop, prepared by Nicoleta Geamana, Georgia Cosor and Angheluta Vadineanu, was held in Bucharest in October 2011 with about 25 participants present. In the workshop some 10 drivers were identified as important in the process of landscape change for the Continental Region of Europe. Both climate change and policy and regulation were identified as self-driven concepts influencing other concepts only. Policy, funds, climate change and land ownership are considered important drivers.

<i>drivers</i>	<i>effects</i>
Policies	-> positive* for funds, landscape & biodiversity, but also for unsustainable use -> negative* for land ownership: less land owners
Climate change	-> positive for Infrastructure, farming diversification -> negative for landscape & biodiversity
Land ownership	-> positive for unsustainable use (increase) -> negative for demographic changes
Funds	-> positive for unsustainable use (increase), infrastructure -> negative for demographic changes, farming diversification

\*positive (blue in the diagrams) means stimulating, enhancing development: negative (red) means imposing restrictions

The process of restitution of the property rights by the Romanian State was long: it started in 1991 and in 2000 approximately 80% of the titles were issued and by 2005 95.6% of the agricultural area of the country and about 33% of the forest were returned to former owners or their heirs (National Rural Development Programme 2007-2013).

The 'Policy & regulations' component is very central in the concept of land use change in Romania and is a driver in the whole system (see FCM in Figure 3; this is a simplified representation with the main drivers of the system only). It has both direct and indirect impact on landscape quality. Negative impact has climate change, and unsustainable use as a result of the same policies, but also from consumer behaviour, demographic changes and funds and subsidies.

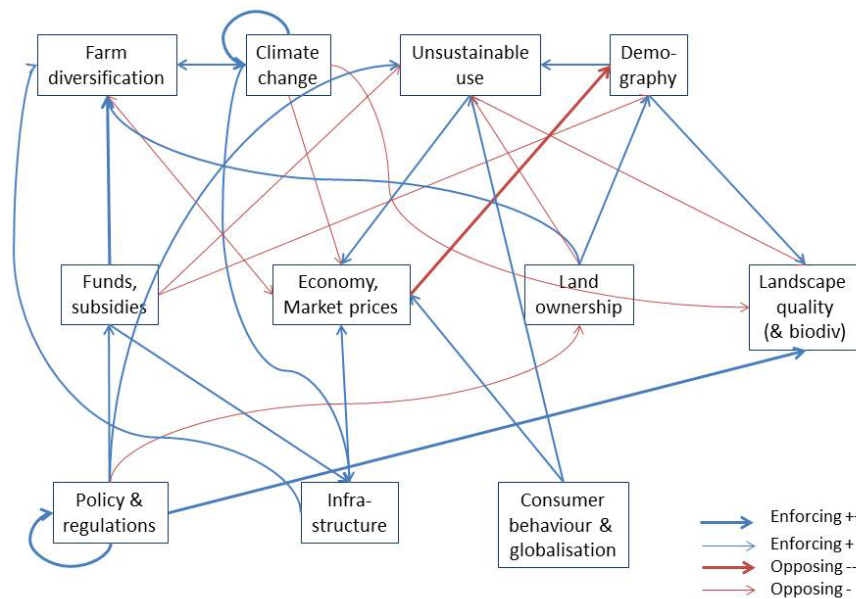


Figure 3 Fuzzy cognitive map of policy effects on land use in Bucharest (Romania / Central-Eastern Europe)

This shows the importance of harmonisation of policies: these can be beneficial through e.g. Natura2000, and environmental measures, at the same time they have strong negative impacts resulting from changes in land ownership, unsustainable use and demographic changes, especially abandonment of the rural countryside.

### 3.4 Processes of change in the Alpine region

#### Case study background

##### *Reichraming case*

The Reichraming case study area in Austria has marginal agricultural productivity. The area is dominated by forest which covers almost 80%, in particular in higher regions. It is mostly coniferous forest and mixed forest (85%). Agriculture is mostly practiced on smaller farms, and the meadows are situated in the valleys and higher up in the Alps. Most of the farmers raise cattle and produce milk. High nature value areas are present. The forests are expanding as a result of declining agriculture.

##### **Workshop Grenoble**

The workshop was held in the Western part of the Alps, in France. However, the resulting map of drivers – effects (Figure 4) can probably be considered representative for the Eastern Alps as well. A central driver for landscape change is agriculture. Agriculture has – according to a number of stakeholders – oftentimes a negative impact on the landscape, both directly as well as indirectly, through regional planning. At the same time it has positive effects where important farming systems such as species rich hay-meadows on steep slopes are maintained.

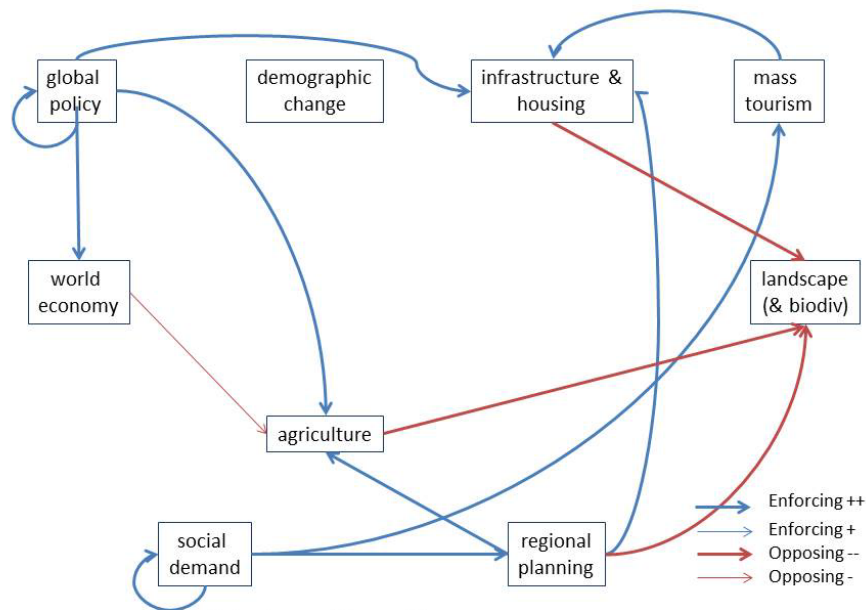


Figure 4 Fuzzy cognitive map (simplified) of policy effects on land use in Grenoble (France / Western Alps)

Agriculture is mostly affected by regional planning and global policies, but many more factors affect farming: social demand, climate change, the world economy, eco-tourism, demographic change. Also infrastructure and housing have a lot of impact on the landscape: it was said to be a result of global policies (in particular infrastructure, roads being built through the Alps, etc.), but also from social demands, which result in mass tourism and causes urban sprawl in the countryside. Also regional planning has much impact on infrastructure development.

Important drivers in this region are in particular global policy, social demand, agriculture, infrastructure & housing, mass tourism and regional planning.

### 3.5 Processes of change in the Atlantic region

#### Case study background

##### Roskilde case

The main land use in the Roskilde (Denmark) case study area is agriculture, predominantly crop farming (61%), but also housing and settlements put a large claim on the land (25%). There is a strong urban pressure on this area from nearby Copenhagen (35 km distance), which leads to conversion of land and farms into non-agricultural purposes (Kristensen et al., 2012).

The analysis of land use change during 20 years shows a small decrease in cropland. Cropland has decreased as a result of expansion of settlements, but also gravel excavation and afforestation (recreational forests). As a result there is a slight increase in total forest cover, and a decrease in grassland. The decrease of grassland is related to the reduction in livestock numbers and dairy cattle over the past 50 years. Farms were converted to hobby farms and part time farms. An opposite trend however is 'horsification', the demand for grazing land and stables for saddle horses, as well as the agri-environmental schemes for grassland management. The agri-environmental schemes not only enhanced the introduction of permanent grasslands, but also wetlands have increased.

Overall land cover change is some 5%, whereas 95% remained stable in the period from 1990-2011. It is mostly urban expansion, or expansion of built-up areas, which occurs in particular around Roskilde city, and seems to



decrease with the distance from town. Also cropland increases in this area, whereas conversion of land into forest takes place in the areas at some distance from Roskilde.

### Heerde Case

Also Heerde municipality (the Netherlands) is located in the Atlantic Region. West of Heerde is the largest forest area of the Netherlands, the Veluwe. Tourism and forestry are the main functions of this zone. Key developments in the region are an increasing pressure from urbanites and tourism on the traditional land use lay-out. Like elsewhere in the Netherlands, the municipality has been subject to processes of rationalisation and intensification of agriculture during the 20<sup>th</sup> century, resulting in disappearance of hedgerows and shrubs, land consolidation of traditional fine-meshed agricultural parcels, up-scaling of farm activities and reclamation of floodplains. Partly this intensification is still in progress as the number of farms has decreased. The average farm size has increased as fewer farms are now cultivating an agricultural area that has decreased only slightly.

The Land cover maps from 1996-2008 show a decline in grassland, and a slight increase in cropland. Otherwise there is limited change in land use: this is probably due to the shorter time frame. Even for a long period from 1900 until 1990 relatively small changes are observed: the productive area decreased by only 2%, mostly a decline of cropland with a small increase in grassland, which shows that most land was already cultivated at the beginning of the last century. The non-productive areas increased, mostly heathland that was converted into forest (for mining industry) at the beginning of the 20th century, and an increase in housing and other infrastructure.

Some 9% of change occurred between 1995 and 2004, 91% was stable. Changes occur mainly outside the Natura2000 area, in particular around the settlements and along the road. Changes are very diverse, but mostly towards grassland or cropland. Expansion of built-up area is not so apparent.

### Workshop Roskilde

A strong driver in the system seems 'Globalisation – Economy', that works mostly direct through Agricultural practices on the landscape (Figure 5). Also the agro-industrial system, mentioned only in this workshop interestingly enough), is influenced by the globalisation, and has direct impact through agricultural practices. Global/EU policies have a strong impact on national policies, which in their turn have much impact on Transport infrastructure and landscape. Global/EU policies have a strong impact on national policies, which in their turn have much impact on Transport infrastructure and landscape.

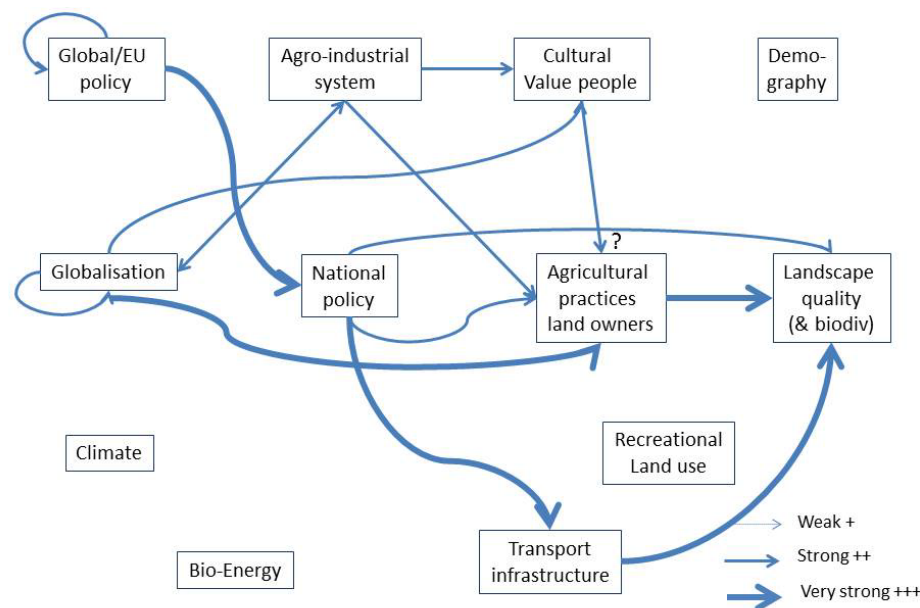


Figure 5 Fuzzy cognitive map (simplified) of policy effects on land use in Roskilde (Denmark, Atlantic Region)

Overall, this stakeholder consultation shows that the national policy is linked with all other drivers and can be considered a strong driver – and shows that governance is an important aspect in this region. The main drivers work mostly through farming practices and (the impact of) transport infrastructure.

If we then consider the FCM, and eliminate other drivers, we come to the scheme as presented in Figure 5. This shows that drivers as demography, recreation, climate and energy overall have limited impact. Farming practices are mostly influenced by globalisation, and to a lesser extent the cultural values of people, agro-industrial system and national policy. EU-policies work through national policies on transport infrastructure.

In comparison with the other workshops, we can observe some important differences: the agro-industrial system was not mentioned in the Alps, or Eastern Europe and is probably indeed an influential driver especially in Western Europe. Further, a main impact on the landscape was farming, through Globalization and international policies, next to transport infrastructure. The national policy and agricultural practices stand central in the whole concept of landscape quality in Denmark.

### 3.6 Processes of change in the Mediterranean region

#### Case study background

##### *Lesvos case*

The study area lies on Lesvos island, around Mytilini city. Most of the area is farmland, of which most (some 50%) is olive groves. Olive growing has a long tradition on the island, and dates back for centuries (Kizos and Koulouri, 2006; Petanidou et al., 2008) In addition there is pine forest. Mainstay for the people is olive oil production, which is partly for the market, partly for own consumption. Tourism has been gradually increasing, it is mostly small-scale tourism, dispersed over the island with development of holiday houses.

Most important change in land use between 1981 and 2004 is the gradual decrease in olive groves and an increase in build-up area. The decrease in olive groves is a process since 1960, however, as Kizos and Koulouri (2006) show olives were typically a crop which changed the diverse farming system in a monoculture one century ago from the 19<sup>th</sup> century and onwards (see Kizos and Koulouri, 2006:334). It is a result of the low prices for olive oil on the international market, which makes olive growing unattractive for economic reasons. Even if there are niches such as organic products (and demands/ opportunities in waste management), local players are not able to exploit them, as they sell in bulk and therefore are unable to fully valorise their product (with some small scale exceptions). Also, the growing of olives is labour intensive, and with an aging population (and a mountainous or semi-mountainous terrain with a lot of non-accessible-by-car areas) this is more and more difficult. This results in people that resettle in villages or cities, abandoning their olive groves. In some areas people choose alternative crops.

In Lesvos landscape change as a result of EU policy is slow. Policies also may aim to preserve the landscape, including some subsidies on olive production. EU policy has mostly impact on the landscape through rural development programs involving agro-tourism and other types of alternative tourism, road building, and development of infrastructures (e.g. Leader, Rural Integrated Programs). In addition, some good practices that contribute to a sustainable development and promotion of local landscape were the network of walking routes, the restoration of industrial buildings and performance of new uses (mills, grinders), the creation/modernization of arts and craft, the reformation of Petrified Geopark forest of Sigri, the regeneration of central squares, etc. Such EU policies have direct or indirect strong impact on landscape (Pavlis, pers. com). However, implementation mechanisms of such policies tend to use single measures to achieve multiple tasks/goals and good economic performance in the absorption of EU budget. Consequently, there is a lack of strategic/ landscape planning, at the local level; lack of expert personnel at the local and national level; lack of knowledge and training/ tutoring at management level; rampant clientelism; inadequate personnel training in

rural issues; inadequate public information campaigns; inadequacy of controls/ examinations by the Ministry of Agriculture inadequacy of local control mechanisms, etc (Chatzitheodoridis, et al, 2006, Pavlis, 2012).

Land abandonment goes with urban expansion (new house development, state and government infrastructure and private business investments) the urban area has doubled since 1960. The urbanisation process was strongest from 1960 to 1980. However, there was also expansion of wholesale shops and industrial production, which increases the build-up area (T.S. Terkenli, pers. com). There has been a small increase of forest land, mainly because of the cultivation or abandonment of olive groves as a result of subsidies for reforestation (I wouldn't say so) . Forest areas have increased, but part of the forest was destroyed as a result of forest fires after 2004 (reforestation of those destructed areas is low). Another issue that might lead to some landscape change in the future is that after 2011 there is an increase demand for firewood. In addition, there are small changes in maquis/ brush/ shrubs, a decrease of crops between 1960-1990 (due to the expansion of olive groves) followed by a small increase after 1990 possibly due to the rise of hobby farming in Lesvos (for self-sustainability reasons), but also as an alternative crop cultivation for full-time farmers.

What is a bit surprising considering the long time period, is that use change is limited: some 3% is changed, which means that 97% was stable in the period from 1981 to 2004. Most change occurs on the Eastern part of the mountain range, along the main axis of development (the main road from the airport towards Mytilini, and further north. Most striking change is the expansion of build-up area. This happens mostly in a concentrated pattern, often adjoining existing town and villages. To a limited expansion of forest took place.

### ***Portofino case***

Portofino Regional Park is located in the Mediterranean north region, a peninsula, and iconic Mediterranean landscape on the Italian Riviera. On the east slopes small scale terraced agriculture has transformed in gardens for semi-residential housing, at the foot slopes culminating in the famous picturesque small natural harbour of Portofino. Since the peninsula was declared a nature reserve in the 1930s, it was protected to a considerable extent from mass tourist exploitation. However, the current Regional Park of the Monte di Portofino is subject to strong pressures of tourism and urban areas, and is at risk of substantial loss of its traditional values of outstanding natural beauty and cultural heritage.

If we compare the totals for land use from the year 1974 to 2000, we observe a decrease of agricultural land, and an increase in abandoned land, which doubled, and a slight increase in built-up areas. Although many processes are similar to Lesvos, Portofino has encountered a much stronger decline of farming, which is beyond marginalization now (Pedroli et al., 2013).

More than half of the territory of Portofino changed. A large proportion of change has to do with the change from e.g. shrubland towards forest, but the large territory that changed was 'open', grassland in 1974, and is now mostly covered. North of Portofino regional park olive yards have expanded much as well.

### **Workshop Lesvos**

Based on the FCM workshop on Lesvos, the following conclusions can be drawn regarding the major land use change processes (Figure 6):

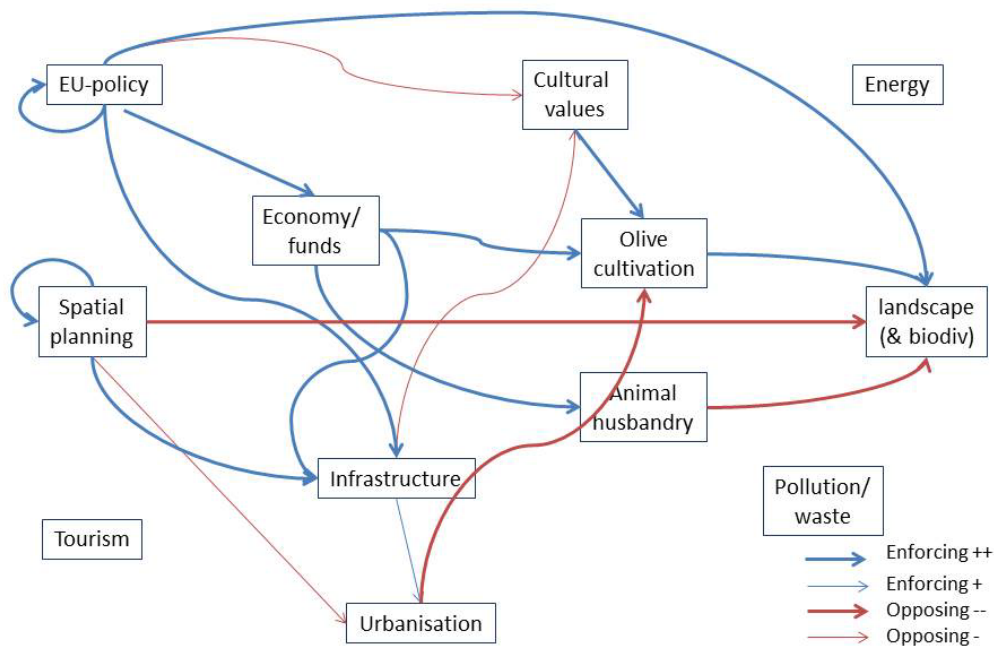


Figure 6 Fuzzy cognitive map (simplified) of policy effects on land use on Lesvos (Greece / Mediterranean region)

- The main land use which is changing (and changes therefore landscape and biodiversity) are the olive groves and animal husbandry. These are not directly in the scheme now, but the EU policies and funding operates through these drivers on the landscape. Therefore these land use drivers were added.
- Climate change was only mentioned in connection with wildfires. We considered that this mainly operates as a result of animal husbandry (may also be due to land-grabbers, because you cannot build in forestland). This driver was therefore not included in the final scheme.
- Finally, (lack of-) spatial planning covered many different aspects, but we combined this as one overriding aspect which relates to (ineffective) planning.

In this case, we see that EU policy and (lack of) spatial planning are main drivers, affecting directly and indirectly the landscape. In particular farming is most important in shaping the landscape. Other drivers have impact, but only insofar they influence farming. Drivers like tourism, pollution, energy exist as well, but their impact is much less than farming.

## 4 Habitat Directive and CAP as policies influencing land use

### 4.1 Transposition and implementation of Habitat Directive and Common Agricultural Policy

VOLANTE deliverable D2.2 (Frederiksen and Vesterager, 2013) provides an overview and comparative analysis of the transposition and implementation of the two European policies selected: the Habitats Directive (HD) and the agri-environmental schemes (AES) under the second pillar of the common agricultural policy (CAP), and the role that institutions play in these processes. It is based on the country reports from the case study countries (Netherlands (NL), Greece (GR), Romania (RO), Austria (AT) and Denmark (DK)) (Frederiksen et al., in prep.).

Both policies have been characterised according to a framework based on the type of policy intervention in question (regulatory, economic, advisory,) and addressed area of intervention (governance structure) in order to approach the subject of the policy (hierarchy, market, self-organised) (Theesfeld et al., 2010). This is supplemented by indicators of institutional fit, according to a typology defining three 'Europeanisation mechanisms' (Knill and Lehmkuhl, 2002), that may be used or may define the level of change in domestic regulatory styles and structures required by regulations and directives that are implemented in member states:

- institutional compliance (requires changes of domestic institutional arrangements in order to assure the correct institutions are in place in order to implement the policy/legislation)
- changing domestic opportunity structures, (requires changes in existing domestic institutions that would otherwise be in contrast to the implementation of new regulation, however no specific and mandatory institutions are defined in order to implement the legislation, but certain options may be excluded from policy choices)
- framing domestic beliefs and expectations (no specific demands required in order to implement the legislation)

### 4.2 Worlds of Compliance

Second, the EU policy transposition styles in each case study country are characterised according to a typology of compliance cultures in Member States in the EU (Falkner et al., 2007; Falkner and Treib, 2008). The following "worlds of compliance" are represented in the typology:

- Worlds of law observance: the compliance goal typically overrides domestic concerns; transposition happens in due time and transposed policies are correct and complete.
- Worlds of domestic policies: EU law observance is one priority amongst many. Transposition depends on potential conflicts with national goals – if no conflict, transposition is smooth.
- Worlds of transposition neglect: compliance is not a goal in itself. Without supranational powerful action, transposition obligations are not recognised.
- Worlds of dead letter: systematic contestation at transposition stage but timely transposition, and non-compliance in application and enforcement.

The Habitats Directive is a regulatory type of intervention, laying down mandatory regulatory instruments for the conservation of the European nature, through area designations and requirements to protections against deterioration as well as pro-active conservation. It works through the domestic administrative structures, but leaves the lay-out of the management structure to the national discretion. The implementation mostly intervene at market mechanisms by putting restrictions to land use: preventing certain projects and activities to take place in or near protected areas. Instruments to pro-actively protect or restore habitat quality are also partly market based, but often found in other policy programs, such as compensation to land owners, who are participating to fulfil the directive, through the agri-environmental measures in the Rural Development

Program under CAP. However, restoration projects that do not intervene on the markets also take place, funded by LIFE or nationally financed restoration projects. It is characterised as a policy that requires 'institutional compliance' in the member states, in order to be implemented.

The concept of the Agri-environmental Schemes is defined as an economic type of intervention, which intervenes at markets by offering the farmer economic compensation on a voluntary basis. Well-functioning advisory services may facilitate uptakes and understanding of the best possible implementation of the required agricultural practices on the agreement areas. The policy is characterised as a policy of 'changing domestic opportunity structures', since it offers an alternative to the price support of agricultural products. A more vague interpretation of the policy would characterise it as 'framing domestic beliefs and expectations', since it does not interfere with how schemes are implemented, and there are no predefined subjects that need to be covered by the schemes. This however depends on the case country in question.

### **4.3 Policy characterisation**

Following a classification according to the 'worlds of compliances', it turns out that the identified worlds of compliances are not the same for the two policies in the case study countries, while there are still some similarities to the Falkner categorisation. The characterisation per country probably depends on whether the implemented policy is regulatory or compensatory, and whether the policy implies national strict requirement for a mandatory institutional style or the policy barely demands changes of domestic institutions/ constitutes a framing of domestic beliefs and expectations.

The characteristic reveals cases of countries that follow a specific set of rules relatively strictly, whereas others oppose a strict set of rules or fit them to domestic policies. The same countries that comply with a set of rules very strictly, however acts less compliant when the frame is defined less strictly, and the countries that apply a domestic policy approach to specific institutional rules manages to comply well to the broader formulated policy.

## 5 Policy Recommendations – a first reflection

### 5.1 Introduction

Many EU policies have an impact on land use and landscapes in a range of direct and indirect ways. Obvious examples are policies on agricultural development, in which price subsidies have historically interacted with market forces causing structural development including increasing farm sizes and homogenisation of land use. Especially environmental policies have indirect effects on land use change, since e.g. EU quality criteria for water bodies and nature will affect the national policies on land use, and the way EU subsidies from e.g. the Rural Development Programme are used.

We analysed the implementation of the Habitats Directive over the past 20 years, and the implementation of the Common Agricultural Policy with particular focus on the agri-environmental policies under the Rural Development Programme over the past 20-25 years. Based on this analysis the VOLANTE project has however confirmed that compliance patterns observed for other EU policies can also to a considerable extent be recognised in the implementation of the Habitats Directive. Also, national governance frameworks and the willingness and ability to adapt these to changing supra-national policies vary across the investigated member states. As for the analysis of the Common Agricultural Policy, and of Agri-environmental Schemes, the project shows that there are several trajectories and development potentials based on the existing policy legacy. This legacy is incorporated in various ways during policy development over time, both when it comes to flexibility in policy content, and to national institutional structures of implementation and policy decision (Frederiksen et al., in prep.).

With the methodologies combined here (assessing governance structures and implementation, the processes of change as well as the drivers of change) the picture emerges that policies, although with intrinsic similar qualities, result in different outcomes. The workshops showed different drivers and different development trajectories, but, most importantly, also that the role of regional or national planning was more or less effective in response to e.g. global drivers. The outcome is different in different regions in Europe, which is partly related to environmental factors, but partly also to the above mentioned governance cultures (Van der Sluis et al., in prep.).

Institutional issues are important aspects to address, if real policy outcomes are to be expected (Frederiksen et al., in prep.). It is apparent that policy integration following the Cardiff process needs further attention, as issues like nature conservation, water quality, climate mitigation and adaptation, as well as agricultural and forestry development need to be addressed in common, in order to ensure cost-efficient solutions to the land systems development.

### 5.2 Issues identified

As “policy recommendations” the following sensitive issues for policy development related to land use change, extrapolated and interpreted from the processes studied, can already be highlighted:

1. *European level procedural issues for selection of policy options*
  - a. Develop further and use methods for ex-ante assessment of institutional compatibility to implementation of policy options
2. *European level policy issues, to be addressed in relation to different policy options*
  - a. Characterise the various policy options in terms of implementation mechanisms to be used.
  - b. Consider the specific challenges – substantial as well as institutional ones – that different (types of) member states or regions may have for the implementation of a given policy option.
  - c. Consider whether the institutional framework selected becomes an obstacle to changes in a well-established policy in the words of Knill and Lehmkuhl (p. 255) “We argue that it is the particular type of Europeanisation mechanism involved rather than the policy area itself that is the most

*important factor to be considered when investigating the domestic impact of varying European policies.” (Knill and Lehmkuhl, 2002)*

- d. Consider how existing experiences from other policies and implementation in different types of countries may serve as good examples (i.e. contributing to successful implementation and outcomes), but be aware that there may be unobserved obstacles, when instruments and institutions are combined in a new country.
- e. An option in certain cases is to use a test policy in order to reveal whether existing institutions are capable for implementation of a successful policy.
- f. Consider the policies to which integration will need to be ensured and include this in the policy design.

### 3. *Preparation of policy implementation*

- a. Convert the policy to well defined institutional measures in order to assure that the right structures are present or can be established in each country, or make the country assure that another alternative in the present institutional structure is present.
- b. Consider whether instruments based on a ‘on size fits all’ approach are feasible.
- c. Environmental factors and different policy cultures require often different approaches in policy implementation and governance structures to come to effective policies.
- d. Map out the implementation phases and specific institutional challenges for these phases.
- e. Consider the funding mechanisms and whether they are adequate for the implementation levels.
- f. Ensure that funding mechanisms and expectations to effort (measures as well as administrative effort) are aligned.
- g. Consider the need for training tools for multi-level and multi-stakeholder implementation.
- h. Develop supporting definitions and guidelines for different steps in the implementation, before deadlines are reached or overrun, to reduce juridical complications and interventions.
- i. Assure that sufficient expertise and qualified personnel is available at relevant levels, or that supporting structures, such as financial support, training material, guidelines etc. are made available.
- j. Assure that the right trajectory and organisational structure is chosen (e.g. agricultural vs. environmental administrations or neutral organisations).

### 4. *Monitoring and evaluation*

- a. Monitor landscape changes to assess the effectiveness of policies in the countries, at a local or regional scale. The studies should go beyond the levels of expenditures made: the crucial information is what the effect is at a regional scale of a policy in terms of governance, social, environmental and landscape impacts.
- b. Studies should go beyond the easily measurable effects of land cover and land use impacts.
- c. Quality of the environment should be an intrinsic part of the evaluation process. As workshops and surveys revealed, citizens and experts alike value the landscape change from this perspective.

In the further course of the VOLANTE project these recommendations will still be refined and extended on the basis of stakeholder experiences and analysis of land use transition processes in other Work Packages, so as to optimally inform the VOLANTE Roadmapping Process.



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