





Forms for  
Adapting to Climate change  
through Territorial  
Strategies

The handbook



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All these organisations have contributed to our project and we hope that this book is a proper reflection of it. Moreover, we hope that the good practices and knowledge presented here, will reach a wide circle of professionals, policy makers and researchers across Europe. Enjoy reading it!

**José Manuel Silva Rodríguez**

Director General of Agriculture and Rural Development of the European Commission

CLIMATE CHANGE confronts us with many challenges and uncertainties. Agricultural production is influenced due to the dependency that the sector has on climate and the environment. In turn, agricultural activities greatly influence the production of many ecosystem services which are important for social welfare and the economy. Apart from the gradual process of a changing climate, the increased frequency of extreme weather conditions puts stress on vulnerable areas. It may lead to increased flooding, a higher occurrence of wild fires and damage to valuable nature reserves. The impact and complexity of these developments are not to be underestimated.

The new Common Agricultural Policy aims to take into account all these issues and to develop agriculture in balance with ecologic functions, making the sector greener and rural areas as a whole economically viable. A new territorial approach is being introduced, aimed at fostering economic diversification thereby making rural areas more sustainable. The new policies are intended to make areas more resilient to future changes and uncertainties. One of the CAP main strategies for achieving this target is to encourage research and development and to achieve innovation. The F:ACTS! project contributed to generating knowledge on how to develop territorial strategies to adapt to climate change, facilitating the interchange of experience and information among its 14 partners across 8 countries.

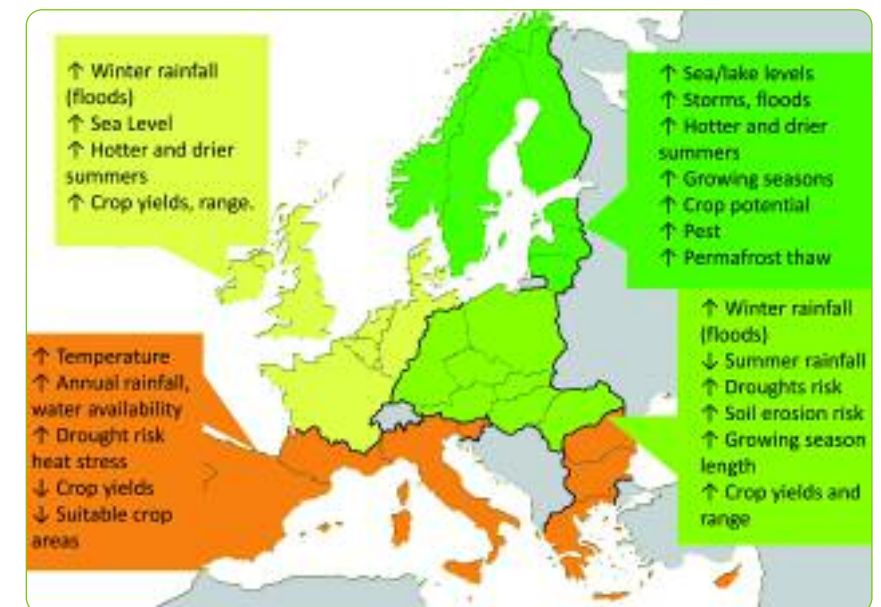
Integrated territorial strategies incorporate local diversity since they enable the adaptation of general and sector policies to territorial particularities. Climate Change Adaptation highly benefits from understanding the multiple, dynamic and complex relations between people and land. Proper analysis of land structures is an important issue since its understanding will facilitate proper application of general policies towards particular rural and peri-urban areas. The rich toolbox that constitute Integrated Territorial Approaches provide enormous potential to increase area resilience, enhance cooperation and implement European, regional and local policies. The information provided in this book can help to create a solid framework based on a better knowledge of the territory, its stakeholders and the governance requirements. I hope that the outcome will be inspiration for all who believe in cooperation to achieve economically vital areas in Europe. ■

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# 1. introduction

Dealing with climate change is not only a matter of mitigation. This idea has been growing during last few years at the EU level, although adaptation approaches to climate change have only recently begun. It was only in June 2007 that the European Commission established a formal starting point for the definition of a climate change adaptation strategy at EU level, with the elaboration of the Green Paper<sup>1</sup>. This was later followed by the publication in 2009 of the EU White Paper<sup>2</sup>. Both documents recognise that adaptation efforts need to be stepped up at all levels and in all sectors and coordinated across the EU, given that climate change transcends the boundaries of individual countries. Furthermore, they state that the experience and expertise in designing effective adaptation strategies and implementing policies is still very limited and that information-sharing about adaptive response measures could greatly reduce learning costs across member states, regions, municipalities and communities. That's the main purpose and commitment of F:ACTSI!, an INTERREG IVC project, which exemplifies this collaborative approach.

Projected climate change impacts for 2080 in different EU regions (EU Agriculture & RD Commission, 2009. Adapting to climate change: the challenge for European agriculture and rural areas)



Due to its cross-sectoral approach, spatial planning has already been identified as a suitable tool for defining cost-effective adaptation measures. As a result, certain land use requirements and how they evolve have been taken into account in order to raise awareness amongst the public, decision makers and professionals alike and to trigger a more proactive approach at all levels.



Meeting during a coaching visit of the Land Laboratory of the University of Santiago de Compostela the the Galician Regional Ministry of Rural and Sea Affairs.

“EU support for implementation could be provided to regions for exchanging good practices and case studies.” (EU White Paper, 2009).

This is what F:ACTS! is all about – aiming to promote climate change adaptation through an Integrated Territorial Strategies approach. In simple terms, creating a flexible tool box which enables multi-sector, coordinated re-organisation of the spatial pattern of a certain area in order to increase its resilience to the effects of climate change.

### 1.1 What are Integrated Territorial Strategies?

**Integrated Territorial Strategies (ITS)** (in a F:ACTS! context) are the pro-active implementation-oriented packages of interventions which aim to make room for new land use functions, rearrange land ownership and use and convert areas into new ways of functioning. Integrated territorial strategies look to achieve the well-balanced development of a determined geographical area by coordinating sectoral actions, public and private partnerships and levels of administration in order to attain an efficient use of local natural resources and, ultimately, pursue sustainable development based on a settled territorial model.

ITS tackle complex, area-specific problems and challenges where general and sectoral policies have failed. A multi-objective scope is used to attain an efficient use of local natural resources and, ultimately, pursues sustainable development based on the specific characteristics and needs of a region. Coordination, co-production and networking between all relevant stakeholders is therefore essential. This can be achieved by establishing a general framework of coordination between governmental institutions and stakeholders or through the creation of a



The three pillars

development objectives. In this sense, integrated territorial development explicitly takes into account the duality of territory as simultaneously characterised by its resources, functions and uses and framed by land property structures and relationships. This could be summarised by the existing dichotomy between land owners vs. land users and land plots vs. territory.

Accordingly, Integrated Territorial Strategies should be based on three pillars; the approach to the area, stakeholder involvement and governance. These three pillars correspond to three horizontal principles which need to be taken into account:

- **The economic viability** of the actions/investment proposed and functions and uses of the territory must be considered in order to be sustainable.
- **Stakeholder involvement** is needed for designing effective territorial approaches, especially when talking about climate change adaptation. Local stakeholders and population have to be heard since they have good knowledge about the territory and they also directly suffer the effects of climate change if no measures are taken.
- Efficient **governance** arrangements are needed to facilitate the implementation of territorial development approaches and anchor the subsequent solutions well within land use planning framework.

These principles should be followed to create a solid framework for implementing integrated territorial strategies. Moreover, the following territorial or

vertical principles should be considered in order to adopt durable integrated actions which make the territory more resilient to change:

- The integrated approach implies looking at the territory from a multi-sectoral approach and taking into account all the functions a territory can offer (multifunctionality).
- The future needs to be taken into account when developing the strategy. Certain questions should be asked, like whether the owner and land use will be the same in the future, or whether they might have different interests or needs.
- A strategy for a specific territory should limit itself and be adjusted according to the problems detected and not solely be defined by the administrative divisions or capabilities of the public administrations involved. The strategy has to include the measures, tools and coordination mechanisms needed for the development of each specific area.

Integrated territorial strategies allows governments and stakeholders to work together more efficiently since sharing a common vision can create synergies and is better assimilated by stakeholders.

## 1.2 Handbook Contents

These concepts will be further developed in the following pages, which will present knowledge gathered during the F:ACTS! project and explain how to set up Integrated Territorial Strategies to implement territorial adaptation and mitigation actions. To this end, the next chapter presents an overview of the project, introducing the main F:ACTS! messages and pilot actions which put them into practice. Following on, chapter 3 will present both strategic and operational knowledge detailing how to properly design and implement Integrated Territorial Strategies. This chapter has a practical orientation and is structured according to the three pillars upon which Integrated Territorial Design, is built: the combination of a good understanding of the territory, the engagement of people and the right governance structure and process. After that, a collection of fascinating examples identified in partner regions are gathered in chapter 4. Finally, chapter 5 briefly presents the F:ACTS! partnership, a network composed of 14 organizations from eight regions all over Europe - a big family committed to continuously updating, improving and applying the Integrated Territorial Strategies approach for the enhanced sustainability of European rural and peri-urban areas.

## 2. F:ACTS! overview

It is undeniable that climate change brings about uncertainties concerning the possible effects of new weather conditions. These effects may entail the increased risk of floods, droughts or forest fires. But it may also provide opportunities such as the increase of productivity of certain crops in some areas or more favourable climatic conditions for tourism in others. Adaptation and mitigation actions try to reduce climate change uncertainties by increasing territorial resilience to changes.

F:ACTS! stands for Forms for: Adapting to Climate Change through Territorial Strategies! The project is part of an Inter-regional Cooperation Programme, INTERREG IVC, financed by the European Union's Regional Development Fund, which helps European regions work together to share experience and good practices and thus reduce learning costs. F:ACTS! aims to reduce the aforementioned knowledge gap on how to design and implement cross-scale and cross-sectoral territorial actions to deal with the uncertainties that climate change may bring.

F:ACTS! tackles this task using a joint learning process, engaging 14 partners in eight European regions. One of the results (in addition to the present handbook) is the preparation of eight regional Policy Issue Papers on how to adapt to climate change through territorial approaches, where all the experience gained is condensed and used to deal with the specificities of each partner region. There are many actions within the project aimed at sharing experience and putting theoretical knowledge into practice, such as joint thematic workshops, study visits and state of the art reviews aimed at delivering input to all regions. Partners also have the opportunity to take part in internships, to visit other partners and learn from their innovative on-the-job approaches. Finally five pilot actions directly prepare territorial plans and climate change adaptation strategies. The pilot actions serve as learning actions. Pilot managers invite other partners with specific knowledge, experience and skills to give direct advice in coaching sessions during the pilot visits.



## 2.1 Main messages

As mentioned previously, climate-proof area development is still at an early stage in the EU. As a result, knowledge regarding how to design and implement cross-scale and cross-sectoral territorial actions to deal with the uncertainties arising from climate change has yet to be developed. The F:ACTS! project aims to tackle this issue and reduce learning costs by sharing the experience of 14 partners from eight EU countries representing several European territorial realities. To this end, a series of actions were undertaken and best practices were studied and discussed. This resulted in 11 guidelines for developing climate-proof areas, grouped around three integrated territorial strategies pillars.

### I. Understanding and using the potential of the area

#### 1. Incorporate adaptation into a broader approach to make areas more resilient.

Started as a journey into understanding how Integrated Territorial Strategies can contribute to adapt regions to cope with the effects of climate change, the F:ACTS!-project found that a transition towards making areas resilient was needed to tackle a wide range of challenges, of which adaptation to climate change is one.

More resilient areas are able to adapt to changing weather conditions, but resilience also requires a more regional and sustainable energy supply, the capacity to react to a changing financial reality or a more efficient and sustainable use of local resources. Resilience requires a system approach of the area, in which relations between ecology, the economy and society are made visible, providing a base for more sustainable development. The core of this is understanding how different territorial variables interact with one another to produce territorial processes. It's the sustainability of those systems which defines the resilience of an area.

The incorporating of adaptation in the General Urban and Land Use Plan of the municipality of Varna is a good example of this approach (see box 2, p. 34).

#### 2. Analyse and make use of the ecosystems of the area.

Ecosystem services provide us not only with a wide variety of products (food, timber, etc...) and services (purification, pollination, climate regulation, recreation possibilities...), they are also crucial for dealing with the effects of climate change.

By providing enough space for ecosystems, natural processes can be used to adapt to changing weather conditions (see section 4.15, p. 90). Green-blue infrastructures connecting river valleys, open water and big nature areas as

well as small-scale structures in urban and rural areas can provide this space and temper the local effects of climate change like flooding, droughts or urban-heat islands. Moreover, according to their characteristics and location, forest or agricultural areas may have an important territorial function regarding resilience, apart from the traditional productive one. As in the case of grasslands, which act as a firewall in areas with a big proportion of forest or as a temporary water retention place. All these structures (and their inter-relationships) are also important for maintaining biodiversity, not only by providing healthy habitats, but also by giving species the opportunity to migrate with the changing climate to more suitable areas.

By taking ecosystem services as a starting point for area development, as in the De Wijers pilot area in Flanders, Belgium (see box 5, p. 38), the value of these services for ecology, as well as the economy and society becomes clearer.

#### 3. Identify and use the driving socio-economic forces and opportunities for economic viability.

Adaptation to climate change can often only be done effectively when the social and financial characteristics and developments of the area are taken into account. In Southern and Eastern Europe for example problems such as forest fires and insufficient local water management are often related to declining traditional economic functions in rural areas. The Monte do Carrio pilot project in Galicia, Spain, (see section 4.6, p. 79) shows that combining land banking with socio economic interventions could be a promising strategy for developing an economically viable land use which can play a vital role in the prevention of forest fires.

### II. Mobilising cooperation

#### 4. Create a sense of urgency.

Climate change has a wide range of effects on land use and therefore its ecological, social and economic impact can be substantial. At the same time, climate change remains an abstract concept to most stakeholders, making the seriousness of the problem often difficult to understand. As a result, lack of awareness can put less sustainable investments at risk.

To be successful, it is important to make colleagues from other departments and services as well as directors, entrepreneurs and residents, aware of the need for climate adaptation and the opportunities it can offer as early as possible, (see box 11, p. 48).

Lofty and positive ambitions, such as the province of Limburg in Flanders (Belgium) (see section 4.3, p. 75) aiming to become a climate-neutral province,

has the potential to mobilise many stakeholders and triggers the needed creativity to realise system innovations.

**5. Involve all stakeholders.** As climate change affects a lot of sectors, the early and well organised participation of all relevant stakeholders is necessary. Stakeholder analysis, the design and organisation of a participation process as well as working together towards a common strategy are important aspects of this. Proper stakeholder involvement renders benefits not only at the awareness raising level, it also greatly enhances the process of understanding the territory and crucially facilitates action, design and implementation as local actors are empowered from the beginning and networks are created. In all F:ACTS! pilot-projects, stakeholder involvement was a major feature. The examples of Vouga, in Portugal (see box 13, p. 50) and Strofylia, in Greece (see box 14, p. 51) illustrate the added value of this.

**6. Make stakeholders shareholders.** The challenge is not only to involve stakeholders, but also to work together on a shared vision and with joint responsibility in order to put this into practice. Adaptation can therefore be a trigger for creating new coalitions. By linking solutions to economic development, costs and benefits can be shared between relevant stakeholders in the area. By doing this, stakeholders become shareholders, providing a solid base for sustainable development. The identified good practices of The Ghent Canal Zone Landscape Fund (see box 17, p. 54) and My Valley in Trentino (see section 4.10, p. 84) can be seen as inspiring examples of this.

**7. Recognise the importance of education.** The students of today are the responsible decision makers of tomorrow. Education is therefore a key strategy in promoting climate-proof territorial development. Education is designed to stimulate creativity and people to become critical thinkers who can work closely together. Cooperation with universities and students in all the pilot projects demonstrated that they can bring about new and unexpected perspectives and results (see section 4.13, p. 88).

### III. Governance for integrated territorial strategies

**8. Create appropriate governance structures.** Integrated Territorial Strategies provide the opportunity for tackling problems on the right scale (water catchment, natural life cycles...) and offer a platform for participation and cooperation. They are able to connect policy goals with concrete measurements at a

grass-root level, taking into account current and future land use. Measures can be put into practice by using and combining a wide range of instruments like land-banking, land consolidation, rural development actions, agri-environmental schemes...

However, an integrated territorial approach requires a new type of governance where governments, business sectors, NGO's and citizens work together on a more regional, local and evenly matched level and have the power and legal framework to innovate and act locally.

Creating this new type of governance should be seen as a joint process involving stakeholders. Taking the time to get to know each other and exchange of objectives and different perspectives is therefore important, as well as looking for mutual interests and the best ways to cooperate together. This requires an open attitude from the existing structures, governments and organisations, and a willingness on their part to adapt their way of functioning to the needs of the area. In the De Wijers pilot this was demonstrated by the establishment of a cooperation structure of 17 public and private partners, with the shared ambition of working together on several challenges (including adaptation to climate change) in the area, (see box 19, p. 60).

**9. Make flexible long term plans based on a clear vision.** Climate adaptation forces us to look far into the future. This requires a clear vision with a long-term perspective. At the same time, the path to achieve this vision should be flexible in order to cope with unexpected (climate) events or incorporate new insights or solutions. The good practice employed in the Dutch Water Line shows how combining these two aspects can be done, (see box 20, p. 62).

Looking far ahead and being flexible requires creativity and thinking out-of-the-box. Therefore the planning process should allow for the use of innovative methods and techniques such as scenario building, which enables participants to come loose from everyday reality. Long-term spatial plans should incorporate the opportunity to react to different climate change developments.

**10. Combine different goals and budgets.** It pays to couple climate measures as much as possible with other policy objectives. Adding green spaces or water to a city can dampen the heat and increase the water storage capacity. Simultaneously, it will also contribute to the liveability of the city. The pursuit of multiple targets in an area simplifies the search for funding and increases support amongst both residents and decision makers.

Multifunctionality is the key-word for achieving this. Multifunctionality requires the joint approach and integration of the sectors involved as well as combining different private and public budgets in order to achieve a common vision. A well demonstrated approach is the development of the River Secchia Park in Italy (see section 4.9, p. 83). In Varna, combining the training of military cadets with a site survey of the natural rain water drainage system was a very practical example of joining different goals and simultaneously saving on an expensive external survey (see box 22, p. 68).

**11. Make climate change visible and actions measurable.** The F:ACTS! project findings demonstrate that not only the participation of stakeholders but also the acceptance of solutions can increase strongly when the measures taken are linked to already present problems (forest fire, flooding...) and developments (the need for recreation, nature development, creation of water storage...). Therefore it is vital to make climate change and the measures against it as concrete, visible and measurable as possible. As we see in the example of Douro region (Portugal), staying close to the actual world of the people involved (see box 23, p. 70) is paramount.

## 2.2 A summary of the five Pilots

One of the scheduled F:ACTS! actions for putting theoretical knowledge into practice, was the creation of five pilots dealing with upgrading territorial approaches in order to adapt to climate change. These pilots provided good research ground for applying the eleven guidelines mentioned earlier. Therefore, the implementation process in these pilots is considered a learning environment for the whole of F:ACTS! The pilots' goal was to deliver lessons within the framework of the three integrated territorial strategies pillars for all the partners. These function as an example of how to transform a technical climate adaptation approach into a people-centred one, how to improve multi sectoral and multi-level governance approaches and how to identify and create new concepts in an economically viable way. The pilots differ highly from each other, so that a wide range of experiences and innovations can be shared within the project.

Table 1:  
structures  
the pilots

Area	Area type	Main risk	Territorial issues	Level of 'climate ambition'
<b>O Carrio</b> (Pontevedra) Galicia	Low dynamic rural area	Droughts > forest fires > damage to property / loss of lives. Fostered by land abandonment.	Improved forest spatial structure and management, supported by reviving of agricultural production	Adaptation
<b>Strofyliia</b> (Achaia), Western Greece	High dynamic rural area	Droughts > loss of bio-diversity Droughts > forest fires > damage to property / loss of lives	Improved forest structure and management, new balance with touristic and agricultural development	Adaptation and mitigation
<b>De Wijers</b> (Limburg), Flanders	Rural/peri-urban area	Droughts > loss of bio-diversity Floods > loss of bio-diversity Floods > damage to property	Re-arrangement of water management, water retention areas, alternative fish production, ecological restoration, biomass production	Adaptation combined with mitigation in a CO <sub>2</sub> neutral regional development approach
<b>Baixo Vouga Lagunar</b> (Aveiro), Portugal	Low dynamic peri-urban area	Floods > loss of bio-diversity Increase sea level > salt intrusion > loss of bio-diversity	Re-orientation of land use, creating water retention and buffering upstream, ecological restoration, recreation development	Adaptation
<b>Varna</b> (Severoiztochen), Bulgaria	High dynamic peri-urban area	Droughts > lack of drinking water > health hazards Floods > ineffective waste water treatment > damage to coastal tourism Floods > interruption of daily (economic) life	Water retention and buffering with consequential benefits for coastal tourism and drinking water station	Adaptation

## Monte do Carrio (Pontevedra), Galicia, SPAIN

**Climate change problem |** The main natural risk Galicia faces are wild fires. The 2008 Galician Action Plan against Climate Change predicts wild fires are on the rise.

The warm, damp Galician climate favours biomass growth which along with land abandonment and poor management due to property and land fragmentation creates very favourable wild fire conditions. Furthermore, the scattered settlement distribution in Galicia increases the risk of wild fires reaching inhabited areas and producing casualties.

In addition, land and property fragmentation makes finding suitable land for well managed agriculture and forest production very difficult. Another shortcoming is that farming specialises in dairy and meat production, making the sector very vulnerable, especially as it is difficult for farmers to find enough land. In the case of forest production, extreme fragmentation makes proper management very difficult and since there is no tradition of joint property management, wood harvesting and forest plantation is not carried out with a proper plan. The lack of land use regulations during the last few decades has also contributed to the extensive and uniform plantation of easy burning tree species and growth of scrubland without proper management.

**Measures |** The overall goal was to develop a territorial strategy to increase resilience against wild fires. An important lesson learnt from forest fires is that it is not only a forest and foresters' issue. It is one of territorial development, affecting all rural and even urban territory, with an important focus on the prevention of land abandonment.

Traditionally, public administration actions to solve problems related to land management were based on the implementation of land consolidation projects and the promotion of the forest and agricultural areas, mainly through subsidies. However, a change has occurred in the development of land development policies and spatial planning. New instruments are being supported such as a land bank, (BANTEGAL), forest management units (see section 4.6, p. 79), wild fire protection and prevention plans and new types of land consolidation, as well as innovative ways of developing the territory in order to get a rational use of it, taking into account protection against wild fires.

**F:ACTS! exchange |** Lithuanian F:ACTS! experts were invited to participate in the O Carrio pilot project, due to their experience in the fragmentation of land use,

O Carrio, Galicia  
(Spain)



one of the main risk factors in forest fires. The Monte do Carrio pilot also strengthened cooperation between the Galician government and the Land Laboratory (LaboraTe) of the University of Santiago de Compostela, (USC).

The Galician forest fires experience was shared with Strofylia, Greece. The USC and Netherlands Government Service for Land and Water Management, (DLG) pooled their land use knowledge to a large group of countries participating in international networks like FARLAND and LANDNET, supported by the Food and Agriculture Organisation (FAO).

## Strofylia (Achaia), Western Greece

**Climate change problem |** Kotychi-Strofylia National Park comprises of three Natura 2000 sites, with a forest of 1570 ha and a Ramsar wetland area of great aesthetic and environmental value. It is at risk from forest fires, (750 acres burnt in 2008 and 1,000 acres in 2011.), mainly caused by reduced rainfall and the large availability of biomass. Nearby intensive agricultural and cattle-breeding practices involve burning agricultural residues thus creating risks and putting extra pressure on the environment. Farming production and practices result in the over-consumption, salinity and pollution of ground water and soil as well as ecosystem disturbance. The area suffers from illegal wood cutting and grazing, leading to deforestation and the loss of plant species, uncontrolled tourist activities, illegal hunting, waste dumping, etc. As such, the co-existence of biodiversity and economic activities is at risk.





One of the wetlands and the Black Mountains in Strofylia.

**Measures** | In 2002, the Kotich-Strofylia Nature Park Management Body was established to manage an area of 57.870 hectares, for the protection and conservation of the complex mosaic of wetland ecosystems, forest habitats, dunes, flora and fauna, as well as raising public awareness. Together with the corresponding forest department, a territorial strategy will be developed based on reducing forest fire risk through adequate land use management, regulating economic and recreation activities in the protected area and monitoring and elaborating the necessary plans to diminish risk. On a regional level, the local government, through agricultural and environmental initiatives (fire prevention plans, adoption and diffusion of environmental friendly practices, support of the rural economy, etc) contributes to the adjustment of the three pillar operational model (economy, society and environment) that reinforces the area's sustainable development.

**Use of F:ACTS! principles** | The pilot will be used as a case study so that well-established practices and methods applied by partners can meet the learning needs and vulnerabilities of the area and lead to an improved regional management and development model:

- Methods and tools for stakeholder involvement, (Flanders and Holland).

- The expertise of UNCEM (Italy) with the community based integrated approach of sustainable development (Oil Free Zone, Slow Food, Energy Book, Green Communities).

The tools and practices for territorial planning (multi-sectoral development plans, sketch match, multi-functional land use models) are applied by the USC, Van Hall Larenstein University and Regional Ministry for Rural Affairs in Galicia.

#### De Wijers, Flanders, Belgium

**Climate change problem** | The larger Demer catchment area faces increasing risks of flooding downstream, affecting the urban centres of Diest, Aarschot and the environment. Upstream, in the Wijers area, flooding also occurs, but on a smaller scale. Occasionally, this leads to the dumping of surplus waste water into surface water, leading to pollution of vulnerable (NATURA 2000 status) De Wijers pond systems. Longer dry periods cause problems upstream for the ecological quality of the De Wijers pond systems. Besides, this also leads to an increased wild fire risk in the heath areas that are part of the Natura 2000 location.

Aerial photograph of De Wijers



**Measures** | The complexity of the territorial issues creates the need to prepare an integrated area development programme. Meanwhile, the Province of Limburg has formulated the policy ambition of becoming a CO<sub>2</sub> neutral province by 2020. Area specific problems have thus been integrated into the higher level policy ambitions. A master plan has been established to create a territorial strategy for De Wijers against climate change which contributes to the regional policy ambition of making Limburg a CO<sub>2</sub> neutral province by 2020. The strategy deals with actual hazards related to climate change (i.e. flooding and drought) and combines adaptation and mitigation measures into an overall integrated framework.

**F:ACTS! exchange** | De Wijers invited the National Union of Mountain Municipalities, Communities and Authorities, UNCEM for their outstanding experience with sustainable energy. Also, as a consequence of F:ACTS!, cooperation between VLM and the province of Limburg was strengthened.

VLM and Limburg were invited for their experience and creativity with stakeholder involvement. During F:ACTS!, the CO<sub>2</sub> neutrality ambition of Limburg developed, a nice example of the joint process of creating urgency and setting an agenda.

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Baixo Vouga Lagunar, Aveiro, Portugal

**Climate change problem** | Baixo Vouga Lagunar is situated in the Vouga river delta. The unique (Natura 2000 status) bocage landscape of Baixo Vouga Lagunar is under pressure from the extension of the estuary under tidal influence, induced by the rising sea water level caused by climate change. The salt/fresh water line is moving further upstream and more frequent high water situations are causing an increase of flooding in the area in recent years. The direct result is that agricultural systems cannot be maintained if the area becomes saltier and more frequently flooded. The bocage landscape will disappear together with its unique natural values (flora and fauna).

**Measures** | The high pressure on land use (agriculture, nature, industrial, urban, etc.) in combination with the 'new' threat caused by climate change requires multi-level governance and a bottom-up integrated approach. Many ideas, plans, visions and opinions exist. However, they are not well supported or well embedded in an operational programme to deal with the problems. Coordinated action

Bocage landscape  
in Baixo Vouga  
Lagunar



is needed since it is necessary to involve many different stakeholders. New ideas and solutions for adapting land use to the changing conditions are also required, as well as new functions in order to make the area as a whole, stronger and sustainable. Nevertheless, there is no current general comprehensive or well-tuned strategy, in which actions in Baixo Vouga Lagunar are linked to its wider environment and in which mutually supporting activities between sectors are determined.

**F:ACTS! exchange** | Vouga took advantage of the VLM and Limburg expertise on stakeholder involvement and agenda setting and from the Dutch Government Service for Land and Water Management (DLG) regarding technical assistance on salt intrusion and strategic project management.

Vouga serves as an interesting example for other partners in terms of dealing with climate change in vulnerable wetland areas. Especially considering the challenge of combining spatial planning policies with operational programs from other sectors.

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Varna, Bulgaria

**Climate change problem** | In Varna, the main climate change risks are water related. The increase of heavy rainfall causes frequent floods in urban areas and

overflowing sewer systems which lead to sanitary problems in coastal bathing waters. On the other hand, more frequent dry periods also cause drinking water shortages, whilst public space is irrigated and washed using drinking water. Varna prepared a new land use and spatial plan of the city and its peri-urban environment to solve these issues, but the effects of climate change did not have a prominent place in this process.



**Measures** | As part of F:ACTS!, an additional climate adaptation territorial strategy has been developed to provide better peri-urban water management and to maintain good quality bathing water. Solving the problems derived from floods and water shortages requires a combination of land use (water retention in combination with other functions) and technological solutions at different scales (larger than the Varna municipality). The pilot project will make common interests clear for municipalities, responsible for urban land use planning and green management and the state, responsible for water management. Through this, it aims to open up the possibility of ambitious cooperative thinking on regional planning. The project will be an example of climate adaptive planning practice for a peri-urban area involving many stakeholders and different levels of authorities.

Area of the pilot project in Varna.

**F:ACTS! exchange** | Varna invited DLG and Almere to a joint sketch match, a communicative planning approach. During this workshop, planners worked together with different local and regional stakeholders to develop future scenarios for the whole of Lake Varna.

Varna has been an inspiration to other partners by connecting the strategic regional goal of being an internationally known resort area and city with local mitigation and adaptation measures to technical concrete gully management.

## 3. pillars for climate proof areas

Climate change (CC) is a major threat to sustainable development and as such, the need to adapt to its effects is now widely acknowledged. Including such a goal at plan level requires long-term planning. However, identifying concrete threats and how to adapt to them, remains far from clear. Uncertainty about the future, together with the need to plan long-term, calls for flexibility in tools/methods but also in solutions/outputs.

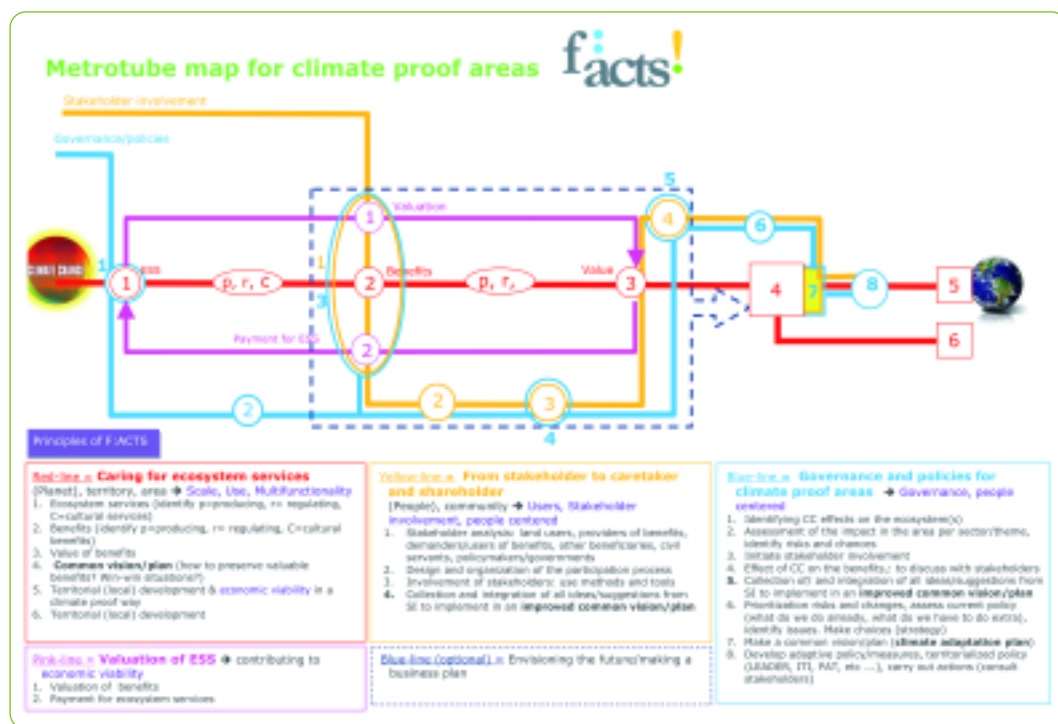
Although the need to integrate a “CC dimension” into all areas of policy-making has undoubtedly become more necessary and widespread, there are no pre-defined or acknowledged methodologies for doing so. CC is affecting Europe as a whole; but its impact varies according to regions, sectors and social groups. Therefore, decisions concerning CC adaptation bring with them choices and actions involving a broad range of sectors and affecting all levels of decision-making, from local to international levels.

Such aspects, together with the unequivocal relationship between CC effects and the characteristics in each territory, drive F:ACTS! partners to consider that **Integrated Territorial Strategies** (ITS) provide a very useful and suitable approach when dealing with CC adaptation. This is because they enable the combination and coordination of different measures that are, along with a tailor-made view, implemented at a local level to re-configure its physical and socio-economic resilience.

In recent years, it has become clearer that such approaches need to be people-oriented. While society is changing, a set of new conditions need to be considered: higher complexity (like adding the “CC dimension”, for instance), globalisation, governments acknowledging that regulation is necessary but not sufficient for the intended outcomes of public policies, citizens demanding participation in decision-making processes, decreasing available resources combined with an increasing amount of functions leading to the need for more efficiency and effectiveness, greater impact, etc.

The following sections will cover the paths that should be followed to create ITS. These paths correspond to the three pillars that ITS should be founded on, represented in the metro map in the next page.





The red line represents the process of ITS creation. The pink, yellow and blue lines represent respectively the processes of evaluating the territory, stakeholder involvement and governance, which are the three main pillars of the ITS approach. The stations are the steps that should be followed and the lines that arrive at them indicate the information that is provided in each step from each process (line).

The following sections will be divided according to the lines that represent the three pillars of ITS. In each section, the information will be structured according to the guidelines that should be considered. In section 3.3.2 (in page 63), the metro map will be analysed again in greater detail to demonstrate how all the processes are interlinked.

### 3.1 Understanding and using the potential of the area

Climate change brings about uncertainty regarding the possible effects of variations in precipitation, temperature and extreme climatic events. This uncertainty is even greater considering the complexity of the territorial processes which depend on many variables which interact amongst themselves. Therefore, the consequences of climate change may vary a lot and have favourable or adverse effects depending on the particular area. For example, an increase in temperatures may cause very hot summers in southern regions of Europe, whereas in northern regions, summers will be warmer. This will change the potential of each area for tourism and crop production, may change energy consumption rates and thus will produce either adverse or beneficial effects. The same will happen with rainfall; heavy rains in northern Europe will increase flood risks, whereas drier climatic conditions may increase droughts and wild fire risks in the Mediterranean basin.

Given the influence that territorial processes and structures have on the effects and potentialities of climate change, a special importance shall be given to these issues so as to understand them and plan territorial strategies that will help increase territorial resilience.

#### 3.1.1 Incorporate adaptation into a broader approach to make areas RESILIENT

The concept of resilience is very important, since it represents the capacity of a system to adapt to different circumstances. In terms of a territorial perspective, resilience must be seen as a continually changing process, in order to guarantee that the territory has capacity to adapt and transform itself in response to stress. In that sense, from a nature perspective, adaptation is a fundamental condition for ensuring the sustainability and resilience of ecosystems. Climate change is clearly related to this perspective, taking into account that changes are not merely temporary. The system is constantly evolving, perhaps even capable of reverting back to its initial context.

Within this approach, we can't expect to return to an initial state but instead permanently move towards a different state, integrate, and if possible, take advantage of changes. Being resilient and sustainable means having the capacity to adapt, and this capacity can be incorporated and enhanced by people.

A territorial intervention should contribute to increasing this resilience, since it is the only way of promoting adaptation in an uncertain and unpredictable con-



### BOX 1: TERRITORIAL CHARACTERISATION OF THE BAIXO VOUGA LAGUNAR AREA

In the case of Baixo Vouga Lagunar, the Portuguese pilot, the first step in implementing the Territorial Integration Strategy was the territorial characterisation of the area, including all the variables referred to above. To understand the territory, a physical analysis was made, along with a climate analysis and one containing recent data indicating potential climate changes. Research was also undertaken on soil characterisation, water resources, fauna, flora, landscape, land use, demography, social and cultural aspects. Lastly, a

detailed characterisation regarding agricultural activities and a survey on potentially relevant economic activities were carried out, which implied a mix of territorial variables. This analysis concludes that landscape depends on agricultural maintenance. This is particularly striking in reference to the rice fields, extremely important for feeding the birds (protected species). Another important aspect regarding this balance and inter-relationships is the strong dependency of agriculture on good quality soil and water availability. ■

text like climate change. Therefore, the first and fundamental step to achieve this target is to analyse the processes that take place in a territory so as to know how to influence them. This implies looking at the territory by using multiple perspectives, knowing their variables (table 1), realising the relationships between them and evaluating in what ways resilience depends on those variables and their relationships.

As can be seen in table 1, one group of variables affecting territorial processes are socio-economic ones. During the course of time, people have occupied

FUNDAMENTAL VARIABLES AFFECTING TERRITORY		
BIOPHYSICAL		SOCIO-ECONOMIC
NATURAL	ANTHROPOGENIC	
<ul style="list-style-type: none"> <li>■ Topography</li> <li>■ Climate</li> <li>■ Geology</li> <li>■ Geomorphology</li> <li>■ Soils</li> <li>■ Water</li> <li>■ Biologic resources</li> </ul>	<ul style="list-style-type: none"> <li>■ Land use</li> <li>■ Landscape</li> <li>■ Cultural recourses</li> <li>■ Heritage</li> <li>■ Physical quality of environment (water pollution, waste)</li> </ul>	<ul style="list-style-type: none"> <li>■ Demography</li> <li>■ Housing</li> <li>■ Services</li> <li>■ Economic activities</li> </ul>

Table 1: Types of territorial variables (extracted from: Partidário, R., 1999. *Introdução ao Ordenamento do Território*, Universidade Aberta, Lisboa).



Flock of bustards by Nuno Lecoq, (courtesy of Liga para a Proteção da Natureza).

territory to take advantage of its resources and thus used it as a basis to develop their socio-economic activities. This occupation is determined by the kind of use that is made of land. For these reasons a complete analysis of a territory not only needs to study the variables affecting it and the relationship between them, but the main land structures (property structures, parcel shape and size, hedges, pathways, drainage system, etc.), the production assets (how they are distributed and linked to territory), and the technology used to manage them. Furthermore, it is also important to pay attention to the different factors which contribute to balance the territory, such as population growth, economic development models, functioning markets (especially land markets and land mobility) knowledge and technology.

Territorial analysis requires a system approach (considering the territory as an eco-system) so as to understand the complex processes and how they determine the effects of climate change. At the time of analysing territory, the use of the concept of Ecosystem Services (ESS) based on system-thinking, where the focus is on cyclical rather than linear cause and effect, is important. Understanding the parts in relation to the whole and examining the links and interactions between the elements which compose the whole system provides the basis for two things: identifying potential in the area and relating functions to space/location. The idea that all goods and services ecosystems can contribute to society may be considered as a holistic and global framework which simultaneously enables thinking about the characteristics of the territory within two perspectives: a) human-organised areas with the focus on multifunctional land use and b) strong human pressure on ecosystems (through urbanisation, fragmentation, effects of CC, pollution, etc).

### BOX 2: INCORPORATING A CLIMATE CHANGE ADAPTATION STRATEGY INTO THE GENERAL VARNA SPATIAL AND LAND-USE PLAN

The municipal General Spatial and Land-Use Plans are amongst the most important local government documents in Bulgaria, outlining development trends of the municipal territories for a 20-25 year time-span. A GSLUP is usually based on the Municipal Development Plan which is the strategic basis for the development of all municipal sectors (economic, environmental, social, health, education, safety, etc.).

Improving the resilience of the municipal territory and adapting its functions to the negative impacts of climate change were two of the key goals in the Varna planning exercise. One aspect of improving of

the resilience of the municipal territory was the creation and preservation of wetlands in Varna lagoon, (see section 4.1, p. 73).

A good understanding of the territorial processes that ensured the ecosystem services that the wetlands provided was crucial for adopting adequate planning measures. Cooperation with the University of Varna and the Nikola Y. Vaptsarov Naval Academy (see box 22, p. 68) provided very valuable information on ecosystem functions and hydrological dynamics that contributed to understanding the territorial dynamics and considering them at the time of making decisions about the area. ■

### BOX 3: BALTIC CLIMATE TOOL KIT FOR STRATEGIC PLANNING

The Ministry of Agriculture for the Republic of Lithuania participated in the Baltic Sea Region Project “BalticClimate” between 2009 and 2011. The project was aimed at providing tools for climate change adaptation for policy makers, spatial planners and business people.

These tools were grouped in a kit for the region <http://toolkit.balticclimate.org/> which established the following recommendations for tackling climate change adaptation and mitigation through strategic planning:

Strategic planning plays an important part in opening up possibilities for the positive future development of the Baltic region, since it addresses future needs and thus creates a solution which may help avoid future conflicts.



To this end, strategic planning should motivate cooperation between different stakeholders, encouraged by recognising their motives and understanding the importance of their different perspectives. The actions taken should be integrated into existing policies, structures and processes with the potential for modifications when and if necessary. Finally, monitoring the developed strategy plays a crucial role since in many cases the strategic plans are not legally binding and can be implemented at many levels. ■

Whilst in order to plan a “climate proof” area and considering the ESS, different types of effects of CC can be identified as primary or secondary, according to the nature and size of the effects. This classification is important for designing a strategy to increase territorial resilience, since it will provide a different resource allocation and timeframe for action.

#### 3.1.2 Analyse and take care of AREA eco-system services

The territory, with all its various features, includes a broad range of ecosystems. All those ecosystems provide a large diversity of benefits for people, which are known as *ecosystem services*, frequently grouped into three main categories: *productive, regulatory, cultural and support services*. The first category includes goods that are obtained from ecosystems, such as food, fuel, drinking water, genetic resources. The second category includes the benefits obtained from the ecosystem regulatory processes, such as water filtration, storm protection, erosion control and carbon sequestration, etc. Finally, cultural services include the non-material benefits people can obtain from ecosystems, like recreation, beauty, aesthetical references, well being, cognitive development, etc...<sup>3</sup>

*Ecosystem services* production is determined by *Support services*. For example, in the pilot area of Varna (see section 4.1, p. 73) wetlands play an important role in erosion prevention, water quality, biodiversity, etc.,. Another example is that of Weerterbos (see section 4.15, p. 90) where the creation of a natural park in the upper part of a watershed helps maintain the water retention function of land and improve both natural values and recreational functions of the area. These examples demonstrate the close relationship between the production of ecosystem services and land-use which in addition are influenced by climatic conditions. Bearing this in mind, a useful exercise to further implement a territorial strategy is to identify the ecosystem services produced by the territory and the indispensable features for their maintenance, focusing on land uses and how climate change may affect their provision. It is important at this point to consider the possible opportunities and drawbacks so as to assess the possible risks and establish an integrated territorial strategy to increase the resilience of ecosystem service production. In this sense, a territorial integrated project must identify possible weather-related losses and gains, and consider how the impact of weather conditions can be favourably influenced.

Climate Change (CC) has different impacts on ecosystems. Such impacts vary according to the sector or topic we take into consideration: nature, agriculture, tourism and recreation, health, transport and logistics, infrastructure, etc... All

#### BOX 4: ANALYSIS OF ECOSYSTEM SERVICES IN KOTYCHI-STROFYLIA, WESTERN GREECE

During the first coaching visit in Greece for the Strofyliya National Park pilot area, invited experts from the Province of Limburg guided stakeholders through the Ecosystem Goods & Services (ESS) methodology. The vital knowledge extracted and its role as an essential tool for facilitating strategic nature protection and conservation planning was analysed in combination with growth and development in all economic and social sectors. Practice followed theory with a workshop identifying the pilot's ESS, during which the participating stakeholders studied the goods and services provided by the ecosystem in detail and recorded them. Identifying all the actors involved, along with their role and needs in the area, highlighted the benefits and helped estimate the future situation of these services along climate and anthropogenic parameters (decrease-increase-disappear).

The detailed analysis resulted in a long list of actors involved, directly benefited/affected and the interrelation between them became clearer and more distinctive. This ESS study indicated the main aspects that have to be taken into account when planning actions and strategies for this valuable and at the same time, vulnerable area of Strofyliya: It is a place which offers vital services to people

- The suppliers & demanders have to be involved in the area's protection and conservation strategy, as they are the ones who depend on or live from the benefits the ecosystem delivers. Unite them under common goals (maintaining & managing the area for sustainable development).
- The benefits & services found can be used for a "Willing to Pay" research and the formation of new financing mechanisms for the National Park's conservation,
- Benefits can be made more available (reopening the thermal springs infrastructure which has been abandoned), or be promoted in a sustainable way (always keeping a balance). The suppliers of these benefits can receive an additional income, leading to synergies and a more active involvement in maintaining the area,
- The suppliers can be involved by supporting and promoting their products and services (Strofyliya's local brand identity), gaining their interest in preserving the ecosystem and income from its presence.
- Regulate and prevent unsustainable use of resources that is above the ecological strength and capacity of the area.
- An accessibility plan for the National Park and the surroundings should be developed.
- The creation of a network with recreational pathways will add to the area's benefits and opportunities. ■



Umbrella pines  
in Strofyliya help to  
prevent erosion.

these impacts may lead to the degradation of ecosystems and the consequent decline of ecosystem services.

Besides, not all impacts of CC are negative. For instance, higher temperatures may lead to lower expenditure in pesticides to fight against particular plant diseases, thus lowering production costs. CC and its negative effects are widely known, but its potential positive impacts may be not so familiar to stakeholders. Therefore, when discussing the effects of CC, it is very important this point is made and that people have open minds in terms of looking for possible benefits.

This means an assessment of CC impacts is needed, so that we:

- Characterise current climate variability in the area including short-term (extreme weather events) and long-term events (trends in seasonal and annual variations). Sources of information include historical weather records, stakeholders' inputs and CC projections;
- Analyse key interactions within and between different sectors/topics present in the territory, taking in consideration the surrounding area as well. The comprehensive assessment of the totality of impacts is greater than the sum of the separate sectoral impacts.
- Determine which and how the relevant development sectors/topics are (or would likely to be) affected by the short and long-term CC effects.
- Identify risks and opportunities.

Therefore, when assessing the impact of CC in an area, one has to take in consideration the different sectors which are important and identify which are the most vulnerable and most resilient to such effects.

### BOX 5: DE WIJERS ECOSYSTEM SERVICES

A first and important step in the De Wijers project was to develop a common vision (master plan) for the area. This was done using an intensive participatory process, employing the concept of 'ecosystem services'. At first, all actual and potential cultural, production and regulation services in the area were identified, together with all the relevant stakeholders during a workshop. This sparked a greater awareness of and insight into the importance of the water system and the need for integrated water management in the area. Opportunities for restoring the relationship between the physical system and human activities were identified and in a following step, the social and economical relevance of these opportunities were determined. By doing this, the qualities of the landscape and the services they pro-

vide were taken as a starting point for the social and economical development of the area. It turned out that this approach stimulated stakeholders to think on a more regional level and in a more integrated and sustainable way about the area and their contribution to its development.

The principles that were set during this process are now put into practice in several projects within the Wijers. In 2012, an international design workshop for the land development project of the Stiemerbeek was organised. The developed vision of turning an artificial river bed, with a strongly disturbed relation to its valley, into an attractive green-blue infrastructure, with room for natural processes like water infiltration and purification, provides a strong base for concrete measures to be taken. ■

BEFORE



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This differentiation provides relevant information since the most vulnerable sectors/topics relate to bigger risks in the area and may need more urgent and/or significant intervention, whilst the most resilient ones may provide an opportunity to make the area more robust to CC effects. This means that when we identify and differentiate risks and opportunities, we also become able to prioritise interventions/actions for the strategy.

Also, when identifying opportunities in the area, it is necessary to bear in mind that local ecosystem services are surely the most resilient features in relation to effects of CC on that specific area. Therefore, they should be considered a most useful and relevant component for inclusion in the strategy.

#### 3.1.3 Identify and use driving socio-economic forces and opportunities for economic viability

As has been demonstrated, ecosystem service production is also influenced by land use and the socioeconomic activities that determine it. Normally, although ecosystem services are very valuable for the welfare of society, they are not taken into account in the cost and benefit balance of economic activities because they are very difficult to evaluate. This may provoke the loss of economic activities which are very beneficial for ecosystem service production because they are no longer affordable.

Considering ecosystem services value is very important when adopting climate change adaptation and mitigation strategies, as it is often vital to prove that it is more cost-effective to maintain and improve the functions of healthy ecosystems than to lose them. Maintaining nature and ecosystems along with socioeconomic activities which contribute to ecosystem service production, usually offers cost-effective solutions.

It is useful to know the cost of producing ecosystem services and their monetary value in order to analyse the economic viability of integrated territorial strategies and capture the hidden values of all actions and outcomes of ITS, thereby achieving an effective implementation. This will also help to create awareness among stakeholders and make them more receptive to participating in the decision-making processes for establishing climate change adaptation and mitigation strategies.

**What about conceiving the territory as a business, providing resources and ecosystem services?** A territory can be considered a generator of resources and environmental services. But what would happen if we analysed territory as if it were a business, providing goods and services?



### BOX 6: EVALUATING ECOSYSTEM SERVICES IN MONTE DO CARRIO, GALICIA, SPAIN

Traditional Galician agriculture was a subsistence family activity. Food production was based on an agro-forestry system where four hectares of forest land produced the necessary biomass to keep the fertility of one hectare of agricultural land. With the arrival of the green revolution and the industrialisation of agriculture, this system changed and the forest lost its initial function. As forest undergrowth was no longer used for pasture or to produce manure, biomass increased. The loss of value of

former activities and land uses which helped to control biomass combined with hotter and drier summers due to climate change, increased the risk of wild fires.

In Monte do Carrio, these problems are tackled by fostering activities that help control biomass such as promoting silvopastoralism activities and using biomass for energy production. In this way, biomass will again be a resource, (an ecosystem service), and not a problem. ■

*Ulex europaeus* shrubland in Monte do Carrio. This species has traditionally been used to enrich soils, for pasture and as cattle bedding to make manure.



### BOX 7: IMPORTANCE OF THE VALUE OF ECOSYSTEM SERVICES IN RIBEIRA SACRA, SPAIN

The Ribeira Sacra in Galicia (Spain) is made up of canyons of the rivers Miño and Sil. It is an area of very high historic and landscape value due to the high number of monasteries and landscapes formed by the centuries-old cultivation of terraced vineyards. Those in charge of tourism and rural development plans in the area always believed Ribeira Sacra's main asset was wine production and the cultural and historical issues related to it. But a tourist preference survey, conducted by the University of Santiago de Compostela, discovered that tourists

gave more importance to the landscape than the cultural values associated with wine production.

This experience shows the importance of carrying out a good assessment of the production and consumption of ecosystem services in order to discover their real value and the possible commercialisation channels. The information gathered in these studies is very useful for establishing a good ecosystem services payment scheme that will help ensure the ecosystem service production in an area. ■

Business model generation theories study the rationale of an organisation/company for creating, delivering and capturing value. These theories can be used to define the strategy of a business or organisation. In our case, these theories are used to discover how to establish a strategy to evaluate and manage the environmental values and resources of a territory.

A business model can best be described using nine basic building blocks which demonstrate the logic of the business-making process. These building blocks should be developed within a company and cover the five main areas of a business:

Business areas	Issues to address in a territorial analysis
Infrastructure	Who produces ecosystem services and how?
Offer	Values of the environmental services. (See previous section)
Customers	Who are the beneficiaries of the services?
Marketing	What is the relationship between supply and demand?
Financial viability	What is the cost of producing these services and what is their monetary value?

The first four blocks of the business model enable the analysis of the product and commercialisation and consumption of ecosystem services. How the offer should be analysed in order to know more about the infrastructure and the customers has already been explained in the previous section. It is thus necessary to study the actors, the socioeconomic activities and the resources participating in the production of the ecosystem services in order to understand how they are produced. The outcomes of this analysis will enable the development of an initial strategy and investigate its viability, as well as determining the costs of producing the ecosystem services and giving a monetary value to them. This corresponds to the last block of the business model.

The information obtained in the last business model block will be very helpful for creating awareness amongst stakeholders about the importance of ecosystem services production and their economic interest, as well as the economic viability of the proposed management strategies. Economic viability is estimated by balancing the value of ecosystem services with the costs of their production. When dealing with CC effects and specifically risks which have a concrete spatial dimension, this means taking into account that a concrete activity or land use may provide more or less resilience in a certain area to events (such as flooding or forest fires) and that can be considered in itself an ecosystem service.

### BOX 8: CALCULATION OF THE REAL COST OF FOREST FIRES IN GALICIA

The year 2006 was one of the worst in terms of wild fires in Galicia. In less than 12 days, more than 90.000 hectares were burnt in many different wild fires throughout Galicia. In a study undertaken by University of Santiago de Compostela researchers, the value of these fires was calculated using the ecosystem services theory. The calculation included the loss of timber and tourism, biomass, patrimonial damages and the cost of extinguishing work. The total cost of the fires, without taking into

account the losses in biodiversity, was between €249 and 336 million. Doing these calculations and making them visible would make the population and politicians more conscious at the time of carrying out activities in the countryside or designing policies. Indeed, when talking about costs in the research project, it was calculated that people would be willing to pay €39.84 per household in their next tax declaration to finance an “anti-fire” program/policy. ■



Besides, it also means that several land-based activities in rural and peri-urban areas comply with several functions, often not traded in the market. This may mean they are unable to survive competing with other more market-valued options or that they just collapse and are not replaced (for instance, leading to agricultural abandonment). In both cases, some important ecosystem services are not produced anymore. Therefore, it is important to be aware of the relationship between the activities developed in a certain area, their land use outcomes, the functions provided by these land use results, and the links with other characteristics of the territory as seen in previous section.

In order to recognise this situation, several methodologies can be used to calculate the value of ecosystem services. One of them is the Total Economic Value (TEV). The TEV evaluates services and goods in economic terms that satisfy human needs, but which are not market values.

The Total Economic Value of ecosystem services or goods, is the result of the addition of The Use and Non-Use Value:

The Use Value, represents the value people give to a certain ecosystem service or goods, because they are going to use it in some way. This value can be direct (for example the recreational activities of a natural preserved area) or indirect (for example the drinking natural water that comes from sources located in a natural preserved area).

The Non-Use Value represents the value people give to an ecosystem service or goods just for the mere fact that it exists. For example, people generally want to maintain bird migration and for this, natural conditions have to be preserved. This value also takes into account the availability of this value in the future (“option value”).

The Total Economic Value is a concept which is broader than the typical/traditional calculation of costs and benefits, since it includes not only tangible costs a market has, but also other costs which are difficult to evaluate because they are intangible. Thus, although intangible costs are evaluated by people, there is no market for them. However, there are different methods/methodologies available for achieving a monetary indicator for each of the values (see box 9, p. 44).

Once the value of the ecosystem services is known, it is necessary to analyse the costs of producing them so as to evaluate their economic viability. Therefore, we should consider the direct costs of producing the ecosystem services, the opportunity costs that producers have to assume by renouncing the extra incomes of alternative activities which are more profitable and the transaction costs derived from negotiations between producers and consumers.

**BOX 9: VALUATION****METHODS**

**Direct valuation methods (direct market values).** These methods are used for cases in which there is a market that can be used to calculate the values of the ecosystem services and goods. In general terms, the valuation can be determined by: losses or gains in productivity of the goods or service considered, e.g.: loss in agricultural production due to pests, loss in income or calculation of opportunity. The most widely used example is the travel cost method very commonly used to determine the value of Natural Parks. It consists of calculating the costs incurred by visitors for visiting and enjoying the Park: travel costs, hotels costs, etc... This method only determines the Use value.

**Indirect valuation methods (indirect market values).** These methods are used for those cases in which there is no real market for the goods and services. However, these calculations can be done taking into account other markets (assimilated exist-

ing markets). In general terms, the valuation can be determined by people's preferences about when they want to do an activity. For example, the value of a landscape could be determined considering the increased price a house would have if it was built in a place with a high aesthetic value instead of a place with a lower aesthetic value (Hedonic prices method).

**Direct methods of a non-market: Contingent Valuation (construction of a market).** This method is used for those cases in which a real market doesn't exist and an assimilated market can't be used. Therefore an "unreal" market is created for the valuation. In general terms, it consists of creating hypothetical situations and asking people how they would react to them, using questionnaires, interviews and different techniques intended to determine their willingness to pay for specific ecosystem and services. The aim is to estimate the total economic value. ■

**BOX 10: PAYMENT FOR ECOSYSTEM SERVICES IN MONTE DO CARRIO, SPAIN**

In the case of the Monte do Carrío pilot, a proposal was made to fund wild fire prevention activities along with other new land management activities in common forest land. Money which electric companies paid to common forest associations for installing wind power mills in these areas was used and so the ecosystem services common forests provide were ensured. ■



This cost and benefit balance will help make clear how much money would be needed to keep the production of ecosystem services. Therefore, the economic viability of several strategies could be evaluated. Bearing this in mind, the last issue to think about for finding economically viable strategies is funding sources. Therefore, once the offer is known and evaluated and the demand is identified, the question of who finances the ecosystems services and goods and how arises, and just as importantly, the relationship between the producer-service-consumer is explicitly shown.

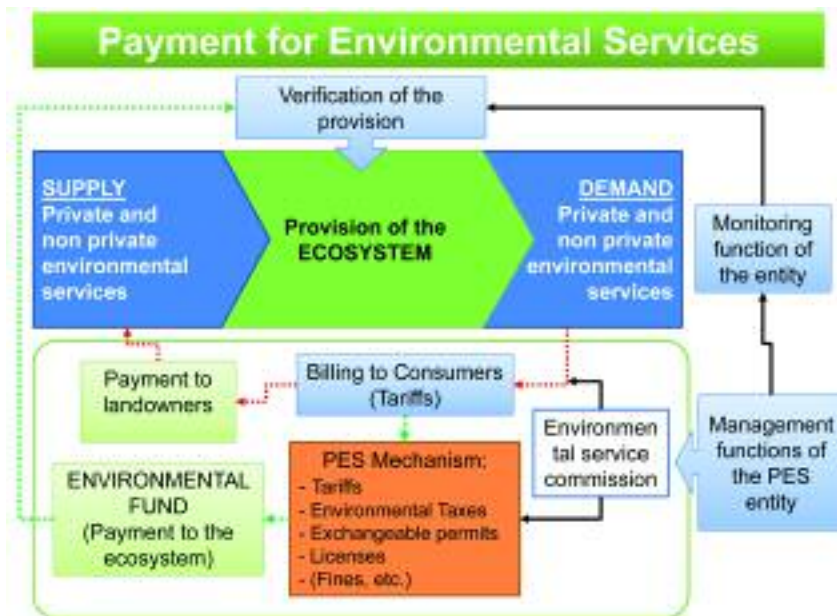
Until now, Payment for Ecosystem Services (PES) schemes have been considered assuming the principle that as long as property rights are clearly defined and transaction costs are low enough, bargaining between the parties will achieve the most efficient economic outcome. Based on this viewpoint, three conditions payments for environmental services schemes have been identified: the link between land use and the ecosystem service must be clear; the transactions must be voluntary; and there must be a monitoring system to ensure the service is being delivered<sup>4</sup>. But these conditions are not always met.

PES can be financed by public funds, private funds or both (see section 4.5, p. 78, of the San Juan reservoir where a parking tax was established). Even though experience up until now meant public-private financing has been looked at, the truth is that the uptake of private funds is still limited<sup>5</sup>.

The establishment of a PES scheme requires a series of actions that can be summarised as follows.

- 1. Firstly, the identification of providers is required as well as a socio-economic study of the area's ecosystem services and goods.
- 2. Based on that and physical mapping of the area, the preparation of a rural development plan follows. The rural development plan must contain a study of the ecosystem service or goods provided.
- 3. Next, we have to identify the potential demanders for such an ecosystem service or goods and their willingness to pay for it/them. Usually, a Contingent Valuation Method is used, given that ecosystem services and goods are non-market goods and services. This determines the demand function.
- 4. The study of the supply function follows, consisting of the valuation of the costs implied in the provision of ecosystem services and goods. As we have already said in the previous section, to evaluate the costs implied requires a calculation of provision transaction (negotiation, project development, administration and monitoring) and opportunity costs. Payments to landowners for the development of certain practices will stand between





opportunity costs (the minimum) and willingness to pay values (the maximum). But often, landowners do not receive individual payments. Instead, they receive an indirect payment, such as investment in public goods.

■ 5. Legal structures needed must be taken into account, as well as the administrative level of action.

■ 6. The establishment of the mechanism of payment used by the PES scheme is the last point to take into account. A variety of mechanisms have been implemented in different public schemes (tariffs, environmental taxes, licenses, auctions...).

### 3.2 Mobilising cooperation

Our democracy is in motion. On the EU-level, a new mode of governance is developing. Representative democracy is being complemented by a new direction towards a more participative, interactive and direct democracy.

Policy (on climate adaptation) should not only lead to good results but should also be developed in a good manner. The perception of whether a policy is legitimate or not is subjective: to what extent do citizens find that the policy corresponds with their desires, expectations, values and standards? So the legitimacy of policy depends on the impressions and value perspectives of citizens. The values of citizens depend on the local (national) culture (see also the 5-D Hofstede Model). Taking into account these cultural differences, the participation process should be tailor-made.

The legitimacy of policy depends on stakeholder's support. Often, the level of support among stakeholders is quite important, because they have to implement policy or at least not resist it. The level of support is related to the level of satisfaction with both process and results. People can feel satisfied because they highly value the specific outcome (e.g. their advice has literally been taken on in a policy document), but also because they value the process. For example, when they learn more about other's perspectives, the complexity of the policy process or because they feel they have had enough chances of influencing the outcome.

The amount and diversity of the types of public consultation and participation in policy making is increasing, but it depends on the local political structures and systems. Consultation and participation can vary from 'counting', as in referendums or opinion polls, to 'talking', in citizen's panels. Consultation and participation can be direct, (during a town meeting), or indirect, (through polling<sup>6</sup>). In complex policy issues it is wise to use and balance the 'consultation-mix'. In the next paragraphs the **main recommendations** 3.2.1 until 3.2.4 are given.

#### 3.2.1 Create a sense of urgency

Climate change has a wide range of effects on land use and therefore the ecological, social and economic impacts can be substantial. At the same time, climate change remains an abstract concept to most stakeholders, making the seriousness of the problem difficult to understand. As a result, awareness is low and less sustainable investments are often a risk. To be successful, it is important to make colleagues from other departments and services as well as directors, entrepreneurs and residents aware as early as possible of the need for climate adaptation and the opportunities it offers.



**BOX 11: THE DE WIJERS BLUE PEARL**

At the start of the participation process in the De Wijers project, a Blue Pearl was used to communicate with the inhabitants about the problems and opportunities in the region.

The Blue Pearl was revealed in February 2010 by the Flemish Minister of Nature during a start-up event. The Blue Pearl is a round post box made of blue glass and a symbol for De Wijers. Pearls are considered very valuable jewels. They are product of water. The colour of water is blue. In the same way, the thousand ponds in De Wijers produce goods and services that are as valuable as pearls. They need to be cherished.

The Blue Pearl travelled from municipality to municipality. It was exhibited, together with a small display about the area and the project, for a month in a public place in each of the seven municipalities and the house of Province. Each time, the local government organised a public event or press release to get the attention of the inhabitants. The local community was invited to post their dreams for De Wijers. A total of 117 were posted. These were then used as input, together with the outcome of several workshops in the period 2010-2012. ■

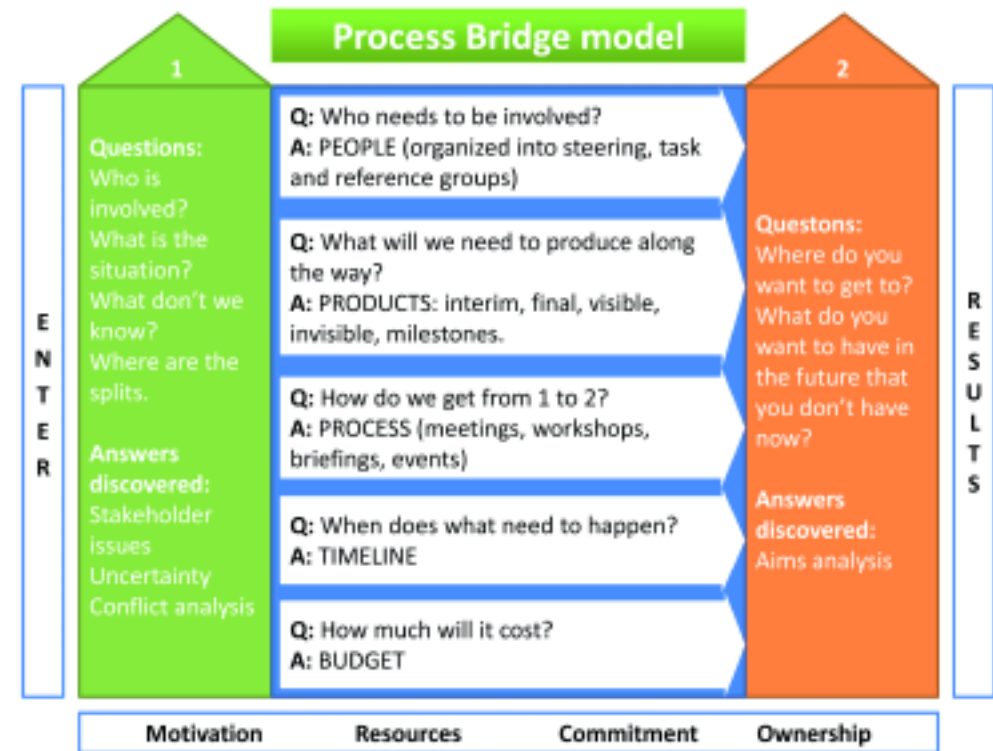


**BOX 12: DESIGN AND ORGANISATION OF THE PARTICIPATION PROCESS**

The goal of a participation process is to develop cooperation between the project team and stakeholders with the intention of achieving good results. So it's about the measures that have to be taken to make an area more resilient to the consequences of climate change.

Participation is more than giving stakeholders 'a voice'. It is a collective learning process, 'social learning'. It is a way of obtaining a system where people/stakeholders, by learning together and with/from each other, are able to handle uncertainty, complexity and risks better. It's about sharing common visions, goals and experiences. It assists the acceptance of proposed solutions.

An interesting tool for designing a participation process is the Process Bridge-model (see figure 1). The project manager should make a project plan in which answering the questions in pillars 1 and 2 is planned. In the process plan, the process manager plans the answering of questions in order to make a bridge from pillar 1 to pillar 2. In some projects the project management and the management of the process are done by two different people. The success of the project depends on the success of the process. This process can take years, which is why it is wise to plan it well in advance, so the different steps and timing of the process is clear to everybody. ■



**Figure 1:** 'Public participation' means involving those affected by a decision in the decision-making process (see section 4.3, p. 75). It promotes sustainable decisions by providing participants with the information they need to be involved in a meaningful way, and it communicates to participants how their input affects the decision. Involvement of all stakeholders will raise awareness of the problems and the need for actions.

**3.2.2 Involve all stakeholders**

When stakeholders are involved from the start of a project, there is more civil support and less resistance. Projects come to an end more quickly. Policy is more effectively executed.

On the other hand, stakeholders can deliver knowledge about the territory. When theory and practice are confronted, new or maybe more innovative ideas can arise which elevates the quality of the project. Stakeholders who feel themselves 'owners' or 'co-authors' of the project will act more responsible (many of the good practices identified in F:ACTS! take into account these issues such as the one in Vepriai; section 4.11, p. 86).

However, involving stakeholders is not easy. You must not only know who the stakeholders are, you must also decide who you wish to involve and to what extent - do you want to inform, consult, co-create, include them in the decision making process? And which resources will you make available? In any case, you need a clever plan with a collective approach. The process of involvement of all the important and relevant stakeholders has to be designed before starting the project. Organising a public participation process is not easy. Some people/bureaus specialise in this, therefore it is sometimes a good idea to involve specialised consultants. A process plan is a refinement of the project plan which focuses on the process. One can choose a project manager to manage the content of project – the development of a common vision, goals and measures – and a process manager to manage the participation process.

### 3.2.3 Make stakeholders shareholders

A stakeholder is any person or organisation, who can be positively or negatively impacted by, or cause an impact to the actions of a company, government, or organization. In our context a stakeholder is any person or organization who affects or is affected by decisions made on the territory. Stakeholders who should be involved are: citizens, civil servants and politicians, entrepreneurs and the organisations who represent them and their interests.

The following crucial questions must be answered at the beginning of the process:

#### BOX 13: STAKEHOLDER INVOLVEMENT IN VOUGA PILOT AREA

In 2012, Portuguese DGADR and DGOTDU organised two discussion workshops with local municipalities (Aveiro and Estarreja), the Regional Directorate for Agriculture and Rural Development, NGO's (Quercus and Geota), the Farmers' Association, the Society for the Protection of the Marinhoa cow and the University of Aveiro.

The objective of these workshops was to create a vision for a new future for the Baixo Vouga Laguna together with the people who live there. During those interactive workshops, the participants identified valuable Vouga ecosystem. goods and services and the effect of climate change on the local ecosystem was discussed. So it became clear what consequences they were facing, what kind of land use should be preserved or even promoted and what should be changed in the future. Participants envisioned the new future of the Baixo Vouga Lagunar and discussed how the territory could be promoted, to increase the land (use) value and how the different actors could cooperate in this.

During these workshops, a provisional but shared and integrated vision was formulated for the first time. The participants were very happy about being involved in a discussion about the future of the Baixo Vouga Laguna. They were not only consulted, but they were also invited to co-create a mutual vision. The vision and the wish to cooperate is a good starting point to develop the necessary structures to make this happen. ■

#### BOX 14: STAKEHOLDER INVOLVEMENT IN THE KOTICHI-STORFYLIA PILOT AREA

Throughout F:ACTS! lifecycle and due to the demanding and yet positive actions foreseen for the Strofylia pilot area in Western Greece, NEA decided to open up the project to all key actors directly or indirectly involved in the management and protection of the area under study. Using the guidelines and knowledge gained from the partners' experience and good practices (Stakeholder Analysis, State of the Art Reviews, Participation Ladder etc), stakeholders were identified and the phases of their involvement during the project were determined in order to achieve the best results. A long list of both stakeholders and shareholders was made and continuous communication led to synergies and cooperation in many phases throughout the project. Depending on the topic, several organisations, individuals and public bodies had the chance to exchange experiences, be heard, express their learning needs and barriers, gain and share knowledge, and increase their skills through the coaching

visits, study visits, events, the conference organised for the project and the Kotychi-Strofylia pilot. NGOs, Management Bodies, Educational Institutions, mayors, regional and local authorities, ministries, students, volunteers, entrepreneurs etc, were involved either in interactive workshops organised, along with experts from the project's consortium, to be interviewed, attend study visits to selected places of interest, conferences or as invited speakers and to take part in initiatives as co-organisers. In all cases, their participation was made public with press releases or in the event's report and the results were always made available to them for any future use. Approximately 150 stakeholders were actively involved during those two years in the various activities and events organized by NEA and 135 more were informed of the project, the Strofylia pilot and the actions undertaken. The result is the creation of an important network ready to welcome new actions and challenges. ■



### BOX 15: STAKEHOLDER INVOLVEMENT IN THE DE WIJERS PILOT AREA

A project manager and process manager were involved in the De Wijers project. While the project manager focussed on the content (objectives and actions), the process manager organised project structures, stakeholder involvement and participation methods. Politicians from local and regional governments were gathered into a steering committee. Civil servants from different administrations and NGO associations worked together in the project team. Climate change and other issues were discussed in small working groups.

For example; one working group discussed the environmental quality needed in the pond area in Bokrijk (in De Wijers) to obtain the favourable Natura 2000 habitat and species category. Finally, a natural development vision was constructed. Ultimately, the owner and provincial government approved this vision and asked the Flemish Nature Minister to authorise the VLM to make and conduct the land development plan. Actions are planned for 2014.

Ecosystem goods and services were used as an approach to organise the involvement of stakehold-

ers in De Wijers. Seven creative workshops were held with more than 200 stakeholders. Ecosystem services and the effects of climate change on them were discussed:

- Cultural services: tourism, recreation, education, cultural heritage and landscape.
- Regulating and producing services: agriculture, water management/valleys and canals, nature, urban green areas.
- Social and economic services: urban and industrial development, tourism, sustainable development, renewable energy, adaptation to climate change.

A final report, Challenges for De Wijers, was made drawing upon ideas from the three working session groups. All the stakeholders were invited to the announcement of this report in May 2012 and were able to witness how their ideas were used. The next step is to translate the challenges into strategic and operational objectives in a Master plan. This will be ready by the end of 2012. ■



### BOX 16: STAKEHOLDER INVOLVEMENT IN THE VARNA PILOT AREA

On the 26th of March, 2012, an interactive design workshop was held in the village of Konstantinovo, in Varna, Bulgaria as a part of the F:ACTS! pilot area. The technical team implementing the Pilot Project presented the results of a Water Balance Study and Flood Risk Assessment for Konstantinovo to the villagers and asked them to comment on the suggested technical solutions. The Sketchmatch Method, an interactive design method, was used.

The method proved to be surprisingly effective: the engineers received extremely valuable information about the natural processes in this village, particularly about the impact of climate change on the hydraulic regime of the gully, which had never been measured and monitored but which the local people were familiar with. During the Sketchmatch exercise, three teams of villagers “competed” with each other and suggested changes and amendments to the proposed technical solutions which were readily accepted by the Pilot Project’s technical team. ■

■ Who are the key influential stakeholders? Who is in a position to help (support) or hinder the process? The consensus about the content can vary from high to low. In the context of Integrated Territorial Strategies (ITS), the first stakeholders to take into account are those who influence or are influenced by current land use patterns and their dynamics. Obviously, all people in a certain area, or even in a global context, influence and are influenced by the functions of every single square metre of planet earth. Even so, being aware of the importance of the relationship between people and land when dealing with ITS in the context of Climate Change (CC) adaptation, frames the way that stakeholders are identified and analysed. Land owners, direct land managers such as farmers, foresters and environ-

mental groups, along with those responsible for infrastructures and inhabitants have different roles and relationships with their area.

■ What are relationships between stakeholders like? What are their relevant needs, wants and interests? Sometimes, the opinions of stakeholders don’t seem reconcilable. But there can be mutual interests and needs beneath the surface which have to be examined.

■ Who gets which role in the project organisation? Which steps do we have to take to give stakeholders a role in the project?

■ What level of participation do the different stakeholders have? They will be informed, consulted, invited to co-create or to co-decide. The stakeholders must feel that they have had some influence on decision-making.



### BOX 17: THE GHENT CANAL ZONE LANDSCAPE FUND

Over recent years, the port of Ghent has undergone considerable development, putting pressure on the quality of life in nearby villages. The authorities are therefore, investing in making the Ghent Canal Zone a pleasant area to live, with a good business climate for companies and where farmers can continue to earn a living. Buffer zones between the economic zones and nearby villages play an important role in this. Within the framework of ECO<sup>2</sup>, project cooperation between farmers, residents and the business community was initiated to create more green infrastructures in the agricultural parts of these buffer zones.

Firstly, different stakeholders' needs were identified. Citizens wanted a pleasant environment, with minimum disturbance from surrounding industrial activities. Farmers wanted to continue managing their land. They were interested in managing the landscape, if rewarded for the job. The industrial companies wanted a good business environment and had financial resources. These three elements

(demand, offer and financial resources) were the foundations of the market system developed.

The Ghent Canal Zone Landscape Fund has been set up to collect and manage private money. With the donation of 85,000 € from 20 companies, it finances 7km of trees and hedges planted by the farmers. Their maintenance is guaranteed for 20 years. A steering committee decides annually on the use of budgets according to the recommendations made by the advisory group which monitors and evaluates the cooperation between the various partners and the objectives of the fund. Farmers' representatives, the companies and residents participate in both the steering committee and advisory group.

A greener environment for the residents, financial appreciation for the farmers' commitment, and a socially aware profile for the business community, are the motives for a unique and sustainable cooperative venture between farmers, residents and businesses. ■



The Participation Pyramid



The challenge is not only to involve stakeholders but also to work together on a shared vision and create a sense of joint responsibility to put it into practice. Adaptation can therefore be a trigger for creating new coalitions (see section 4.10, p. 84). Besides, making adaptation to Climate Change part of an Integrated Territorial Strategy means people can understand the link between Climate Change, their land and the future of their territory more easily. In this way, something sometimes as “vague” and “global” as Climate Change becomes closer and real when it is translated into the surrounding landscape, “this hedge or that forest”, “our river or my meadow”, and when for instance neighbouring farmers or local land owners become crucial actors. In this sense, CC adaptation becomes spatially explicit through ITS. Moreover, by linking solutions to economic development, costs and benefits can be shared between relevant stakeholders in the area. By doing this, stakeholders become shareholders, providing a solid base for sustainable development. In this way, people are both accountable and empowered to simultaneously use and maintain proper land functions, thereby improving territorial resilience.

A stakeholder has an interest in something, while the shareholder possesses a part of something. A shareholder wants to acquire and take responsibility for his own interests and those of his co-shareholders. A shareholder wants to give and take. To make stakeholders shareholders you have to involve them in a high level of participation. The shareholder must at least be a partner. This means they have to be treated equally.

Partnership or mutual collaboration with stakeholders means being a partner in each aspect of the decision-making, including the development of alternatives and the identification of a preferred solution. In this partnership, stakeholders are asked to give advice and formulate solutions which will be turned into decisions. Shareholders are co-managers of the project.

#### 3.2.4. Recognise the importance of education

Mutual learning is important for shareholders. They want to learn with and from each other. This means that there must be a level of cooperation/partnership between the shareholders. The process/project manager has to develop a cooperation program throughout the year which determines the time and place where the shareholders can meet and exchange experiences so they can improve their actions/measures out in the field. Communication is important. A mutual interest in making an area more resilient to climate change will contribute to more frequent and better adaptation measures.

Climate change adaptation and mitigation strategies require learning new knowledge and skills and changing behaviour in order to reduce the vulnerable aspects of an area and manage the risks of climate change. Education is therefore a key strategy in promoting climate-proof territorial development.

Education is designed to stimulate creativity and people to become critical thinkers who can work closely together. Higher education institutions have an important role to play in facilitating this and where possible, directly contributing to building adaptation capacity within society. Cooperation with universities and students in all pilot projects demonstrate that they can bring about new and unexpected perspectives and results (see section 4.13, p. 88).

### 3.3 Governance for integrated territorial strategies

Changing concepts from “government” to “governance” is fundamental for the development of Integrated Territorial Strategies (ITS). In other words, looking at a planning and implementation perspective (whilst taking into account the concept of Governance as referred to above), means that an ITS is actually territorial governance: so, governance is not one of its attributes but an essential constituent of an ITS.

In this context, several governance principles are most relevant and should be carefully considered when developing an ITS. We highlight four of them:

1. **Participation** – needed since it is fundamental for promoting an effective stakeholder involvement process (as underlined in section 3.2, p. 47);
2. **Transparency** – vital as it is a basic ingredient in building trust, essential for cooperation and sharing responsibilities;
3. **Accountability** – necessary since clear responsibilities are fundamental and have to be set right from the start of the process, thus leading to improved transparency in decision making;
4. **Efficiency** – collaboration instead of competition leads to greater efficiency, as well as clear and well balanced responsibilities on all governance levels and amongst different stakeholders.

As referred in Chapter 3.2.2, (in page 49) participation is a basic ingredient for promoting an effective stakeholders involvement process. Such processes are particularly fundamental at project level as they promote collaboration, shared responsibilities and the sense of co-ownership in a project. Transparency becomes fundamental when we need to build trust, which is essential as we want to promote cooperation and have clear procedures for decision making. Sharing responsibilities in a multiple stakeholders’ process means that such responsibilities need to be clear right from the start (thus leading to improved transparency in decision making) but it also brings about the need for accountability since it must be ensured that every stakeholder is regarded as responsible for corre-

### BOX 18: THEMATIC GOVERNANCE WORKSHOP IN VILNIUS, LITHUANIA

One of the governance-related activities in the F:ACTS! project was the thematic workshop which took place from the 9<sup>th</sup> to the 11<sup>th</sup> of June in Vilnius (Lithuania). The workshop aimed at sharing ideas related to governance and institutional arrangements to generate knowledge in this area for the implementation of Integrated Territorial Strategies.

The partners formulated several principles that should be taken into account when creating good governance such as openness, participation, accountability, effectiveness and coherence. According to these principles, the following issues should be tackled for an effective governance structure that will facilitate the implementation of ITS for climate change adaptation and successful management:

- Introduce a historical and country-specific analysis.
- Assess priorities
- Consider stakeholder involvement right from the start of the process.
- Set up a public participation and communication strategy
- Define the boundaries of responsibility clearly
- Establish effective coordination between different levels of management
- Create innovative ways of working and tools to build active project ownership by the people. ■

sponding decisions and actions. As the scarcity of resources becomes more acute, efficiency comes as a major issue. This can be improved as we look for the right balance when distributing responsibilities at all governance levels and amongst different stakeholders. Besides, by promoting collaboration between stakeholders, we avoid the overlapping of functions and make better use of different skills and responsibilities in order to maximise resources.

A specific aspect of ITS is that they often deal with land tenure and land use structures, trying to promote a better land use pattern. In this case, those governance principles become even more important. When dealing with land and people's relationship to it, several dimensions are involved: property rights, land use rights, cultural aspects, the quality of life and health, wealth and access to resources, etc. The way in which participation, transparency, accountability and efficiency are included determines the validity of any ITS and its power to be a real approach, enhancing resilience through the consideration of economic viability and environmental behaviour.

### 3.3.1 Create appropriate governance structures

In practice, the governance agenda can become unrealistically long. Besides, democratic principles are based on culturally determined norms and values which may depend on the region (again land issues may have special significance). Therefore, the governance agenda needs to be tailor-made. That is, designed according to historical and regional-specific analysis, critical aspects of Climate Change (CC) adaptation and determined priorities and existing alternatives. It's about looking for the most suitable and realistic model for existing conditions, which can be "good enough governance" instead of the complete governance agenda. Governance is also important because it is multi-agent and this reflects, for instance, one of the major benefits for a planner when integrating local needs and combining top-down with bottom-up initiatives in the plan/project, thus sharing responsibilities and promoting local empowerment.

An ITS has the potential to be a positive influence on local governance by improving administrative efficiency, cooperation and coordination between actors and strengthening local capacity with respect to project design and distinctive local development. Through an effective integration of the many different interests at stake, we can look at the area (people and land) in a holistic way. Before being able to create new policies and measures and/or actions, the existing ones need to be identified as they may already contribute to the plan/project's goal (besides perhaps being contradictory too). Many regions have already defined their strategies for CC mitigation and/or adaptation. All

Stakeholder participation in O Carrio.





**BOX 19: GOVERNANCE****IN DE WIJERS**

As mentioned before, in De Wijers, local and regional government politicians are gathered in a steering committee. Civil servants from different administrations as well as NGO's work together in the project team. There is a strict joint relationship between these two central project bodies, meaning that being a member of only one of the two main project bodies is impossible. As a result, organisations are not only obliged to work actively on the 'daily affairs' of the project, but they must also take political responsibility for the project. Climate change issues and other thematic topics are discussed in smaller working groups. In total, there are 17 partners in the project with very different thematic backgrounds (nature, social, economic, tourism, cultural...) in order to be able to achieve a multidisciplinary master plan. The Flemish Land Agency (a Flemish government agency and designated project leader) is in charge of coordinating these different project bodies.

The partnership agreed to sign a common declaration in 2010. This De Wijers Declaration was a statement of engagement and had no legality. Nevertheless, it was a formalisation of the intention to cooperate in an area-oriented way. Partners declared they were willing to work together towards a sustainable area-oriented master plan for the

region. Other stakeholders, not being members of the central project bodies (which was a partnership of 17), were asked to participate actively in intensive trail workshops from 2010 to 2012. Because of the complexity of the project, the idea was to gather as many opinions, thematic angles, visions and knowledge as possible. But for the sake of practicality, the core partnership was limited to a workable number of 17 partners, although this number was never fixed. The outlined structure and operational aspects of the project were the result of a profound bilateral consultation in 2010.

After two years of the intensive participation and involvement of approximately 200 people and more than 50 stakeholders (in trail workshops), the master plan content took shape. Four challenges for De Wijers were formulated and endorsed by the partnership, including adaptation to climate change. The next step will be to execute these challenges by formulating an implementation program and initiating concrete projects. However, urgent matters are currently being addressed through a quick win trail. These quick win sub-projects, whether subsidised by the European Union or Flemish Government, always demand collaboration between the different De Wijers partners. ■



regions have set policies and measures that, though aimed at other topics/issues, may interfere with (or be related to) CC adaptation and area development in general. Therefore, it is necessary to assess current policies at all governance levels (national, regional or local) in order to check, which of them support or can be incorporated into the plan. Besides, it may be that other stakeholders are promoting initiatives/projects that may compliment the project/plan's goal. This means planners have to identify all related policies, measures, initiatives and actions that may play a role and influence (positively or negatively) the outcome of the project. Afterwards, the planners will gain insight into what's missing: what has to be done in addition and therefore has to be included in the strategy for the area. But even more importantly, insight is gained into who needs to be involved, at what level and how "everything should be put together" (again, people and land), across every scale and sector within the study area, which is indeed the arena where all actions take concrete shape and outcomes must arise.

ITS for planning and implementing projects for "climate proof" areas, create conditions for improving the capacity of the area to adapt to the effects of CC. By incorporating the governance concept and its principles, we promote this capacity long-term, which is fundamental when dealing with CC (see section 4.3, p. 75). Moreover, the focus is more dependant on the ability of the territory to improve its resilience than on the outputs of concrete actions: we move from content approach towards process approach. One of the most relevant steps when designing an ITS for "climate proof" areas is to involve stakeholders, as referred to in Chapter 3.2.2 (in page 49). This relates to two main aspects: the positive effects of such processes and the need to have a strategy that is inter-sectoral and involves the multiple agents and levels in a related governance structure. Improved governance includes stakeholders' involvement. In area development, there's always a need to find a way to reconcile the interests of all the parties involved (see box 17, p. 54). The truth is that there are gains and losses for stakeholders to consider, though this can benefit or appear more evident to some of them and less to others. Therefore, the challenge is to find the best balance and smart solutions to compensate losses and to make the whole strategy appealing enough for the relevant stakeholders.

Consideration of stakeholder participation over the years has evolved in some places towards a joint shareholder approach. Visions and plans are not only prepared jointly but also implemented in a well coordinated way. In fact, a comprehensive ITS needs the cooperation, to some degree, of all the relevant stakeholders. Recognising the challenges of inter-sector cooperation, it is

**BOX 20: DUTCH WATER****DEFENCE LINE**

The big project “The New Dutch Waterline” (created around 1870) was an 85-km-long military line-of-defence that extended from former Zuiderzee near Muiden to the Biesbosch, in Holland. The Line was established as a protective ring, approximately 35 km long, around the Dutch cities of Muiden, Utrecht, Vreeswijk and Gorinchem. Its primary element of defence against soldiers, vehicles and horses was water. Thanks to an ingenious water management system comprising of sluices, flood canals, and existing waterways and dikes, the Waterline could be completely inundated in just three weeks. Weak points along the natural defence line were strengthened with forts, bunkers and group shelters. In addition, the Line included five fortified cities: Muiden, Weesp, Naarden, Gorinchem and Woudrichem.

Around the year 2000, an ambitious and broad ‘Program’ was established between four Ministries, five provinces, many municipalities, water boards, local initiatives and private enterprises, to rehabilitate and revitalise this historic ‘Waterline’. This has been carried out during the past 10-12 years, and is now in the middle of the implementation phase.

Governance is arranged as follows: The organisation of this big program was formerly based on a strong, broad, high Line Steering-committee with all the relevant authorities represented in it and supported by a strong ministry-supported Project

Bureau. Recently, provinces have got more responsibilities in terms of a political decentralisation framework. The Project bureau will remain operational but ‘operated’ more from that level. Participation: Top-down steering is being gradually replaced by bottom-up. The ‘market’, as in private enterprises, are involved in more initiatives. Step-by-step, the attention and focus is shifting from implementation to exploitation and maintenance and from awareness-raising using historical and potential values, to the new ‘brand’ of achieving formal UNESCO heritage status and the recreational exploitation of that. Openness: From the early beginning, a broad, active and open PR has been used for events, open days, newsletters, education, etc. Effectiveness: Halfway through, the implementation of the results is clearly visible: A clear ‘brand’, increased status, and a higher tourism impact as well as the initiation of private enterprise activities. Accountability: All activities are clearly monitored and reported openly to all partners and the press. Coherence: All projects and activities are branded with the same logo, flag and demonstrate they are contributing to the higher overall objective. ■



Fort Honswijk defended the river Lek's northern inlet sluices, whose water could be used to inundate defence line areas.



Explore the future - chameleon metaphor: adjust to changing future conditions

may be enough and no less powerful than the previous ones. A common vision can be endorsed by all the parties involved and contain guidelines for further concretisation through specific projects or activities.

### 3.3.2 Make flexible long term plans based on a clear vision

In order to compile a full list of risks and predictable changes in an area (as a result of Climate Change (CC) effects and other factors), the need to “look into the future” as a way of figuring out what we want to achieve (the journey’s destination) and how we can get there (the path to follow on the journey) is necessary. Given its flexibility, Integrated Territorial Strategies (ITS) respond to uncertainty more easily than other types of intervention, as they are process-driven (instead of instrument or output driven). It’s a kind of approach that, by integrating the participation of multiple stakeholders, incorporates the principles of governance in order to cope with the complexity of the problems and solutions.

Therefore, ITS share three significant defining characteristics with the governance concept:

- a. The focus is on the territory, not on a specific sector (multi-sector).
- b. Participation and cooperation between stakeholders are considered key elements (multi-agent).



**BOX 20: SCENARIO ANALYSIS**

Scenario analysis is “a process of positing several informed, plausible and imagined alternative future environments in which decisions about the future may be played out, for the purpose of changing current thinking, improving decision making, enhancing human and organisation learning and improving performance”.<sup>7</sup> Scenario planning is a useful tool for developing a common vision for a region/area together with stakeholders, for example with stakeholders during a workshop.

Scenarios consist of three components: the current situation, images of the future and the pathways to the future images. There are two steps:

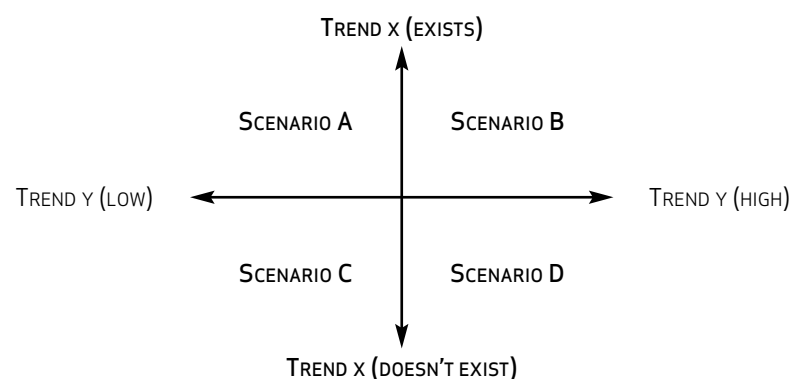
- Identify driving forces: elements that are virtually certain to occur

- Identify the critical uncertainties in the environmental variables

**Scenario matrix.** Position two key-uncertainties/critical factors in a scenario matrix or in an axes system. The variables vary from one extreme to another, for example: money (none – enough), risks (low – high), population decline (yes – no), improve existing identity v promote new identity. ■

		VARIABLE 1	
		OUTCOME 1A	OUTCOME 1B
VARIABLE 2	OUTCOME 2A	SCENARIO 1	SCENARIO 2
	OUTCOME 2B	SCENARIO 3	SCENARIO 4

OR



c. Co-ordination between different levels of government and networking also play a significant role (multi-level).

CC refers to long-term effects. But adapting to such effects requires timely short-term as well as medium and long term action, as both change and adaptation are dynamic processes. This means there is a need to define (future) needs. So, if successful strategies focus on problems and opportunities of both today and tomorrow, we need to explore the future. The truth is that when we think about risks and opportunities for an area, we are looking into the future and we are considering what will happen in the long or short term, whilst dealing with uncertainty. In such conditions, the strategy for the area – the ITS – should provide the answer whilst considering possible scenarios for future developments and building from a vision that orientates the path to be followed.

Strategies that are future-proof are the ones that are robust (if they can deal with different developments/scenarios) and be flexible (be adjusted when/if the context changes). As we discussed before, this point assumes particular relevance when we are dealing with CC effects and “area proofing” to them. Therefore, using future-oriented planning methods as mentioned before (examples are scenario analysis or envisioning) is to be recommended.

In this respect, useful methodologies that support strategy design by “looking into the future” are scenario analysis and envisioning (see box 21, p. 64): these can provide future-oriented, integrated, innovative and robust insights.

Whilst dealing with CC adaptation, besides the fact that predicting the long term future is impossible, there are external autonomous developments that we can’t influence directly. Therefore, to design a sustainable ITS we need tools to explore the future, taking into account the uncertainties and interactions of those developments. Scenario analysis is such a tool. It deals with forecasting and it is focused, neither on desirable nor probable futures, but on possible ones. Such analysis can be used to learn about threats and opportunities, considering several possible scenarios, thus taking uncertainties into consideration and offering an insight about how developments are interrelated.

When it is used with stakeholders, scenario analysis is also useful for making the decision making process more transparent by providing shared arguments related to the (possible) future, thus giving room for choices to be made in the strategy. Also, this tool can make us more aware of future threats and be used as a kind of “future-proof test” for the strategy (analysing to what extent the strategy is effective in any of the scenarios).

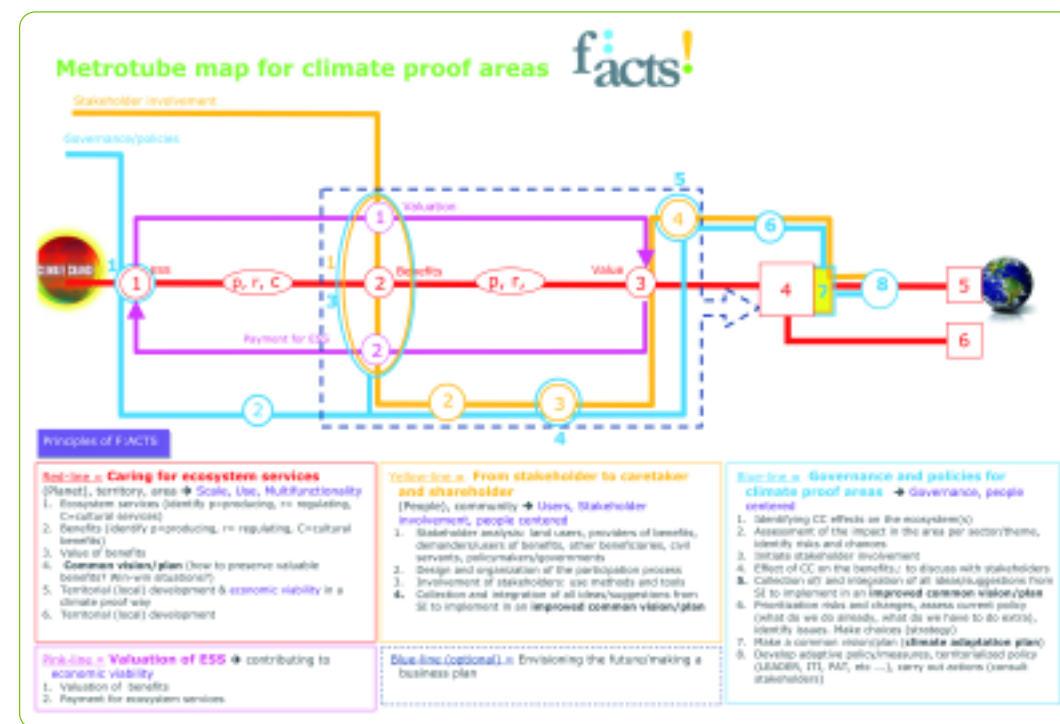
Another aspect of scenario analysis is that it also provides orientation regarding the most relevant issues/themes to be considered in order to shape the future and support a vision for the territory at stake. In this sense, it is agenda-setting as well. Creating a vision for the area development works, in fact, as a compass for strategy development and can be designed using a tool called Envisioning. This is an interactive tool for guiding the visionary thinking of stakeholders by creating a common ground and building a shared vision for the area, its identity and the associated values that will inspire options and choices. It can also be used to test strategies (whilst answering the question “To what extent is my strategy effective in realising my vision?”), identify problems and prepare policies to prevent or address problems. This tool, by enabling a vision of the future of the area at stake to be designed, stresses the themes and aspects the involved stakeholders consider most relevant for the development of the area and which need to be part of the strategy.

There’s no recipe for designing/conceiving an ITS for CC adaptation. Nevertheless, we can think about a few steps/stages and a logical sequence to bear in mind:

1. Identify CC effects on the ecosystem(s).
2. Assess the impact in the area per sector / theme and identify risks and opportunities.
3. Start stakeholders’ involvement process.
4. Analyse the CC benefits for the area.
5. Integrate all contributions from stakeholders and build an improved common vision/plan.
6. Prioritise risks and changes, assess current policies, identify issues at stake and make choices in order to design a strategy for the area.
7. Make a common vision/plan - a climate adaptation plan.
8. Implement the plan (develop policies and measures, carry out actions).

The diagram below illustrates these steps in relation to the other F:ACTS! principles referred to in previous chapters of this handbook.

At the start of an ITS, as one “listens to the territory”, the use of the concept of Ecosystem Services (ESS) based on system-thinking (focusing on cyclical rather than linear cause and effect, that is, understanding the parts in relation to the whole and examining the links and interactions between the elements that compose the whole of the system) provides the framework in which to identify the



area’s potential and relate functions with space/location (in relation to Chapter 3.1.2, p. 35). The idea that all goods and services ecosystems provide can contribute to society may be considered a holistic and global enough framework and simultaneously allows thinking about the characteristics of the territory to take place within two perspectives: a) human-organised areas with the focus on multifunctional land use and b) strong human pressure on ecosystems (through urbanisation, fragmentation, effects of CC, pollution, etc).

As one listens to the territory in order to plan a “climate proof” area whilst considering the ESS, different types of CC effects can be identified: as primary or secondary according to the nature and size of the effects. This classification is important for strategy design, since it will provide different resource allocations and action timeframes.

### 3.3.3 Combine different objectives and budgets

A comparative look at existing European climate adaptation strategies shows that most of them intend on putting Climate Change (CC) on the political agenda rather than establishing concrete plans for implementation and action. National strategies need to provide the appropriate framework for adaptation actions

**BOX 22: COOPERATION BETWEEN  
THE CITY OF VARNA AND THE BULGARIAN NAVAL  
ACADEMY TO DEVELOP A FLOODING MODEL WHICH  
IDENTIFIES HIGH FLOOD RISK ZONES**

In order to plan measures to prevent flooding in Varna urban and peri-urban areas, it was necessary to develop a numerical flooding model for the municipal territory. The model had to be preceded by a field survey in order to gather input data and for the subsequent numerical tests of different flooding scenarios.

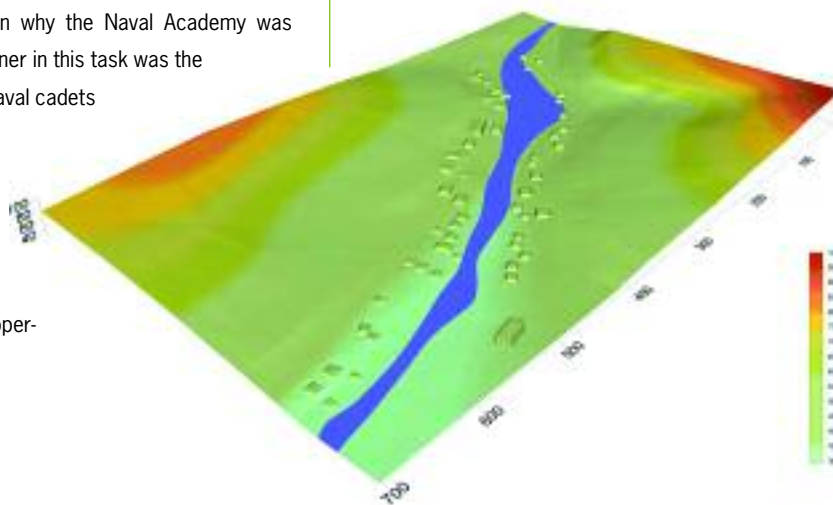
An important City of Varna partner in the implementation of the field survey, which turned out to be quite a large-scale and time-consuming task, was the Nikola Y. Vaptsarov Naval Academy. Six teams of 16 cadets and four supervising officers, including the Academy's Commandant and its Deputy Head carried out a field survey of the natural rainwater drainage system in the second half of July, 2010. The whole survey took more than 1000 hours of field work and another two weeks for the preliminary processing of the obtained raw data before submitting it to the next team of experts, working on the numerical flooding model.

The main reason why the Naval Academy was invited to be a partner in this task was the fact that only the naval cadets had the set of skills necessary for conducting this survey. Another important reason for cooper-

ating with the Naval Academy was the absence of funding for a field survey, both in the project and municipal budgets. At the same time, the cadets had to pass their regular summer practice and the field survey turned out to be a good opportunity for carrying out professional work with real practical value for natural coastal conditions.

The brilliant work was done by the Naval Academy cadets free of charge. It was an excellent example of combining different goals and budgets which offered a very helpful opportunity in times of an economic crisis and financial restrictions.

The results of the field survey provided an invaluable set of full-scale data for the development of a numerical flooding model which was used to test different flooding scenarios in order to identify the highest risk of flooding in vulnerable zones in the city and in the peri-urban areas. ■



but adaptation options have to be tailor-made according to area specificities, with a view to implementing measures at the appropriate level of decision-making (EU, national, regional, local). Adaptation to CC effects has an intrinsically cross-cutting nature. Therefore, only an integrated approach will deliver the appropriate measures to provide sustainable outputs for enhancing resilience in territories. Nevertheless, current strategies are mostly sector-driven, rather than territorial. As we discussed in the previous section, this may hamper the inclusion of governance concepts and principles in such strategies.

When dealing with complex issues such as CC adaptation, an approach that provides a multi-objective scope is fundamental. Characteristics of ITS include significant aspects such as being multi-sectoral and multi-level, area specific, adaptable at the scale of intervention, have the ability to provide a wide range of tools, bring together spatial and sectoral policies and through this, improve the capacity of intervention and offer flexibility within actions. It is in a concrete ITS area that the objectives of different planning and administration levels and other [groups of] stakeholders are explicitly defined and materialised. In this context, CC adaptation objectives have to be combined with the other territorial and sectoral objectives. This has two main benefits. Firstly, that it is the best way of locating and mitigating conflicting goals but also triggering potential synergies. Secondly, it provides the opportunity to link adaptation goals, sometimes not understood or/and integrated by local actors, to more immediate and urgent desires (from the local stakeholders' perspective).

The other side of the coin is that whenever we try to integrate different sets of objectives, there should be an attempt to combine resource sources. Nevertheless, implementation of ITS have a practical drawback within the classical structure of public policy which is sectoral-oriented both in terms of management and, of crucial importance, budgeting. Besides this, the second factor hampering it is that, apart from the sectoral structures, there is a traditional dichotomy between public vs. private funding. Both aspects together, may contain significant rigidities when putting into practice ITS. Therefore, when using an ITS approach, special attention has to be paid to combining resource sources, and this implies not only financial, but also technical, human, intellectual, political factors, etc. In part, good stakeholder involvement and identifying sound ecosystem services, as described above, will establish a solid basis for this step. Indeed, identification of potential resources and fostering investment is the natural follow-up to these two phases.

Moreover, when the goal is to create "climate proof" areas, the impacts of such effects will surely seem like a threat. But they can also create opportunities, as

**BOX 23: DOURO COOPERATION**

As a result of the UNESCO classification of the Douro Region and its natural and human made values as a world heritage site the Portuguese government created a Mission Structure for this region in 2006 which depended on the Ministry of Agriculture, Sea, Environment and Spatial Planning. This entity aims to promote the flow between the skilled central and local administration entities in the region and stimulating the participation and the initiative of civil society in the governance processes.

The Douro Mission Structure is a rationalized public action centre for the 21 municipalities covered by the classified area of Douro and a platform for

understanding between different entities, through the promotion of partnerships and stimulus to the development of territorial projects.

This entity is developing efforts to protect the heritage, by contributing in the maintenance of a fair balance between conservation and sustainable development and quality of life for the communities. Therefore, it also has the task of stimulating partnerships with and between municipalities, enterprises, research centres, educational institutions etc... This is in order to promote territorial valorisation, the competitiveness of participating agencies and regional territorial cohesion in a context of climate. ■



referred to before, and concrete characteristics in the area may lead to a significant or low resilience to CC effects and thus be considered strengths or weaknesses in the area. By putting together the “where we are” (existing present situation), the “where we want to get to” (the vision for the area), the “way forward” (the policies, approaches and instruments that are needed) and the “what’s missing” (measures and actions to be included in the plan/project), the planners will need to define priorities and actions as part of the strategy.

ITS in particular, intrinsically enable the combination of different sectors’ policies and the simultaneous use of a large number of tools, establishing the bridge between policy and implementation levels (see section 4.9, p. 83).

The preferable solutions and actions are the ones that provide win-win situations, that is to say, when actions result in some kind of benefit to both developer and stakeholder(s). In particular, it is highly beneficial when some of these results can be obtained in the short term, even during the planning phase: quick-wins. Such initiatives have a strong positive impact on stakeholders’ involvement.

**3.3.4 Make climate change actions visible and measurable**

As a result of the stakeholders’ involvement process, a lot of information and many ideas/suggestions are collected and need to be integrated into the Integrated Territorial Strategy (ITS). This results in an improved common vision for the area at stake which then has to be implemented. As mentioned before, taking Climate Change (CC) effects into consideration in area development also means that such effects need to be analysed and discussed in terms of the benefits for the area. But, besides bearing in mind that along with negative effects there might be positive ones, the predictable future impacts need to be thought about together with the actual situation, positioning such effects in a time scale: some effects may have an impact in the short-term, others in the long-term. This aspect may give a sense of urgency to some actions, which then requires particular attention and faster decisions and actions.

In general, through stakeholders’ involvement, planners can achieve the most valuable outcomes such as: building trust, mutual learning, sharing responsibilities and knowledge (from stakeholders to shareholders as referred to in Chapter 3.2.3, p. 50), making interests compatible and managing conflicts, thus facilitating the project’s implementation. In turn, such effects contribute to the referred governance principles: transparency (the basic ingredient for building trust), accountability (vital for sharing responsibilities) and efficiency (the outcome of all these factors), and lastly, participation. In the end, the combination



of all these effects results in a better quality project and improves its impact, as well as the sustainability of the results.

Once the ITS for a “climate proof” area is ready, the planners can elaborate the CC adaptation plan, which reflects the common vision shared by stakeholders as presented before, moving towards implementation, which is an important step. It is very important that stakeholders continue to be involved in all the phases: in the execution of the project, the monitoring and the future management of the area as well. So, communication with stakeholders which facilitates their involvement continues to be an issue in all the phases of the plan/project and afterwards. This means that there is a need now to consider the implementation phase carefully and identify which instruments and means are needed for this (see section 4.17, p. 93), to prepare a chronogram and a monitoring plan as well. All these principles are transversal to an ITS process, from the planning to the implementation phases. Therefore, it is desirable that we develop indicators for monitoring such principles in order to check their status and make adjustments, if necessary. An analysis of the whole process should be made for reflection and the introduction of improvements in future processes/projects. Whilst preparing the monitoring plan, some indicators related to governance principles should also be included.

## 4. good practices (lessons learnt)

### 4.1 Designating areas for new “artificial wetlands” in order to mitigate the negative impact of climate change on biodiversity

The innovative planning concept of creating artificial wetlands has been promoted for the first time in Bulgaria with the General Spatial and Land-Use Plan (GSLUP) for the Municipality of Varna. Several water zones inside Lake Varna and on its southern bank have been reserved for creating artificial wetlands. Their role will be to provide new natural habitats for water birds to feed and nestle in and around the lake. The new wetlands will be created with environmental engineering methods and means and will compensate the damages and losses caused to bird habitats through fires, successive heavy rains and droughts (so called ‘climatic contrasts’).

Zones designated in the GSLUP, for artificial wetlands in the lake of Varna.

The creation of new wetlands is in line with Strategic Goal 1: Mitigating the Impact of Climate Change and Strategic Goal 5: Limiting the GSLUP Loss of Biodiversity. In the long run, the creation of artificial wetlands is expected to have a strong positive impact on biodiversity due to the increase of natural habitats and by linking them through green corridors with other natural biotopes in the



gullies and in the forest areas south of Lake Varna. The wetlands will play a very important role for the birds during the migration period and in winter time because the only wetlands where birds can stop and feed between Lake Shabla and Bourgas (200 km from each other) on the migration route via Pontica are to be found in Lake Varna and Beloslav.

The wetlands will have a “cascade” structure composed of dykes and

berms created on the coast and inside the lake. The wetland will pass smoothly into a coastal brackish water lagoon with islands and shallow areas planted with reeds which will provide suitable conditions for waterfowl. The detailed design of the new wetlands will be preceded by three technical studies: modelling of the sedimentation processes, analysis of the water exchange pattern; assessment of the indirect impact on aquatic organisms and birds which feed on them.

The waste water treatment concept adopted for the villages of Zvezditsa and Konstantinovo is based on the idea of creating bio-lagoons in order to save money and energy. But they can also provide enough purified water for the wetlands cascade, created around the mouths of the existing gullies, thus forming an entire artificial eco-system. Use can also be made of the dredge spoils which appear regularly due to the maintenance of the fairway, provided the laboratory tests show they meet the sanitary requirements.

This innovative planning decision has been widely discussed during the GSLUP public hearings and has received warm support both from the public and academic sector.

#### 4.2 Building multifunctional settling basins to protect bathing waters from storm water pollution

All the gullies in the City of Varna pass through urbanised areas and drain their storm waters into the Black Sea. Their main role is to prevent the city from flooding in heavy rains. In the case of dry weather, most of the gullies remain dry, especially in the summer, although two of them are in fact small creeks that never dry up. The gullies reach the beach and in the case of heavy rain, urban area storm water runs off into the sea, creating a risk of polluting both the beaches and bathing waters. To prevent a possible sanitary risk, the City of Varna has built settling basins at the mouths of two of the biggest gulches, whose primary function is to work as mechanical water treatment facilities, capturing sand and sediments and sometimes larger pieces of waste which might end up in the sea.

One of the settling basins is located in the heart of the biggest city park, very close to the beach promenade and thus challenges the aesthetical values of the whole area. The settling basin it is not a cheap facility because it requires permanent maintenance and frequent cleaning. The designers have coped with these diverse challenges by making the basin a multifunctional facility, performing



A settling basin in the Sea Garden in Varna.

three functions at the same time: 1) a storm water sediment settler, 2) a landscape component of the city park, 3) an artificial lake for water scooters used by children, which can generate income and is partially self-funding.

One of the most unpleasant manifestations of climate change in the region of Varna is the frequent occurrence of small and mid-size floods.

The monthly meteorological data for

the last 18 years in the region reveals increasingly sharper variations/contrasts in temperature which cause short-term changes in the amount of precipitation and eventually flooding. These floods can cause not only financial damage but also pose a risk to the quality of bathing waters. This only proves the growing importance of the urban multifunctional storm water treatment facilities which quite successfully protect the bathing waters of a tourist city like Varna from the negative impact of climate change.

The use of urban storm water treatment facilities requires innovative thinking and multifunctional design. But because of their importance for tourism and the large area they occupy, they become a vital element of urban planning as well and are closely linked to the concept of climate adaptive multifunctional land use, especially when it comes to the use of expensive public space.

#### 4.3 Climate Communities: Citizens saving energy from Limburg to Europe

Climate communities were launched by the province of Limburg in 2003 in cooperation with the non-governmental organisation, the Belgian Federation for a better Environment (Bond Beter Leefmilieu [www.energyneighbourhoods.eu](http://www.energyneighbourhoods.eu)). The rationale of the project was to reduce CO<sub>2</sub>-emissions as was agreed in the Kyoto-protocol of 1997 and the objective: "saving energy in private households". The approach was bottom-up. About 8-12 households in certain neighbourhoods united themselves in a group called a Climate Community. The people in the group could be friends, family, acquaintances or neighbours.

The challenge for each Climate Community is to save 8% of energy in six months: in this case, from the 1<sup>st</sup> of November until the 1<sup>st</sup> of February, 2003. The group members compare their energy consumption, exchange tips and tricks to save energy and the competition between the municipalities and the citizens brings in a fun-factor. Each group gets advice from a voluntary 'Energy Master', on how to reduce their energy use with simple interventions such as installing energy saving light bulbs and energy efficient shower heads, dimming the lights more often, lowering the temperature by one degree on the thermostat, cooking with the lid on the pot, apply reflecting foil behind the radiators, shutting off standby-lights, etc. Gas and power meters are regularly checked with an online tool and the energy profit is calculated in detail. Important side effects are certainly saving money (up to 50-80 €/year), enhanced public awareness and a more sustainable way of life and energy use.



Climate Community meeting

The project started in Limburg in 2003 in 13 municipalities and 300 families participated. The campaign was a huge success from the start and in 2004 the project expanded to all the municipalities in Flanders. In 2007, nine European countries applied for funding from the European Commission's 'The Intelligent Energy' – Europe (IEE) programme. The funding was granted and the project, called 'Energy Neighbourhoods', ran from 2007-2010 in Belgium, Bulgaria, France, Germany, Ireland, Italy, Spain, Sweden and the United Kingdom.

In Flanders, there were 443 Energy Neighbourhoods with 5000 participants in 125 municipalities in 2010. More than 500 volunteers were trained to be energy masters. A total of 143 out of the 443 Energy Neighbourhoods managed to save 8% or more energy. Top scores in some municipalities were: 37-35%, 30-82% en 29-80% energy saved. On average, 6.18% of energy was saved in Flanders, about 1500 ton CO<sub>2</sub>.

Almost 6000 households achieved an average energy saving of 10% in nine different countries in Europe, compared to the previous year, using 9,150,000 kWh less energy and saving 3320 tons of CO<sub>2</sub> accordingly. All together, the groups spent approximately €250.000 less on energy during the campaign year.

Energy Neighbourhoods won an IEE-award and funding for the project continued for the period of 2011-2013. Energy Neighbourhoods2 is the successor and

runs in 16 countries. New countries are: Austria, Greece, Hungary, Latvia, Poland, Romania and Slovenia. The new challenge is to save at least 9% of energy in four months.

An important lesson learnt is the social aspect. Citizens are willing and participate enthusiastically when they are actively involved in projects concerning climate change. The Flemish government is investigating how citizens can be involved in climate adaptation on a family or local community level. To be continued...

#### 4.4 Agro-environmental cooperation in Wuustwezel, Belgium

Climate change results in even more problems such as flooding and droughts. Areas with sandy soils, which have less capacity to retain water, are specifically vulnerable to these problems. Therefore, in the Kempen area in northern Flanders, the Interreg Ila project 'Water management in het Benelux-Middengebied' was launched at the end of the 1990 's with the aim of promoting the water conservation principle among farmers in the border region of the Netherlands and Flanders. Water conservation implies maximising groundwater retention during winter and spring, in order to reduce the need for irrigation during summertime. In the project area of Wuustwezel, small manageable dams were placed on private ditches. Unfortunately, the end of the two-year Interreg project in 1999 also put an end to the support and management of these, resulting in neglected dams.

A dam installed at one of the ditches in Wuustwezel.



In order to spark new enthusiasm, as well as provide more knowledge and experience to the farmers involved, and consequently guarantee the continuity of the dam management, the farmers, with the help of ECO<sup>2</sup> (a cooperation between the Flemish government and the farmers union)<sup>8</sup> started the agro-environmental cooperation for water conservation, Wuustwezel.

The cooperation encourages farmers to share knowledge and experience on the matter. Within the group, new initiatives are presented and dis-

cussed, and personalised guidance is offered. In total, 15 farmers have offered to operate the dams. They manage and regulate the dams themselves whilst repairs are organised by the group. Electronic water level meters were installed so that the water level in the fields can be measured. This information is linked to the dam work carried out by the farmers, who make notes on specially designed files for that purpose. This way, the management results can be regularly discussed within the group. The farmers have already noticed the added value of the measures and have acknowledged that the practice provides the best incentive for further cooperation!

#### 4.5 Payment for Ecosystem Services (PES)

Natural ecosystems provide a lot of environmental services and goods that are necessary, not only for maintaining life in general, but also for maintaining the conditions and sustainability of human activities in a specific territory. These services are related for example with the provision of clean water, erosion protection and biodiversity. The maintenance of these services and goods implies benefits for society or a group of people. However, the costs are assumed by public administrations or by private individuals. The lack of economic resources or proper markets in which the costs can be supported by the final user/beneficiary makes the maintenance of these services at risk of disappearing.

The PES is an innovative way of establishing or creating markets for the provision of these services and are a clear example of the different functions of the territory. The philosophy of this tool is that there are people who provide maintenance and offer with their actions an environmental service and there are people who benefit from these services. This is the case, for example, of farmers, who when using the basin of a river, maintain the quality of the water for all the territory downstream with environmentally friendly actions. Taking this into account, a PES can be defined (according to Robertson & Wunder 2005)<sup>9</sup> as:

San Juan reservoir, in Madrid, Spain.



1. a voluntary transaction in which
2. a *well defined* environmental service (or the land use that will probably guarantee that service)
3. is 'bought' by a (at least one) buyer of environmental services
4. from a (at least one) *provider of environmental services*
5. if and only if the provider of the service provides that service continuously (this is a conditional or quid pro quo principle).

These tools have been successfully applied in a lot of countries across the American continent and at different scales. But good examples can also be found in Europe. This is the case for example of the San Juan water reservoir in (Madrid) in which, through a participatory process, a scheme of PES was designed in which visitors of the area (most of them come from the close city of Madrid) could enjoy the beauty and natural values of the landscape and also support maintenance costs through the payment of a car park tax to access the area.

#### 4.6 Land property management instruments

Like most European rural areas, the Galician countryside has experienced a depopulation trend in the last 50 years. Nowadays, Galician rural areas have a low and ageing population which leads to land abandonment. This fact, coupled with a fragmented land property structure that makes its management difficult and a strong cultural attachment to land ownership, have hampered land management strategies so far. Hence, many problems derived from land abandonment which in turn affect the environment, agriculture and forestry are very difficult to tackle.

Not managing or using land together with good climate conditions which fosters the growth of plant species, means abandoned or badly-managed land often has a lot of biomass: "fuel" for a fire. This situation is enhanced by climate change since predictions point to future higher temperatures and lower precipitations which will, especially in winter time, increase the risk of forest fires in Galicia. Due to the problems described above, many farmers have difficulties accessing this unmanaged land which they depend on, making them less able to bring about changes and



rendering them less adaptable and resilient to climate change.

In order to solve these problems, the Galician regional government created initiatives like the Land Bank of Galicia and Forest Promotion Societies (SOFOR). The Land Bank is an instrument created to promote land use and reduce the amount of land that is abandoned, intermediating between owners

that have land and don't use it and people who really need it and will use the land for different purposes (farming, forestry, nature, conservation...). The intermediation is done through direct and dynamic contact with landowners and farmers or other users, mainly giving guarantees in the process of renting or leasing land, reducing transaction costs and fears that a lot of people have in Galicia about renting their land. To manage the Land Bank, a web GIS application called SITEGAL ([www.bantegal.com/sitegal/SetLocale.do](http://www.bantegal.com/sitegal/SetLocale.do)) was created where the land that is included in the land bank by its owners is available for use by farmers or other users.

The SOFOR is intended to encourage forest land owners associations to manage their land together. Forest land can then be grouped into large plots, reducing operations costs and increasing benefits to land owners, making managing forest stands easier. Forest owners will be able to invest more money in forest protection and fire prevention measures since these will be more affordable. If a group of owners who own more than the 50% of a forest area agree, they can create a forest management unit. Private forest sector companies can also participate by contributing funding.

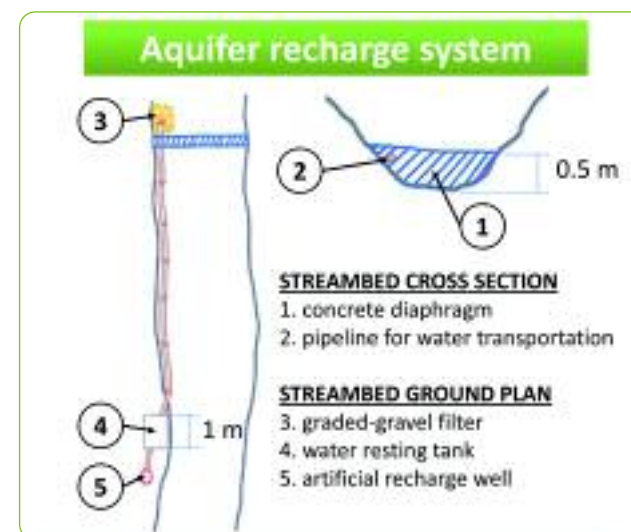
Both BANTEGAL and SOFOR try to increase the adaptability and resilience of agriculture and forest land to climate change by promoting land property structure changes and improving land management.

#### 4.7 Artificial enrichment of underground aquifers in Western Achaia, Greece

South-west Achaia presents natural conditions and geographical features providing all the necessary prerequisites for economic and social development. However, the water quantity and quality have been degraded in both hydrologi-



Forest fires in Monte do Carrio pilot area.



cal basins on the river Piros and river Larisos. The high demand for water for agricultural and urban use results in the intensive exploitation of resources. Heavy pumping leads to declining aquifer water levels and renders underground waters unsuitable for water supply and irrigation as salination enters the inner lowland. This nullifies underground waters, forcing farmers and other users to drill deeper with uncertain results and huge costs.

The Artificial Enrichment of Underground Aquifers started in 1999,

researched by the Ministry of Rural Economy and was further developed in 2003 as a co-funded project in Achaia. The technique includes the diversion of surface water straight into the aquifers through specially constructed drillings. A total of seven pilot drillings were thus created as an experiment into their feasibility and effectiveness. Their systemic operation can achieve an underground storage of more than 1.000.000 m<sup>3</sup>/year of water. Another ten special drillings were made close to the water points so that water flows naturally to them, with the aim of storing and reinforcing underground water up to 1.160.000 m<sup>3</sup>/year. The proposed duration of the permanent application of those drills were 130 to 150 days per hydrological year (January to May). The Intake was taken from the superficial runoffs from streams and springs in the surrounding areas and the intervention foresees the following works: Water intake work, Water transfer pipe, stagnant water trump and Hydrometer and enrichment pipe.

This practice fulfils the augmented water demands stemming from rural, livestock, industrial and tourism activities in the coastal area, eliminating the ineffective large-scale drillings and the exhaustion of water reservoirs in the wider area by storing water when it is plentiful and recovering it when it is needed.

The benefits of this potential exploitation in areas that face similar problems are the following:

- Large water volumes are stored underground with no water losses due to evaporation or drainage due to shallow quantities.

- The quality of water is not affected by land erosion.
- The technique follows the natural water process without intervening with the environment with huge and expensive surface constructions.
- It is used for pumping in summer when the need is greater and re-charging the natural storage zones in the winter at a very low cost.

#### 4.8 Sustainable rural development policies in Western Greece: “the Basket of Products” and “the Cultivation Plan”

Based on multi-operational agriculture, and working within a framework of Europe’s new development strategy, the region in Western Greece identified restructuring the primary sector of the regional economy as its main goal and launched the “Basket of Regional Products”. This initiative aims to stimulate rural and livestock production, enhancing the competitiveness and certification of products, linking the primary sector of the economy with the processing and the promotion of quality, providing certified products for foreign markets through further facilitated exports and above all, fostering agricultural practices which are more sustainable and respectful to biodiversity and the environment in general. As a *political choice*, it tends to create a competitive agro-food model for the region, pivoting on an axis of identity, quality and sustainability.

The selection of the products included in the Basket was based on a number of criteria so as to ensure specific characteristics which exist with reference to tradition, high standards of nutritional value, environmental protection and preservation, high added cultural value and the support of the local producer.

The Basket was constructed using a concrete methodology that was comprised, inter alia, of conferences with veterinarians and agronomists and consultation rounds with stakeholders in all regional units.

The Basket is an operational plan that functions as an umbrella strategy and contains a series of interrelated *actions* or *proposals* like:

- Guidance points supported by scientific consultants.
- Agri-food partnership consisting of agricultural unions, producers, export enterprises etc...

- Field visits in order to reverse the mentality of local stakeholders.
- Possible funding schemes.
- Production of a cultivation plan.

The cultivation plan is considered the highlight of the operational plan and includes the current state analysis, different cultivation proposals based on the particular characteristics of the region, guidelines regarding the future perspective of agricultural product cultivation and supplementary actions focusing on environmental protection and natural resources (especially waste) management.

This tool is planned to take advantage of integrated cooperation actions and develop a *dynamic Agro-Production Map* for the region, able to provide information regarding meteorological data, the situation of the soil, appropriate use of pesticides and the sustainable use of water and energy sources, as well as the environmental costs or environmental footprint on the territory.

#### 4.9 Secchia River Natural Park

The Secchia River Park Consortium was established in 1989. It was founded to manage land auctions with river protection measures and environmental improvements and landscaping. As part of its institutional purpose, the river authority has set itself the goal of working in an integrated way to define measures and protect and enhance the riparian areas of the river Secchia basin in Italy.

Since March 1997, the Consortium has been responsible for managing the Nature Reserve’s “detention basin of the river” established by the Resolution of the Regional Council of Emilia Romagna to protect against flooding and, in some cases, downstream erosion by storing water. The river Secchia dams are the oldest mill structures and constitute passive environmental protection which manages to store about 15 million cubic meters of water in 200 hectares area.

In parallel with its flood prevention function, the other purpose of the consortium is to deliver services, propose initiatives for schools and improve people’s relationship to nature through the exercise of culture, education, leisure and sport. The park consortium also provides protection and territory control by organising surveillance activities, carried out by institutional authorities and volunteer guards.

These practices aim to ensure the sustainable management of the park consortium by promoting multifunctional land use and stakeholder involvement. In the case of the multifunctional land use, the park has developed a land use system that merges a set of recreational activities, whilst promoting the maintenance and protection of the territory. The consortium is also opening up more to provide opportunities for participation in the planning of socio-economic and cultural partnerships with governments and stakeholders, to involve them in decision-making processes and improve governance.



Water infrastructure at the Secchia River Nature Park. Photo by Claudio Chiossi

#### 4.10 Tools to help achieve good governance; the ACSM group: “Oil Free Zone” and “My Valley” projects

**The ACSM** | ACSM (Azienda Consorziale Servizi Municipalizzati S.p.A.) is a public company that undertakes the production of renewable energy from natural local resources and operates in a territory that covers the municipal boundaries of 13 local councils, which are also its shareholders. This is a mountainous territory in Italy, rich in natural resources such as wood and water; with a low population density (18,400 inhabitants and 23 inhab./km<sup>2</sup>) but with population peaks during the summer and winter tourist season (57,700 people in July and August in the last few years) and whose principal economic activities are tourism, construction and alpine agriculture.

**Oil Free Zone project** | This project tries to take advantage of traditional local resources in 13 municipalities in North East Italy, lower the territory’s dependence on oil and offer the tourism industry a different and enticing factor to attract an environmentally conscious client base. The project involves the collaboration of all business units, taking into account the territorial balance and is



Oil free zone project

kinds of private and public organisations, with different roles and responsibilities. This strongly links ACSM activities to this territory, taking into account not only economic performance but also social, cultural and ecological aspects.

The basis for providing coherence to the ACSM is a territorial approach at a valley scale. Moreover, multifunctional land use is practised, as both forestry and agriculture production are involved in the cycle of energy production, through the use of sub-products such as wood chip and animal waste.

Map analysis in Energy Book

**Project Energy Book** | This project, which was first implemented in the Municipality of Transacqua (the Italian province of Trento), intends to develop a Web-GIS (map below) with a user friendly interface, which gathers and disseminates information regarding the energy efficiency and CO<sub>2</sub> emissions of buildings. In summary, it’s a type of integrated energy cadastre which includes energy



aspects in urban planning. The tool aims to provide useful information for citizens, assist authorities with urban and economic planning as well as supporting experts and the private sector and thus raise awareness and help to make more energy efficient decisions.

### 4.11 Integrated land consolidation model, Vepriai, Ukmerge district, Lithuania

This integrated land consolidation model covering several villages was created together with an agricultural and rural development project for the Ukmerge district in Vepriai, Lithuania.

Main results: new integrated land consolidation plans were prepared, solutions were provided for common territorial management problems (including adaptation measures to climate change), and the potential integration of local development strategies into an integrated land consolidation model were identified.

The integrated land consolidation model solves problems such as:

- Chaotic fragmentation of land.
- Land abandonment.
- Extreme consequences caused by climate change (droughts, floods, frosts, storms, fires, etc.).
- Small private land holdings.
- Land fragmentation caused by intervened state land plots.
- Lack of land reserved for public needs.
- Difficult conditions for any kind of improvement in local infrastructure.
- Poor or bad drainage condition in the areas.

There are various balanced rural development measures such as the construction of new roads (or repairing the existing ones) and reconstruction of drainage systems, implementation of environmental and climate measures, improvement of infrastructure in rural areas, new constructions for public and social needs foreseen during the preparation of the integrated land consolidation model.



Logical scheme of the integrated land consolidation model

### 4.12 Viva Sol: an example of responsible farming



Viva Sol Logo

Viva Sol is an association of cheese eaters and producers in Lithuania who maintain farms based on small-scale and environmentally-friendly production, limited inputs and develop strong links with consumers and local inhabitants. All the work in the farms needs to be done by the farmer with no additional wage-labour. The farmers' aim is to maintain and ensure environmentally-friendly practices at all stages of production, process and sell and rely

on their own labour with as little investment as possible.

Inspired by local, sustainable and civic agriculture, in view of natural and social challenges, Viva Sol developed a wide range of activities across several areas in cooperation with local inhabitants and partners from abroad:

- **The 'Cheese Market'** - a farmers' market based on the idea of solidarity between producers and consumers, enabled four small cheese and bread producers to sell their products directly.
- **A subscription scheme** - inspired by French colleagues. Vegetable growers started weekly deliveries of vegetable boxes to households, creating direct and regular commitments between farmers and consumers.
- **A dairy sheep and goat husbandry project** run together with Heifer international, combining traditions with innovations.
- **'A different farming'** – together with the Baltic Environment Forum started an initiative to network farms demonstrating added value and promoting the environmentally-friendly farming practices along with training and information sessions for farmers and local authorities.
- **The Cheese-makers' Home** - a non-profit company which sells locally produced cheese, bread, and cooked food using neighbour's vegetables allowing, them to involve other villagers into their activities.

All Viva Sol activities and projects allow them seek and share their vision – raising a sense of community and developing the links between city and village, producer and consumer, thus gaining trust, solidarity and stability. To build the trust between farmers and consumers, Viva Sol has introduced the common work-party tool, with people taking part in the farmers' daily work, getting to actually know the farmers' surroundings and getting further engaged with the creation of



a lively village. Environmentally-friendly farming practice helps to develop eco-related self-awareness and adapt to new challenges such as climate change.

Seeking answers to the needs of small-scale farmers, Viva Sol has based its work on three main pillars: Knowledge, Sales and Resources (funding, land), engaging in training and promoting the small-scale and environmentally-friendly farming model.

### 4.13 Using international interdisciplinary student workshops to conduct area studies

International interdisciplinary student workshops, as part of large projects, add value to education as students experience real life problems as part of their curriculum. Students learn, in practice and under pressure, how to cooperate with representatives from other planning cultures and with experts from other disciplines. They develop skills that will be very useful in their working life.

International interdisciplinary student workshops improve projects as students can come up with useful, unconventional ideas. Students are able and dare to contribute refreshing comments, critical analysis and solutions on current policies and practices in a project.

**Example: VALUE workshop, Amersfoort, Netherlands** | In the EU INTERREG VALUE project, supporting inter-regional co-operation, an interdisciplinary student workshop was held in Amersfoort in the Netherlands. Students in urban planning, landscape architecture, nature management and real estate worked together in a four-day sketch match or pressure cooker. They had to develop a housing plan in a large green area in the city in such a way that the value of the real estate would receive a maximum benefit from the green park surroundings. The idea was that this would enable the municipality to invest more money in the park. At the end of the

Student workshop in Strofyliia.



workshops, students came up with completely new ideas, which appeared to have been excluded at the beginning of the official Amersfoort project. Policy officers admitted that the proposed solutions were much better than the official policy making process results.

**Examples: F:ACTS!** | The F:ACTS! international interdisciplinary student workshops have been held in Vouga, Strophyliia, De Wijers and Monte do Carrio. Students from Van Hal Larenstein University (VHL), USC (F:ACTS! Partners) and the universities of Patras, Tirana, Varna and other cities have been involved. In Vouga, different scenarios have been presented by landscape architecture, agricultural engineering and hydrology students. The results were used in a workshop with the relevant stakeholders, held to discuss different water management options for the pilot area. The three scenarios developed by students were used as a means to further open minds and show how the area would “look”, together with the possible goods and services provided by the ecosystem, according to different options for future intervention in the area.

### 4.14 Vierde Bergboezem: city flood protection and retention, connecting the city with rural areas

The general aim of this project in Holland is to find practical, innovative and sustainable solutions for the flood protection of urban areas, combined with the spatial development of retention areas as well as connecting the city with the surrounding rural areas. Another aim is to create stronger connections between the city and rural areas for citizens, help them gain knowledge about or even engage in using the rural areas and all their aspects along with the peri-urban areas, thereby creating a socio-economic impulse.

In the Netherlands, the city of Breda has a probability of flooding once every 50 years when the national standard is once in 100 years. To prevent and reduce floodwater damage in Breda, extra retention facilities will be required.

The retention area is situated north of the city and suitable for other purposes: a combination of landscape, nature, cultural heritage, educational recreation and water storage.

The water retention project objectives are: Preventing Breda from flooding; Compensating for the loss of a nature area to a highway and railway nearby

(HSL/A16); Restoring landscape and cultural history; Improving recreation (biking and walking).

Within the scope of the project, partners focus on flood prevention activities, spatial development and connecting the city with the rural areas, individually and in cooperation with each other. Therefore, stakeholder (community) participation is an important project topic, carried out in conjunction with another topic: child/youth education. Local investments (developing structural works, infrastructure etc.) are prepared and achieved through partner cooperation. By means of visits, internships workshops and other work methods, the exchange of knowledge and experience participation is optimised.

This also means that different partners will be involved in financing the project. Total investments approx costs **€ 8.550.000**

EU	€ 700.000	INTERREG
National	€ 4.300.000	various, incl. acquisition of land
Provincial	€ 1.550.000	
Municipality	€ 200.000	
Regional Water Authority	€ 800.000	
State Forestry Service	€ 150.000	
RWS: project organisation	€ 850.000	HSL and A16

#### 4.15 Weerterbos: using natural processes to adapt to climate change

“het Weerterbos” at the head of a former estuary in Holland is one of the last few large remaining nature areas, following its transformation from heath and moorland in the early 20<sup>th</sup> century into agricultural land. In terms of Climate Change and in particular, the increasing effects of rainfall, this area has the potential to



The area on the right side of the canal will be transformed into multi-functional water storage in case of heavy rainfall. The rest of the time, it can be used for recreation and nature.



The F:ACTSI team visit to Weerterbos

retain surface water. In fact, its former swamp and moorland habitat naturally lends itself to water retention. Returning the land to this original state will create a natural climate-buffer, which will increase the ability of “het Weerterbos” to retain surface-water. Like a sponge, the area holds the overflow of water and releases it in small amounts. Thus, it provides a flood prevention solution for the surrounding areas and cities of Den Bosch and Eindhoven.

Re-designing the area also benefits nature and recreation. For more information, go to: [www.ark.eu](http://www.ark.eu).

The current forest production area will be transformed into a more native forest with natural vegetation. By filling up the drainage system with water, the original swamps will recover. Those natural sponges store the water during periods of heavy rainfall, and in the dry periods they will unleash it. Thus, such a natural buffer helps in two ways: in wet periods it contributes to water retention and in dry periods it supplies water to the surrounding area. After its construction, the system will operate as a natural dynamic area, where human management is reduced, minimising the effects of climate change in the region. The project occupies about 800 hectare and is under construction.

“het Weerterbos” is also a missing link between the Dutch and the Flemish ecology system. The variety of wet and dry vegetation is more attractive for different species. In a central marked area, 20 Red Deer will be brought in. The purpose of this action is to re-introduce this animal into the ecosystem, thereby helping to restore biodiversity. After all the measures are completed there will be an Ecological system in the Netherlands and Flanders with a surface of at least 22.000 ha. This will also give a financial boost to local recreation enterprises.

ARK Nature Development managed the whole process. The stakeholders involved are the Peel en Maasvallei Regional Water Authority from the Province of Limburg and Limburgs Landschap, the nature protection organisation who manage the area. Besides this, key-stakeholders ARK Nature Development communicates a lot with the local farmers, inhabitants and municipalities in the area.

This project teaches us about building an integrated territorial strategy whereby different goals strengthen each other. Also, how different budgets where combined.

Many F:ACTS! principles were used in this project: It is a flexible, long-term plan and different goals and budgets have been combined. It takes care of ecosystem services, all the stakeholders are involved and lastly, it creates a sustainable system.

#### 4.16 Climate change adaptation of the Douro vineyards

In the northern region of Portugal, especially in the highest areas, the effects of climate change are endangering some of the agricultural systems, namely Durience Viticulture. Several specialists calculate that if world temperatures increase on average just 2.6°C, it might be impossible to cultivate vines in warm regions unless the producers adopt measures for adapting to climate change. In the Douro region, this work is being done through a local association – ADVID (Association for Durience Viticulture Development).

ADVID was created in 1982 with the aim of contributing to the modernisation of viticulture and the consequent increase in vine yield of the Demarcated Douro Region, as well as improving the quality of its wines. It has since been dedicated to the promotion, development and support of research work.

Throughout the years, ADVID has conducted technical activities involving experimental research and development, nowadays focused on climate issues in particular. This implies the improvement of an experimental development and practical application in partnership with universities and farmers.

This research covers several aspects of the vineyards including the varieties and their clones, agricultural practices and water management. For this work, ADVID has been studying several aspects linked with the climate (especially tem-



Viticulture landscape in the Douro region.

perature and water availability in the soil), and its variance over the years (having collection and structuring reference data for the Douro).

In the climate context, their activities focus on the climate characterisation of the region and evaluation of wine-growing years. Along with the maintenance of a climate information network, currently being refurbished with stations equipped for radio transmission in six locations in the region, the collection and processing of Demarcated Douro Region (DDR) climate data, analysis of agricultural developments and drafting of follow-up reports on the climate, plant and phytosanitary aspects are under way.

In this sense, ADVID have structured a reference index for harvest quality, to validate the climate effect, and a modelling of the 'effect' on growing based on growth simulation models. These experiences and research are linked with the establishment of zoning studies focussed on climate change issues.

The results of this research are then published, including the technical data, not just in technical publications but also conferences and meetings. The objective is to raise awareness, disseminate the acquired knowledge, discuss adaptation strategies with farmers and further assist them in implementing a truly territorial adaptation strategy.

#### 4.17 Integrated Territorial Intervention (ITI)



Author: Rui Cunha (courtesy of Liga para a Proteção da Natureza).

Portugal, like other countries, has specific areas where biodiversity depends on agro-forestry systems. The aim of Integrated Territorial Intervention (ITI) is to promote environmental efficiency through sustainably managed agro-forestry, in areas where nature values benefit from or depend on agriculture management. The rationale is to maintain the agro-forestry use.

An ITI combines different policy instruments, framed by Common Agriculture Police (CAP) Regulations in the second pillar - Rural Development.

■ It's tailor-made for a specific territory.

- Conciliates agricultural and environmental sectors.
- Promotes the management of public goods.
- Each ITI is specific to a certain territory because it is conceived taking into account the:
  - Identification of target areas.
  - Degree of threat and the importance of protecting environmental values.
  - Goals established,
  - Definition of fair pay.

The steps for designing an ITI are firstly the selection of the main goals (biodiversity and landscape) and the elaboration of a proposal framed by a Rural Development Programme.

The initiation of these actions has a top down approach (national level) but their implementation is local (there are 11 ITI 's in Portugal so far). Throughout its planning and realisation phases, ITI requires cooperation between the project team and the stakeholders in order to be successful: The Ministry of Agriculture, Sea, Environment and Spatial Planning (Management Unit for Rural Development Program), the Services of Agriculture and Fisheries (DRAPS), the Local Support Structure (ELA) and farmers, involving all possible actors covering the national, regional and local levels of intervention.

Once the ITI is established, its success strongly depends on the action of a Local Support Structure (ELA) which is responsible for promoting technical support and actively involving the key stakeholders (farmers).

ITI promotes multifunctionality in the context of sustainable rural land use by establishing a framework for local actions which conciliate both objectives: conservation of areas with natural values and 'traditional' economic activities.

## 5. the policy issues papers

### 5.1 Wide variety of Policy Issues Papers

An important F:ACTS! goal is for partners from each region to prepare a Policy Issues Paper (PIP) to improve their policies and methods on adaptation to climate change. State of the Art Reviews, Thematic Visits, Study Visits, Pilot Actions, Coaching Visits and Internships are used here. Partners have been working together on the PIP's, sharing knowledge, ideas and experiences in three interactive workshops (in Lisbon, Varna and Hasselt). The result is a wide variety of tailor-made PIP approaches reflecting the region's and partner's needs, ambitions, resources and possibilities.

F:ACTS! partners deal with a wide variety of territorial plans. Some are on a strategic level (the Masterplan in De Wijers; the Dutch Water Line). Some focus on the management level (Strofylia). Varna is integrating water aspects in strategic and operational territorial plans.

Some F:ACTS! partners deal with concrete climate change problems. Mostly however, climate change worsens existing problems such as flooding (Varna), forest fires (Strofylia, Carrio), salinisation (Vouga), biodiversity decline and land use problems. Sometimes climate change threatens existing land use.

Most partners consider climate change to be a long term problem that should be integrated into long-term strategies. De Wijers even sets a long-term CO<sub>2</sub> neutral ambition. Almere has its Almere Principles: 'On climate change we do not have problems, we have ambitions' (although we are five metres below sea level already).

All partners are cooperating with a wide range of individual stakeholders like farmers and citizens; institutions such as municipalities, regions, water boards and management bodies. All partners are making big efforts to integrate many different sectors into their new territorial development plans.

Even the role of the pilot areas is not always the same. Some try to influence legislation whilst others try to develop new ways of working.



## 5.2 Overview of Policy Issues Papers

**Galicia** | Territory is considered to be a resource generator. Departments and all other stakeholders should cooperate in joint policies taking into account the physical and cultural aspects of the land. The Monte do Carrío area needs integrated policies. Two policy options have been developed for discussion with Galician politicians and policy makers. The first option is to put an end to the current practice: different local government departments do not share a common vision on the territory and think and work within different sectors like agriculture, forestry, urban facilities and so on. The second option has been inspired by F:ACTS!. In this option an integrated vision for the development of the area will be defined and responsibilities and actions will be distributed to the different departments involved. In this option, special emphasis is put on a learning-by-doing approach. Pilots and good practices will inspire policies.

**Flanders** | Limburg has already developed a mitigation strategy. They will try to put adaptation on the agenda by making vulnerability and opportunity maps. The adaptation policy should not only include spatial planning and water management. Agriculture, mobility, health and well-being are also important. To establish this, Limburg will cooperate with local universities, execute innovative experiments, cooperate with national and local authorities and develop an adequate communication strategy.

VLM together with other stakeholders is involved in putting together the Flemish Adaptation Plan. VLM will also develop guidelines and use best practices from F:ACTS! and Flanders in De Wijers and other VLM projects. The F:ACTS! project demonstrates that collaboration with research institutes, universities and students can lead to inspiring and innovative results.

**Greece** | The lack of integrated plans and the limited collective actions over the years have led to the degradation of the Strofylia protected area, enhancing the vulnerability of both the environment and its people. F:ACTS! provided a rich “Fruit Basket” of tools and methodologies which will be included in the integrated strategy of the Greek PIP. Inspiring future plans and visions for Greek green areas will be proposed connecting them with opportunities for the parallel development of economic and social sectors. The PIP will offer tools and suggestions for the successful management of green areas underlining the urgency for actions in favor of integrating the environment in all policies and plans at dif-

ferent levels of administration. It aims to convince all stakeholders that adaptation to climate change can only secure the sustainability of natural resources, simultaneously creating jobs, attracting investments and ensuring the well-being of the people. Three pillars of sustainable development, all secured by simple and well-structured actions.”

**Italy** | The Italy PIP stresses the relatively high vulnerability to climate change in mountainous areas. Their economy, based on agriculture, farming and tourism, is highly dependent on local ecosystems. The Italian PIP is aimed at giving an overview of the current challenges and opportunities in land use/territorial strategies that the mountain communities in Italy face due to climate change impacts. It describes the strategies successfully implemented by Mountain Communities to adapt to these impacts and persisting problems that the communities are still affected by. It describes how the F:ACTS! project contributed in promoting an exchange of knowledge and good practices from several pilot projects all over Europe and how this exchange of knowledge contributed to provide the basis for developing more sound adaptation strategies to climate change impacts.

**Lithuania** | In Lithuania, the Ministry of Agriculture and the National Land Service are preparing a document which will reflect the objectives that have been set in the regulations of Common Agricultural Policy 2014-2020 and National Strategy of Policy Management of Climate Change. According to Lithuania, sustainable agriculture and rural development is essential in order to conduct climate change adaptation in an economically viable way. According to the Common Agricultural Policy 2014-2020, adaptation to climate change can be established by combining sustainable territorial development, efficient use of natural resources and a shift towards a low carbon economy in agriculture, food and forestry sectors. The involvement of relevant stakeholders such as ministries, municipalities and universities is crucial for the process.

**The Netherlands** | In the Netherlands, DLG and Almere developed generic and inspiring guidelines for sustainable areas using F:ACTS!. DLG and Almere want to make flexible long-term plans; combine different goals and budgets; analyse territory and context; involve all stakeholders; create a sense of urgency; make actions visible and measurable; recognise the importance of education and create sustainable systems. The guidelines will be used to audit on-going projects and as a source of inspiration for DLG, Almere and all their partners in territorial development to achieve more resilient areas.

**Portugal** | Both Portuguese partners recognise that increasing cooperation between different levels of governance and promoting the practice of stakeholder's involvement as a procedure is necessary in order to improve the planning and implementation of complex projects (such as Climate Change adaptation). Such projects call for: integrated territorial approaches, holistic perspectives and effective stakeholder involvement.

Based on F:ACTS! knowledge, three main recommendations are proposed for regional and local levels of governance:

1. Raise awareness and make local impacts of climate change visible to local stakeholders and the general public – start acting now!
2. Stimulate innovative planning techniques, like 'envisioning', scenario analysis or the use of ecosystem services and multifunctionality as basic concepts,
3. Invest in process management for stakeholder participation by providing tools, methods and training for people.

In terms of the process, both organisations intend to present this PIP to local and regional stakeholders who were involved in the Vouga pilot project, developing clear connection to actions, as a project for resilient area development. Besides, DGADR and DGT propose providing support to regional and local authorities (in terms of instruments, expertise...) and implementing lessons learned in other on-going projects where any of these two organisations are involved.

**Varna** | A *Territorial Climate Adaptation Strategy* for an entire agglomeration of seven municipalities – Varna, Aksakovo, Devnya, Beloslav, Avren, Provadia and Dolni Chiflik has been prepared. The seven municipalities propose future inclusion in a common "Regional Planning Scheme". The strategy will be all-inclusive. Risk areas will be mapped. Areas will then be designated for controlled flooding, protection, development of natural areas and production of sustainable energy. Management approaches and standards for design and construction will be changed and updated. Finally, a training program will be established for the technical administration to introduce modern methods and technologies for assessing and managing the risks imposed by climate change.

## 6. F:ACTS! partners

### 6.1 DLG: Government Service for Land and Water Management



Peat land  
in the Western  
Netherlands

As a National Agency, DLG - Government Service for Land and Water management - has existed for almost 80 years now. It was founded in the 1930's, when the first land consolidation act was introduced. Over the past decades, large parts of the Netherlands have been involved in land consolidation. Over the past

thirty years, DLG has been improving conditions not only for agriculture, but also for nature, recreation and landscape design. Since the world economic crisis, a package of work tasks is expected to revitalise the rural areas with the participation of all interested private and public parties. With 1.000 employees and a yearly turn-over of more than €600 million, DLG has executed 400 projects covering 2 million hectares over the past years

DLG is an independent public organisation, with knowledge of the rural area and a focus on carrying out national and regional public policies. Public clients can be supported by fulfilling a role in the field of: Process and Project management, Rural Development/Land Consolidation, Land Banking, National Ecological or Agricultural Network, National GIS Competence Centre and International (cooperation) Projects. DLG integrates disciplines such as hydrology, ecology, land use planning, landscape architecture, (agro)economics, engineering; GIS uses. It also combines finances and links questions about water, ecology, agriculture, cultural-history and recreation.

The Netherlands is a densely populated low-lying country, which has invested highly in housing, agriculture and industries throughout the past few centuries. A large part of the Netherlands consists of polders below sea level (see picture above). It suffers from soil subsidence, a rising sea level, salt intrusion and

increasing main river flow-rates, which makes it very vulnerable to hydrological extremes. The effects of climate change, especially on ecosystems and agriculture, from such things as heavy rainfall and droughts, only increase these risks. Climate adapting strategies have now been developed on various scales. Adaptation measures, such as making the Dutch water management system more flexible and efficient, are being programmed on a lower administrative scale by the provincial and regional water authorities. Also, regional authorities have been forced to become more self sufficient due to the increasing investment costs. Implementation will mostly take place within an integrated territorial approach. The global financial crisis should give such integration a push. Nowadays, as an advisor to national and regional policymakers, as well as a project executor, DLG is involved in many ways and in many roles.

## 6.2 Wageningen University and research centre, Van Hall Larenstein, the Netherlands

Van Hall Larenstein (VHL) is a University of Applied Science, which is part of Wageningen UR. The VHL curriculum focuses on nature and environment, human and animal health and responsible entrepreneurship. A wide range of research units support the education departments which provide skills-based educational programs.

The research unit, 'Green in Metropolitan Areas,' cooperates with the Landscape Architecture, Land and Water Management and Forestry and Nature Management educational departments in research projects in urban areas at a national and European level.

Students play an important role in VHL research. They are the future professionals and research projects act as a learning laboratory. However, their participation can provide extra value in research projects. Students can open windows of opportunity that highly experienced older staff cannot. Students are more flexible and can easily integrate different disciplinary concepts. Also students can ask questions that no-one else dares to ask. VHL has a lot of experience in short student workshops integrating social, economic and spatial aspects.

In a highly urbanised country like Netherlands and many other European cities, green areas are under pressure. Research focuses on the development of methods to enlarge citizens' involvement with green public space. Research varies



Van Hall Larenstein research focus is on topics like landscape as a job creator, short and extreme long-term scenario development for climate change adaptation and the agriculture 2.0 landscape focussing on economically viable sustainable regional food strategies.

## 6.3 Municipality of Almere

From the moment it was established in 1976, in one of the newest polders in the Netherlands, Almere has been one of the fastest growing cities in Europe. Containing 190,000 residents, Almere is now one of the four main cities in the Amsterdam Metropolitan Area. As part of current development plans for this Metropolitan Area, Almere has provision for the growth of an additional 60.000 houses and 100.000 jobs before 2040.

The intended growth of Almere will take place in an ecologically, socially and economically sustainable manner. To inspire everyone who contributes to the future of the city, the *Almere Principles* were defined in concurrence with American architect and international sustainability expert William McDonough:

- Cultivate Diversity.
- Connect Place and Context.
- Combine City and Nature.
- Anticipate Change.
- Continue Innovation.
- Design Healthy Systems.
- Empower People to make the City.

Situated in a polder below sea level, Almere is prone to flooding. The presence of a high density of urban dwellings implies that the flood risk is both a large financial as well as social risk. The natural habitats around the city are situated on clay soil and mainly have a wetland character. These areas are vulnerable to both drought, flooding and extreme rainfall. The effects of climate change only increase these risks.



Aerial view of the city of Almere

Most measures against climate change are executed on a national or provincial level. Examples are Water Storage projects, Ecological Main Structure and Agricultural structure improvement. In Almere, these national and provincial strategies are being implemented within local urban development plans.

## 6.4 Flemish Land Agency

The Flemish Land Agency (VLM) is a Flemish government agency, responsible for the organisation and management of the open space in Flanders. Furthermore, it contributes to shaping rural policy in Flanders. In execution of the manure policy, it works on achieving better water quality. Its field of activity comprises of the rural areas and the peri-urban open space in Flanders.

In Flanders, rising sea-levels, higher temperatures, less but more intense precipitation during summertime and increased precipitation during wintertime are the main climate changes to be expected. Increasing water shortages during summertime will have negative impacts on the water supply. On the other hand, increased and more intense precipitation can generate floods with severe impacts on flood-prone coastal and river zones, agriculture and urban areas. High temperatures can cause severe impacts on public health, especially in urban areas. The combination of these effects can also lead to the loss of biodiversity.

In a region as densely populated as Flanders, with its fragmented open space, climate change is only one of many factors putting pressure on the different sectors. In several cases, climate change will increase the already existing problems.

The VLM seeks to create a sustainable open space where it is good to live, work and enjoy leisure activities. Using an integrated, area-specific approach,



Water conservation is progressively becoming an import issue

several measures are being taken which also temper the effects of climate change. Creating sustainable water systems, preventing soil erosion and protecting and restoring biodiversity are important goals in many projects. Water conservation is also progressively becoming an important issue. The creation of green belts in and around cities can play an important part in reducing the urban heat-island effect.

Agro-environmental agreements with farmers and the execution of a sustainable manure policy have an important role in achieving different environmental goals in rural areas as well. The desire to develop an increasingly joint and area-focused approach is growing, providing opportunities to tackle climate change among other problems more efficiently.

Because of its expertise in land exchange and flanking measures for land owners and land users, VLM is also actively involved in the Sigmaplan. This plan combines natural and economic development measures to safeguard the Schelde-estuarium against flooding.

The future challenge will be to take climate change into account more explicitly when examining an area. The integrated territorial strategies already provide a good framework for incorporating climate adaption in different domains where VLM is currently working.

## 6.5 Province of Limburg

The province of Limburg is one of ten provinces in Belgium. There are 44 municipalities in Limburg and about 840.000 inhabitants. Limburg has an intermediating government acting between the Flemish government and that of the municipalities, which stimulates and promotes the qualities of the whole province as the place to live, work, play, invest in and do business with. Limburg is a strong brand!

The northern part of Limburg, Campines, is vulnerable to climate change due to the sandy soil which warms up rapidly and is sensitive to drought. Water supplies are under threat and natural habitats can suffer from lack of water (quantity and quality): especially water dependent ecosystems. Besides, forests and heath lands are vulnerable to wild fires. On the other hand, due to the consequences of climate



change (more and heavier rainfall, hotter and drier summers), more flooding risks can be expected. Built-up areas and farmland may be at risk of flooding. Flooding can lead to the pollution of vulnerable NATURA 2000 areas, causing loss of biodiversity.

In the south and hilly part of Limburg, Haspengouw, there is a high risk of erosion and mud streams due to heavy rainfall. Droughts, hail storms and late frost lead to failed harvests.

Water-related industry along the Albert Canal depends on a sufficient water supply. The water level in the Albert Canal depends on the water level of the river Meuse, which is a rain river. So in periods of drought, the minimum water supply in the canal is not guaranteed. Inland waterway transport and the economy is affected.

The province of Limburg is already talking about some measures to adapt to climate change: building of water catchments, measures to prevent erosion and mud streams, supporting projects regarding sustainable water use in agriculture, etc. The province of Limburg wants to be climate neutral in 2020 and has initiated a raft of initiatives regarding sustainable development and a platform to involve all the necessary stakeholders. Since the start of the F:ACTS! project, the province is aware of the necessity of making a climate adaptation plan. The first steps are being taken: De Wijers is a good case in how to implement this within provincial administration. A climate adaptation plan for the whole province is a goal for the near future.



Fish pond in De Wijers.

## 6.6 Municipality of Varna

Varna is the third largest city in Bulgaria located in the North East of the country, on the Black Sea coast. The population of the city is 346,000; the total municipal area is 237 km<sup>2</sup>. The Municipality which includes the City of Varna, two big seaside resorts and five villages is highly urbanised and has almost no arable land of commercial importance. There are, however, beautiful forests and several protected areas, including the Golden Sands Natural Park. The terrain is quite complex and fragmented. It comprises of an urbanised plain, divided by Lake



Entrance to the Port of Varna

Varna, bordered by the Franga Plateau on the North, by the Avren Plateau to the South and by the Black Sea on the East. Clearly divided watershed features like gullies, gulches and rivers pass through the city and run off to the sea. The Eastern part of the Municipality is relatively steeper compared to the Western part.

The first natural hazard connected with “climatic contrasts” – the type of climate change typical in this part of Europe – is flooding. For the time being, Varna has experi-

enced only small-scale floods. Such floods appear only in cases of heavy rain: the streets are covered in water, sometimes the traffic has to stop but there are no physical damages to buildings, casualties and/or human deaths. One of the most devastating secondary effects of small and middle-scale floods is the activation of land-slides and land-falls due to the over-moisturising of the sliding surfaces of the ground layers. Depending on the size of the area affected by a land-slide, the economic losses might be striking, as was the case in 1997.

The Municipality of Varna includes the City and five neighbouring villages: Topoli, Kazashko, Kamenar, Zvezditsa and Konstantinovo. The last two being the Pilot Project area implemented within F:ACTS!, The Varna pilot project is an example of a climate adaptive planning practice for a peri-urban area with different stakeholders and different levels of authorities involved. Its primary goal is to bring the problems to the key municipal and technical infrastructure experts. The reasons for the lack of response (both technical and institutional) to the negative impact of climate change have been pointed out and appropriate solutions proposed. The pilot demonstrates the common interests of the municipalities (urban land use planning and green management) and of the state (water management). By this, it aims to open the possibility of ambitious cooperative thinking on regional spatial and land-use planning.

## 6.7 Development Enterprise of Achaia (NEA), Western Greece Region

**The Development Enterprise of the Achaia-Western Greece Region** constitutes a fully incorporated enterprise, established in Patra in 1997. Its flexible operational structure allows NEA to adapt to the regional priorities and developmental objectives, and has solid experience and expertise both in the Strategic and Oper-

ational Planning, Operational Restructuring and Reorganisation and Management and Monitoring of major projects. It has cooperated with various local and regional administration organisations and departments and fully supports the Western Greece Region's work and planning.

Greece, lying in the North Eastern part of the Mediterranean, is one of the 18 most vulnerable areas on the planet due to climate change, predicted to suffer the impact of a rise in the world temperature. In Western Greece, the impacts of Climate Change (CC) are already visible. Precipitation has diminished by 20%, heavy rains have increased along with the phenomena of landslides and floods, while the length of heat waves and strong winds have risen along with the frequency of forest fires, drought, soil erosion and physical discomfort for the residents. Scientific studies describe even worse domino effects on transportation, agriculture, fishery, tourism, urban environment, quality of life, biodiversity, ecosystems, etc. which are all indispensable parts of the region's identity and developmental pillars.

It has been estimated that the cost of 'doing nothing' about CC in Greece will reach €701 billion in 2100, while adaptation actions of €67 billion can reduce the cost to €510 billion (National Bank of Greece, June 2011).

NEA tries, through environmental projects, to raise awareness on Climate Change issues, to 'shield' the region's ecosystems, as well as transfer lessons learned and good practices to the responsible authorities and their working procedures (Region, Municipalities, Stakeholders). Bearing in mind the region's vision for a self-sustaining, extroverted sustainable reform of Western Greece's identity based on human and environmental principles, NEA works on, consults and contributes to the planning of regional strategies for environmental protection, natural resources, culture, economy, sustainable development etc. and tries to incorporate the 'CC adaptation need' dimension into the strategic objectives and policies of the region as well as into its decision making criteria.



Rio-Atirrio  
Bridge in Western  
Greece region

## 6.8 UNCEM: National Union of Mountain Municipalities, Communities and Authorities



View of the  
Dolomites by  
Fiera di Primiero

The National Union of Mountain Towns and Communities (UNCEM), is a national organisation - present in all the Italian regions - gathering and representing mountain municipalities and communities, as well as associating counties, associations, chambers of commerce and other entities operating in the Italian mountain areas.

UNCEM has existed for over fifty years and is representative of an area which corresponds to 54% of the Italian jurisdiction and in which more than ten million inhabitants actually live. From January 2011, UNCEM has started an integration process with the National Association of Italian Municipalities, (ANCI).

After the XV Congress of Trento held in February 2010, UNCEM has taken a "green" direction. UNCEM's new strategy

focuses on increasing sustainable energy production in the mountain areas thanks to hydropower, wind power, biomass and photovoltaics.

Beginning with the premise of recognising mountains as a national resource for the modern development of the country, UNCEM develops its activity offering its services to the authorities who have joined the association. In particular aiming at the:

- complete enforcement of Article 44 of the Italian Constitution;
- the promotion of a mountain policy in line with environmental and territorial protection principles;
- support and provision of research, taking into consideration the peculiar problems of mountain areas;
- support and assistance of local authorities;
- enhancement of regional mountain characteristics;
- promotion of any possible cooperation with national, European and international bodies interested in the development of mountains.

UNCEM also implemented various projects dedicated to energy efficiency, sustainable development and resilience like F:ACTS! (EU level) and “Green Communities” (in partnership with the Italian Ministry of Environment).

## 6.9 Ministry of Agriculture of the Republic of Lithuania

Lithuania is the land of plains and hills spotted with crystal-clear lakes and meandering rivers. Agriculture in Lithuania has a long tradition. Ministry of Agriculture of the Republic of Lithuania is a governmental executive authority, which carries out governmental policies on land, food, fisheries and rural development. These functions are assigned by laws and other legislative acts.



Lithuanian countryside

Agriculture is one of the sectors most sensitive and vulnerable to climate change, since expected changes in temperature, rainfall regimes, and other extreme meteorological events may affect yields and the potential to grow certain crops. This entails a series of challenges to make agriculture more resilient; such as adapting forms of farming, stabilising profits from agricultural production, establishing insurance payment systems and ensuring the social needs of farmers are met. Climate change will also affect forest ecology and therefore forest production.

Agricultural activities are very important in tackling climate change adaptation and mitigation strategies, as they play an important role in reducing greenhouse gas emissions, bio-energy development and carbon retention in soil.

The Ministry of Agriculture is tackling the aforementioned challenges by adapting various legal, planning and socio-economic measures. As well as fostering the exchange of information and experience on climate change adaptation and mitigation, across policy makers at all levels of governance. The Ministry of Agriculture also operates on a more local scale by providing farmers strategic guidelines for adaptation, practical recommendations for farming, and some methodological material on climate change impacts (for example, a methodology for assessing vulnerabilities for a specific region or the whole country).

## 6.10 National Land Service under the Ministry of Agriculture of the Republic of Lithuania

Lithuania's Ministry of Agriculture's National Land Service (NLS) was established on the 1<sup>st</sup> of July 2001. NLS is a state institution, which implements state policy in the fields of:

- land management;
- administration;
- land reform;
- accounting;
- real property cadastre;
- geodesy;
- cartographic development;
- geo-referential databases and information systems needed for agricultural development.

Aerial view of Lithuanian landscape



On the 1st of July in 2010, county governing administrations were liquidated. Therefore NLS has taken over operating land management divisions and other county head administrative functions related to land management. To operate these, 50 territorial management divisions now exist which serve all the municipalities in the country.

The successful participation of the NLS in international projects (e.g. FARLAND, implementation of the INSPIRE directive, FAO, AEIAR, etc.), has supported the achievement of these goals, upgraded staff skills and demonstrated the serious disposition of Lithuania towards international cooperation.

Climate change in Lithuania is expected to increase the frequency of storms which will produce more damages to trees due to strong winds. There will also be more frequent downpours which will increase flood risks and land erosion. As a result, these effects will produce alterations to the landscapes and therefore agriculture, forestry and ecosystems. One of the most important issues in adapting to climate change is to produce bal-

anced spatial planning when elaborating land-use plans and complex land consolidation projects.

The NLS mission is to participate in the process of elaborating land consolidation and other land-use planning documents so as to produce balanced spatial planning which takes into account climate change adaptation issues. This agency is also responsible for controlling the fact that land use and land use changes meet the regulations established in land use planning documents. It is also in charge of updating land-use planning documents and organising the monitoring of land resources

### 6.11 DGADR: General Directorate for Agriculture and Rural Development

The Directorate-General for Agriculture and Rural Development (DGADR) is a central state organisation within the Portuguese Ministry of Agriculture, Sea, Environment and Spatial Planning. DGADR's mission is to contribute to the implementation of policies and regulations in the following areas: farming activity, agricultural genetic resources, training for rural actors and diversification in rural areas, sustainable management of the territory and irrigation. DGADR was created as the National Authority for Irrigation and its assignment is to contribute to the formulation of the Ministry's strategy, priorities and objectives and participate in the elaboration of plans, programmes and projects in the areas described above. Amongst other tasks, DGADR was also assigned the promotion of the economic and social development of rural areas and participation in the definition of the national water policy.

Portugal is one of the most vulnerable EU countries to the impacts of Climate Change (CC) effects. The most significant trends that future scenarios refer to are a considerable increase in the average temperature, increased frequency and intensity of "heat waves", the occurrence of extreme weather events (like intense rainfall or droughts) and greater uncertainty in rainfall patterns. Such



Campilhas in Alentejo– Project with 1840 ha, executed by DGADR, to initiate water storage supply and flood control

effects have several impacts, namely on agricultural productivity, forest fire hazards, changes in land use and water resources.

Adapting to CC effects in terms of improving water management (broadly, considering water storage and use, plus flood control and drainage) and contributing to the sustainability of farms and rural areas as a whole, taking in consideration the preservation of natural resources and the protection of agricultural land are clear tasks for DGADR. These tasks can be accomplished either at an implementation level (such as in the case of the national strategy for rural development, with particular emphasis on irrigation and soil conservation) or on the strategic level whilst contributing to the national water policy.

### 6.12 DGT: Directorate General of Territorial Development

The Directorate General of Territorial Development is a central state administration service, whose mission is to implement the national territorial and urban development policies as well as to create and manage Geographic Information Systems and related data bases. Its skills namely include participation in the definition of the National Territorial and Urban Development Policy (NTUDP), its monitoring and assessment, the promotion, monitoring and assessment of the National Spatial Development Policies Programme and the stimulation, monitoring, guidance and technical support to land management practices at a national, regional and local level. It is also concerned with promoting the conciliation of procedures and adequate technical criteria and the dissemination of related good practices, as well as ensuring the coordination of the NTUDP with sectoral policies and promoting, coordinating and managing the National Territorial and Geographic Information Systems and related data bases, etc.

According to the conclusions of studies by research expert groups on climate trends and scenarios for 2008-2100, Portugal in general, with some relevant regional variations, can expect a significant increase in the average temperature, as well as in the number of hot days and tropical nights. Along with a decrease in indexes related to cold weather, an increase in the frequency and intensity of "heat waves" and a stronger uncertainty in the quantity and distribution of rainfall.

The Directorate General of Territorial Development is one of the key players in the implementation of the National Strategy for Climate Change Adaptation. It's



also responsible for preparing a specific territorial and urban development contribution to the National Strategy Action Plan, namely by preparing and disseminating guidelines and adaptation measures to be integrated in territorial planning and management tools.

### 6.13 The Galician Regional Ministry of Rural and Sea Affairs

The Regional Ministry of Rural Affairs and Sea is the government department in Galicia (Spain) in charge of designing and implementing policies related to sea and rural affairs, including farming, forestry and rural development issues.

Galician territory is characterised by extreme land fragmentation at different levels: at a physical level - with very small parcels, at a use level - with very small farms and forest units - and at ownership levels - with many different landowners. This, together with emigration and depopulation in rural areas, along with a strong feeling and attachment to the ownership has translated into low levels of land mobility leading to a high incidence of abandoned and badly-managed land, then used by other different users as well as having a lot of plots of land without a known landowner. This situation, together with positive climate and soil conditions for biomass production, and that fire was and is used as a traditional way to reduce biomass (scrubland) in rural areas and as a way some people use to make a claim or draw attention to themselves, (pyromania), makes most of the Galician territory at risk of forest fires. Furthermore, according to climate change predictions, forest fire risks will be even higher in the future since the conditions for biomass production will grow, especially in winter and spring time, when rain encourages biomass.

The activities of the Ministry are directly related to land structure and uses and this department is not only responsible for coordinating direct fire-fighting when a wild fire is happening, but it is also for developing and implementing policies to prevent, adapt and fight against forest fires by promoting proper land



Galician countryside

ing current and future users with new mechanisms that reduce administration procedures and involve the population and stakeholders. Promoting the use of the land through the Land Bank as well as giving support through the creation of forest management societies and the development of new land consolidation procedures are good examples of the work done in this sense.

### 6.14 LaboraTe: The Land Laboratory of the University of Santiago de Compostela



Fonseca Palace, USC Rector's headquarters

The University of Santiago de Compostela (USC) is one of the oldest Spanish universities. The USC undertakes its research and teaching activity in the region of Galicia, (NW Spain), through its three campuses; two in the city of Santiago de Compostela and another in the city of Lugo.

The Land Laboratory (<http://laborate.usc.es/en/welcome.html>) is based in the High Polytechnic School at the Lugo campus where disciplines such as agriculture, forest and civil, and topographic engineering are taught. The strong link of the aforementioned subject areas with land strongly determines the research and teaching activities at the Land Laboratory, which focuses on territory and how land property and the structure of land parcels influences land use and there-

fore territorial dynamics. The land laboratory tackles this task from an integrated approach, relying on the multidisciplinary character of its staff and the use of GIS technologies.

The main territorial problems in Galicia are determined by strong property and land fragmentation. This territorial structure coupled with a high demographic imbalance between inland and coastal areas has produced serious land management problems. The lack of proper land management is at the origin of many environmental drawbacks which are aggravated by climate change. The most outstanding consequences of higher temperatures and drier summers are the increase in wild fires, fostered by the high amount of biomass present in unmanaged land. One of the solutions which is being adopted to tackle these issues is the increase of land mobility and the modification of the land tenure structure. Nevertheless, there are many problems when implementing instruments in these lines of action, due to Galicia's cultural attachment to land ownership and land fragmentation.

The Land Laboratory contributes to solve these problems instructing skilled technicians through the Sustainable Land Planning Master (<http://master.terra.usc.es/drupal/en>), operational throughout the past two years. This master will be associated to a PhD programme aimed at training scientists who will orient their carriers in studying both Galician and other Spanish and foreign regions territorial problems and producing solutions. Current Land Laboratory research projects have generated knowledge regarding land tenure and land abandonment, as well as technological tools for planning and land tenure management support such as RULES, SIGui, SITEGAL, etc. These results have been used to give advice to Galician regional government decision makers. One of the main outcomes of this cooperation is the Land Bank of Galicia, which aims to reduce transaction costs for farmers who want to acquire and manage abandoned land. The Land Bank is expected to increase land-use flexibility to better tackle future changes in climate conditions.

**Adaptation** is the conscious or unconscious, planned or spontaneous capacity to modify social, economic and physical structures and processes undertaken by individuals, households, communities or societies so they respond to the observed, expected, or unexpected changes in environmental conditions over time to secure continuity, or become more suitable, whilst keeping the essence of the entity. Adaptation capacity confers resistance and resilience. In the face of climate change –and in the context of F:ACTSI–, adaptation is a purposeful, directed, planned action rather than improvised and unconscious, based on the understanding gained from models regarding on-going and expected changes. Thus, climate change adaptation (CCA) differs from climate change mitigation (CCM) by its action against the unavoidable impacts of climate change, while the latter is concerned with measures applicable to avoid climate change. In this vein, CCM is proactive while CCA is reactive because by focusing on the changes, it recognises them as opportunities to adopt practices more aligned with the new environmental conditions. Understanding climate change as a hazard and risk mitigation (RM) comprises both CCM and CCA, for its focus on the reduction of the hazard, exposure and vulnerability.

**Mitigation** is a dual concept used in two different, although related, contexts: earlier in the realm of risk governance and, later in the sphere of climate change policy and research. Thus, and in order to make both concepts less ambiguous, they should be accompanied by supplementary phrasing in the form of risk mitigation (RM) and climate change mitigation (CCM).

**Risk mitigation (RM)** is the purposeful process of modification of the risk factors, by attenuating some of the hazard dimensions, the conditions of vulnerability or, ultimately, by eliminating exposure, before a disaster occurs. Structural and non-structural measures are applicable. Structural measures are based on intensive use of energy, technology, and capital, modifying the dimensions of hazards or the attributes of exposed elements such as infrastructures. Non-structural measures are of an extensive nature and include risk communication, land use planning, insurance, relocation, renewal, and nat-

ural resource protection. Risk mitigation comprises a coordinated set of sectoral measures which translate sustainable development into practice.

**Climate change mitigation (CCM)** is the set of planned actions aiming at reducing greenhouse gas (GHG) emissions and enhancing GHG removal through carbon sequestration, in order to minimise human impact on the climate system. Measures include reducing the use of fossil fuels by diminishing the demand for emission-intensive goods and services, by changing individual, collective and business practices; switching to the use of renewable energy; and increasing energy efficiency in industry, vehicles in transportation and buildings. The second strategy is based on augmenting carbon sinks through the bio-sequestration of atmospheric carbon dioxide by reducing deforestation, increasing reforestation and afforestation, expanding conservation tillage, and carbon capture and storage (CSS) using geosequestration engineering techniques. These goals may be indirectly achieved using a varied set of measures and policy instruments, including the distribution of pollution permits, carbon trading, emissions taxes, subsidies, and implementing performance standards.

**Resilience** is the capacity, measured by its duration and the final quality of the performance system, of an individual, household or community to absorb the effects of long-term environmental disruption, reacting so as to recover the basic structure and essential functions extant before the event or process, without collapsing. Resilience is relative to the magnitude of the disturbance, and limited by a threshold.

**Vulnerability** is the incapacity of an exposed component of the natural or social system, or the whole system, to withstand the impact of changes in its environmental conditions in the short and the long term, that ultimately may lead an individual, group, or system to collapse. It is defined by a set of unfavourable physical, social, economic, political or environmental conditions which reduce its resistance and/or resilience.

**Governance** consists of the process and outcome of restructuring and adapting policymaking, acknowledging the increasing role of civil society in decision-making and policy implementation, whilst keeping the governmental structures, based on participatory processes, dialogue and negotiation with a range of actors, the measurement of performance, sustained by principles of transparency and accountability in the search for sustainability and the satisfaction

of human needs. Political processes are being reformed to deal with the resolution of the increasing complexity of multi-sectoral, multi-agent problems, in order to increase the efficacy and efficiency of policies and legitimacy of democratic institutions. Governance is complementary, and not a substitute for government. It is horizontal rather than hierarchical, better suited to take into account the complexity of interactions among public and private organisations, and the different levels of administration, than traditional policies.

**Integrated Territorial Strategies** is an approach which looks at reaching a well-balanced impact in the development of a certain geographical area by coordinating sectoral actions and levels of administration in order to attain an efficient use of local natural resources and, ultimately, pursuing sustainable development based on a settled territorial model.

With a multi-objective scope, it comprises policies and strategies aiming to steer land use change and adjust functions approaching land use behaviour, land tenure structures and, normally, construction facilities, and that makes the necessary financial provisions. The co-occurrence, overlap and interaction of multiple functions –agriculture, forestry, mining, conservation, recreation, landscape/seascape - in an area leads to recognise and adopt the principle of multifunctionality of territories, and incorporate governance to deal with the complexity of problems and solutions, with the participation of multiple stakeholders. The actions are implemented following a defined perimeter, and provide a concrete and adapted solution to the area under development (area/project driven). It's the implementation approach of a land management package.

**Land management** is the set of sectoral policies, instruments and practices that deal with the efficient and sustainable use of land as an element coupled with economic, cultural and natural values. Particularly associated with non-urban areas, it comprises negotiated planning of land uses, processes of property arrangement led by public and private agents, and the adoption of sustainable farming and forestry practices which secure livelihoods and subsistence to local communities, benefiting from the ecosystem services obtained from the natural environment and the conservation of cultural landscapes. Integrated territorial development is an appropriate approach adopted to perform coordinated and efficient land management actions.

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- <sup>2</sup> COM (2009) 147/4: Adapting to climate change: towards a European framework for action.
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