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A Methodological Concept for Territorial Impact Assessment Applied to Three EU Environmental Policy Elements

Ein methodisches Konzept für Raumwirksamkeitseinschätzungen, erprobt an drei Politikfeldern der EU-Umweltpolitik

Abstract

EU policies require either impact assessment or evaluation, depending on the character of the policy elements. A relatively new requirement is the need to assess the territorial impacts of a policy as proposed in the European Spatial Development Perspective (ESDP) and promoted by the European Spatial Planning Observation Network (ESPON) 2006 programme. Territorial impact assessment (TIA) is defined as “a tool for assessing the impact of spatial development against spatial policy objectives or prospects for an area” (European Communities 2000). This paper summarises and further develops basic work on TIA and presents a methodological concept and the first results of such a TIA approach, applying it to EU environmental policy (civil protection, water, biodiversity).

Kurzfassung

Für EU-Politiken sind entweder Wirkungseinschätzungen oder aber Evaluationen vorgeschrieben, je nach Gegenstand der Politik. Relativ neu ist die Vorgabe, die räumlichen Auswirkungen einer Politik abzuschätzen, wie es im Europäischen Raumentwicklungskonzept (EUREK) vorgeschlagen und vom ESPON 2006 Programm unterstützt wurde. Derartige Raumwirksamkeitseinschätzungen sollen dazu dienen, die voraussichtlichen Auswirkungen einer Politik auf die Entwicklung von Räumen zu ermitteln, und zwar mit Blick auf raumordnungspolitische Zielsetzungen oder deren Zukunftsaussichten (European Communities 2000). Der Beitrag beschreibt die Grundlagen von Raumwirksamkeitseinschätzungen und entwickelt sie weiter. Er stellt einen methodischen Ansatz und erste Anwendungsergebnisse vor, und zwar am Beispiel der EU-Umweltpolitikbereiche Zivilschutz, Wasser und Biodiversität.

1 Introduction

The goals for European spatial development are based on the overall European objectives of sustainable development and social and economic cohesion. In this context, the European Spatial Development Perspective (ESDP) proposes to examine the effects of European Community policies both periodically and systematically. The ESDP uses the term “Territorial Impact Assessment” (TIA), which is understood as an assessment tool for evaluating major projects. At the

Informal Ministerial Meeting in Tampere in September 1999, the need to develop a coherent TIA methodology was confirmed as part of the ESDP Action Programme: “The development of a common concept for territorial impact assessment (TIA) is necessary to support spatial development policies. The concept shall be of a cross-sectoral nature and include socio-economic, environmental and cultural indicators for the territory in question” (Camagni 2006, p. 2).

The ESPD, however, does not formulate any prescriptions about the design of such a TIA. For the first time this has been addressed by the European Spatial Planning Observation Network (ESPON), where the above meaning of the term is extended to be applied to programmes and policies (ESPON Project 3.1 2004, p. 432). The ESPON 2006 programme has been set up to support policy development and to build a European scientific community in the field of territorial development. The main aim is to increase the general body of knowledge about territorial structures, trends and policy impacts in an enlarged European Union.

The aim of this article is to develop a TIA methodology for EU environmental policies and programmes. Based on the analysis of existing impact assessment approaches and on the requirements of EU territorial policies, as well as on general evaluation standards, this approach should be able to draw a true picture of the territorial impacts of EU environmental policies. Thus, the approach has to fulfil criteria such as orientation towards spatial development goals, the territorial differentiation of assessment results, traceability, flexibility (applicable to different plans and programmes) and the ability to derive policy recommendations at different spatial scales.

This article is based on the TIA approach developed as a part of the ESPON policy impact project 2.4.1 "Territorial trends and impacts of EU Environment Policy".

2 Evaluation and impact assessment of EU policies

The idea of assessing the impacts of a policy is based on a cyclic understanding of the whole planning process. The theoretical steps of a policy or planning process – problem analysis, assessment of alternatives, decision and implementation (e.g. Harris 1967, p. 325) – are part of a policy cycle in which it is necessary to examine whether the projected impacts and improvements have occurred or whether unexpected (and often undesired) side effects have emerged. In the meantime, the general conditions might have changed and, as a result of previous plans, new problems could arise that require the planning process to start again.

Policies can be characterised by different degrees of needs to assess policy decisions. The more another party's resources are involved and the more complex a policy field is, the more there is a need to predict the possible consequences in order to justify the intervention and to identify and, if possible, to avoid unwanted side effects. This is especially the case for decisions of the European Commission, which has consequently placed considerable emphasis on the impact assessment and evaluation of its policies.

The key elements of EU policies can be classified according to the implementation phase as follows:

- *Category A:* Existing operational policy instruments. For these policy elements an ex-post assessment based on observed trends after the implementation can be applied.
- *Category B:* Elements in implementation process. For these elements, regulation at the EU level is ready but the implementation process is ongoing at the regional level. For these elements an ex-ante assessment based on expert judgement of the potential effects of territorial trends has to be applied.
- *Category C:* Policy elements under regulation development at the EU level. For these elements it would be the best to develop the general EU impact assessment methodology by providing TIA tools for the impact assessment framework. Therefore, Category C elements will be excluded from the first application presented in this paper.

The policy elements can be further divided into three classes according to the policy impact mechanism:

- *Regulatory elements:* These are policy elements consisting of specific rules included in national laws (EU ordinances and directives). For these elements, indicators based on the phase of policy element implementation in a certain region can be used.
- *Funding mechanisms:* These are mechanisms that support policy development (structural funds, special funding programmes such as LIFE and Solidarity Fund). For these elements, the use of indicators based on the money allocated to a certain region combined with the expected results can be considered.
- *Others:* These should be described in more detail if they are seen as relevant for a certain policy impact.

The decision concerning whether policy impacts shall be assessed or whether the policy itself shall be evaluated depends on the character of its policy elements. Impact assessment is defined as the "prediction or estimation of the consequences of a current or proposed action" (Vanclay/Bronstein 1995). Evaluation is more comprising. It is the process of looking at what is being assessed and can be defined as the "systematic and objective assessment of an on-going or completed project, programme or policy, its design, implementation and results" (OECD 2002). While impact assessment concentrates more on the desired positive but also on the possibly (unwanted) negative side effects, evaluation aims more at the consistency of the policy as a whole.

3 Principles, context and elements of a methodology for assessing the territorial impacts of EU policies

A territorial impact assessment as envisaged in the ESPON programme has to be carefully distinguished from a general policy evaluation. A territorial impact assessment focuses on the territorial effects of a policy and in a way is of a more specific nature. Within the ESPON Programme, so-called "TIA minimum requirements" were developed by the coordinating cross-thematic ESPON Project 3.1, which can be considered as a checklist for all ESPON policy impact projects (ESPON Project 3.1 2004, pp. 453 ff.):

- *Scoping*: Reference to policy interventions; hypothesis concerning cause-effect relationships; regional scale of observation; reference to past and future
- *Analysing*: Interventions and effects measured; quantitative/qualitative appraisal; technique of analysis
- *Assessing*: Goals referred to (polycentric spatial development, cohesion); applied meaning of spatial/territorial; territorial coverage of outcome.

When looking at this list of requirements it becomes obvious that a territorial impact assessment as defined in the ESPON Programme relates its outcomes to predefined territorial objectives (territorial cohesion, polycentric spatial development). This characterises the TIA as an "objectives-based" approach that allows judgements to be made about the level of the achieved objects. In the classification of evaluation approaches, such a TIA is considered to be a "quasi-evaluation" because questions of value are not addressed (Stufflebeam/Webster 1980, p. 8). This happens in correspondence with the fact that EU environmental policies are mainly regulatory and thus require more an assessment than a true evaluation that includes approaches primarily intended to determine the value of some objects (Stufflebeam/Webster 1980, p. 8).

To date, no common approach to carry out a TIA has been developed. The presented methodology, however, aims at taking into account the listed minimum requirements. Specifically, it refers to existing and relevant policy interventions and identifies cause-effect chains of policies and considers different spatial levels (European, transnational/national, regional/local). Further, the hypotheses are tested in case studies in a qualitative and quantitative way (see Chapter 4). This finally allows statements about the contribution of environmental policies to spatial goals such as polycentric development or territorial cohesion.

4 The TIA methodology

Similarly to the general methodological framework suggested in the ESPON Project 3.2 "Spatial Scenarios and Orientations in relation to the ESDP and EU Cohesion Policy" framework (ESPON Project 3.2 2005, pp. 9 ff., also summarised in Camagni 2006), the TIA methodology that is presented has two levels:

At the *first (or general/European/abstract) level*, basic connections and influences between policies (e.g. regional or environmental policies), territorial trends (e.g. socio-cultural, economic, transport, etc.) and territorial objectives (in the first instance territorial cohesion) are identified and quantified. This approach follows the three phases of scoping, analysis and finally assessment, as suggested in the minimum requirements of a territorial impact analysis (see Chapter 3). This first level has been described by the ESPON Project 3.2 as potential impact (PIM): "General assessment of the impact of EU policies on the overall European territory. This assessment refers to an abstract territory, and the impact may be seen as a general 'potential impact'" (ESPON Project 3.2 2005, p. 11). This assessment is performed against the goal of territorial cohesion.

At the *second level* an estimation of the territorial effects of EU environmental policies on a certain region, taking into account the regional performance of chosen indicators, is carried out. This second phase is similar to the "Territorial impact model for assessing the impact on single regions" (TIM) proposed by the ESPON Project 3.2 (ESPON Project 3.2 2005, p. 11).

Following this framework, a more detailed and applicable methodology has been developed and will be explained in the following.

4.1 Operationalisation of spatial development objectives

The main goals of the ESDP are to support the fundamental goals of European policy: economic and social cohesion; the conservation and management of natural resources and cultural heritage; and a more balanced competitiveness of the European territory (European Communities 1999, p. 10). This shall be achieved by following three major policy guidelines for the spatial development of the EU: the development of a balanced and polycentric urban system and a new urban-rural relationship; securing parity of access to infrastructure and knowledge; and sustainable development, prudent management and protection of nature and cultural heritage.

A question that is central within the whole ESPON Programme is how such spatial development goals can be operationalised. ESPON Project 3.1 points out this general problem: "Spatial objectives, like the concept of polycentricity, cannot be measured directly, but they can only be approached by a combination of indicators which throw a specific light on the subject but that will never cover it one to one" (ESPON Project 3.1 2004, p. 8). This indicates that any approach to operationalising spatial development has to use multiple quantitative and qualitative indicators.

With respect to spatial development, territorial cohesion is one of the key objectives and thus one of the main concepts underlying the research projects that have been carried out under the ESPON Programme. The objective of territorial cohesion is "to help achieve a more balanced development by reducing existing disparities, avoiding territorial imbalances and by making both sectoral policies which have a spatial impact and regional policy more coherent" (European Commission 2004, p. 27). Territorial cohesion as such cannot be operationalised as it comprises very different and often conflicting elements.

Often, territorial cohesion is operationalised by the concept of polycentricity, which is introduced by the ESDP as a part of a "territorial guiding principle" derived from the three fundamental ESDP goals (European Communities 1999, p. 20). However, polycentricity alone cannot cover all aspects of territorial cohesion as it is related more to physical elements of cohesion such as settlement patterns, transportation links and accessibility or functional socio-economic specialisation (Böhme 2004, p. 8 ff.; ESPON Project 2.2.1 2005, p. 27). As long as policies and instruments with a direct impact on these physical elements – like the EU Structural Funds – are under assessment, this concept meets the required needs.

Other authors emphasise a broader view of territorial cohesion and define it as "the territorial dimension of sustainability" (Camagni 1998, p. 17; Camagni 2005, p. 9). This, at the same time, calls for a broader understanding of an operationalisation of territorial cohesion. According to this understanding, territorial cohesion can be divided into the three components of quality, efficiency and identity that reflect the three elements of sustainability (Camagni 2005, p. 10; Camagni 2006, p. 4).

However, although the authors of this article are in line with this broader understanding, up to now no common agreement on these different elements of territorial cohesion has been achieved at the policy level.

In order to operationalise these three components of territorial cohesion they have to be divided into their main elements, described by policy aims and translated into qualitative indicators. The effects of a certain policy can then be described by qualitative indicators based on expert judgement.

- *Territorial quality*

The main policy aim of territorial quality is to ensure a relative homogeneity of life standards at a sufficiently high level in a given territory and to avoid extreme segregation in metropolitan areas. This objective can be described by elements such as conservation and creative management of natural resources, access to services of general interest, quality of life and working conditions, multiethnic solidarity and integration reduction of interregional income disparities, reduction of poverty and exclusion, cooperation between city and countryside, and employment performance (ESPON Project 3.2 2006, p. 15).

The mainly regulative instruments of EU environmental policy can positively influence the elements of territorial quality, especially in the areas of nature conservation and the quality of life.

- *Territorial efficiency*

The main policy aim of territorial efficiency is to increase the efficient use of resources. This objective can be described by elements such as an efficient and polycentric urban system, inter-regional integration, the development of city networks and medium cities, resource efficiency in terms of the consumption of energy, land, water and other resources, general accessibility, sustainable transport (share of public transport and absence of congestion), the quality of transport and communication services, a compact city form with reduction of sprawl, and reduction of technological and environmental risk (ESPON Project 3.2 2006, p. 14).

The regulative instruments of EU environmental policy can positively influence the elements of territorial efficiency, especially in the areas of resource efficiency and the reduction of technological and environmental risks.

- *Territorial identity*

The main policy aim of territorial identity is to consider the issues of identity and local social capital no longer as costs or waste compared to the hard-nosed interests of the economy, but as central concerns in the development of the competitive edge of local economies. This objective can be described by elements such as the conservation and creative management of cultural

heritage, the development of region-specific know-how and knowledge, of territorial “vocations” and “visions”, and of social capital and shared behavioural rules, accessibility to global knowledge and creative ‘blending’ with local knowledge (ESPON Project 3.2 2006, p. 15).

The regulative instruments of EU environmental policy may also positively influence the elements of territorial identity, although the connection seems to be more indirect in this case.

4.2 PIM – the Potential Impact of a Policy

The potential impact of a policy recognises the elements of the policy that might have regional effects. These elements can be subdivided if the overall policy has several implementation options that regions can choose.

The approach to identify the potential impact of a policy (PIM) can be characterised as an empirical-phenomenological systems analysis on the basis of combined expert knowledge and, where information is heterogeneous and/or sparsely available, intuition (WBGU 1994, p. 186). The primary objective of this approach is the identification of the most important effects that are induced by a policy.

In the first stage or scoping phase, the impact of several policy elements on certain territorial trends is identified. The effects of the policy elements on the territorial trends have to be defined separately for each policy element in the scoping phase. There is occasionally a strong link between the policy element and the territorial trend, but often the impacts are side effects of a focused policy element affecting the territorial trend only marginally. The territorial trends themselves can have positive or negative effects on the three objectives of territorial cohesion (territorial quality, territorial efficiency and territorial identity).

For the application of the TIA methodology to elements of European environmental policy, a set of general territorial trends defined by ESPON Project 3.2 was used. These trends were characterized by a clear relation to territorial objectives, but the influence of environmental policy elements on the territorial trends was less pronounced. Therefore, some specific environmental trends clearly affected by the elements of European environmental policy were added to the analysis.

The results of the scoping phase are presented as diagrams of cause-effect chains (see Figure 1). By these hypotheses, the question of what is changed by the intervention(s) is answered. This phase of evaluation refers to an abstract territory, and the impact chains can be seen as general political impact chains. The ide-

as behind and the description of the elements of the cause-effect chains are explained in Chapter 5. This way of identifying and presenting the elements and effects of a policy was inspired by the “Systems Analysis of Global Change” that was developed by the German Advisory Council on Global Change (WBGU 1994, p. 188).

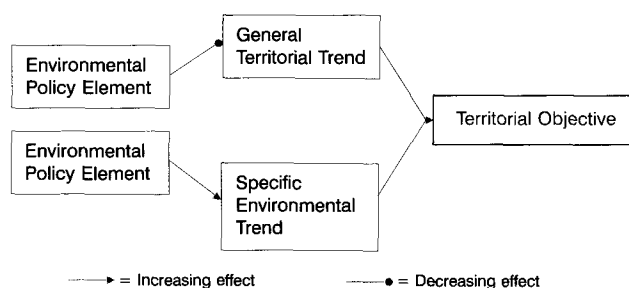
The long cause-effect chains from policy elements through trends to territorial objectives are applied in the analysis of effects related to any of the policy elements. Both general territorial and specific environmental trends are considered. For Category A policy elements, historical development trends have to be considered, while the identification of cause-effect chains related to Category B and C should be based on expert’s judgements of potential trends (see also Chapter 2).

Both links from policy elements to trends and from trends to territorial objectives can have values of -2, -1, +1 or +2, depending on how strong the effect is and whether the impact is positive or negative. The value of a general impact PIM is calculated by multiplying these values. Thus, possible values for PIM can be -4, -2, -1, +1, +2 or +4.

The cause-effect chains can be classified into four groups:

- (1) *Plus-Plus*: A policy element has an increasing effect (moderate = 1, strong = 2) on a trend that has a positive impact (+1 or +2) on a territorial objective. The overall effect is positive (+).
- (2) *Plus-Minus*: A policy element has an increasing effect on a trend that has a negative impact on a territorial objective. The overall effect is negative (-).
- (3) *Minus-Plus*: A policy element has a decreasing effect on a trend that has a positive impact on a territorial objective. The overall effect is negative (-).

Figure 1
General example for cause-effect chains in the TIA for environmental policy



Source: ESPON Project 2.4.1 2006b

(4) *Minus-Minus*: A policy element has a decreasing effect on a trend that has a negative impact on a territorial objective. The overall effect is positive (+).

The observed cause-effect chains are classified into two groups according to their overall effects :

- Cause-effect chains with an overall positive effect on the studied territorial objective: plus-plus and minus-minus chains
- Cause-effect chains with an overall negative effect on the studied territorial objective: plus-minus and minus-plus chains.

In the next phase, the recognised cause-effect chains are described using a story line: a short text that describes the potential territorial effect of a policy instrument.

The story lines aim at the identification of useful indicators for each cause-effect chain. Indicators can be based on the sensitivity (or vulnerability) of the territory to certain changes or on the potential of the territory to benefit from the changes (Category B and C policy elements). They can indicate a measure of actual implementation (money spent to implement the policy) or they can even measure changes in the general or specific trends for Category A policy elements.

4.3 TIM – Territorial Impact Model for assessing the impact on single regions

The final judgement on policy elements and observed or expected trends in a specific region is made by using a Territorial Efficiency Quality Identity Layered Assess-

ment Model (TEQUILA Model; Camagni 2006). This assessment helps to recognise whether an environmental policy element has a positive or negative impact on the three predefined territorial objectives in a specific region based on the indicators developed in the PIM phase.

The recognised indicators representing cause-effect chains as identified in the PIM phase can be calculated for single regions within the area under study, e.g. for all NUTS3 regions in Europe. To make different indicators comparable the values of indicators are reclassified into a relative scale from 0 to 1. The different cause effect chains can also be weighted.

The sums of cause-effect chains show the degree of territorial impact (TIM) of Policy area A on Territorial Objective x in Region r. The end product will consist of three maps showing the overall impact of the studied environmental policy on regions for the three territorial objectives (efficiency, quality, identity; see Figure 2).

The TIM values are calculated as follows:

$$TIM_{x,r} = \sum_c \Theta_c PIM_c S_{r,c} PI_{r,c}$$

Where:

$TIM_{x,r}$ = territorial impact on NUTS3 region r for territorial objective x (territorial quality, territorial efficiency, territorial identity),

r = NUTS3 region,

c = cause-effect chain from political element through trend to territorial objective,

Θ_c = weight of the c chain,

Figure 2

TIM level – Territorial Impact Model for Assessing the Impact on Single Regions

TIM level (NUTS3): $TIM_{x,r} = \sum_c \Theta_c PIM_c S_{r,c} PI_{r,c}$

PIM_c					$S_{r,c}$	Θ_c	$PI_{r,c}$	Σ_c
Story line / Cause-effect chain					Indicator (rel.)	Weight (equal)	Policy intensity	Result (mult.)
Policy element	→	Territorial trend	→	Territorial objective	1	1	1	0.20
Policy element	→	Territorial trend	→	Territorial objective	2	1	1	0.00
Policy element	→	Territorial trend	→	Territorial objective	3	0	0	0.00
Policy element	→	Territorial trend	→	Territorial objective	4	1	1	1.00
Policy element	→	Territorial trend	→	Territorial objective	5	1	1	2.40
Policy element	→	Territorial trend	→	Territorial objective	6	1	1	-0.60
								= 3.00

TIM of Policy area A on Territorial objective x in Region r

Source: ESPON 2.4.1 2006b, p. 56

- PIM_c = potential impact of policy for chain c from the PIM diagram (overall negative or positive effect nominated as -4, -2, -1, +1, +2, +4),
- $S_{r,c}$ = value of the selected indicator for chain c in region r scaled to 0-1,
- $PI_{r,c}$ = policy intensity for chain c in region r (0 or 1; 0 if the chain c from policy instrument to territorial objective is not relevant in region r).

A final aggregation of the results related to the three elements of territorial cohesion into one overall impact might be useful. This will be discussed in view of the real results, gathered from the assessment of the impact of EU environmental policies on each NUTS3 region, carried out by the ESPON 2.4.1 project.

At this point, some remarks shall be made concerning the developed steps so far. In view of the given differences in the physical characteristics as well as implementation of EU policies in the several European regions, some adjustments seem to be necessary:

- The transformation of absolute indicator values to a relative scale requires reference points. At the European level, these reference points are determined by the minimum and maximum values in all regions. For national level case studies it is suggested to take European-wide indicator values as reference points, whereas for regional-level case studies national-level indicator values are suggested. The reference to national levels for regional studies ensures that differences between regions within one country are distinguishable, but it limits the comparability for regional studies in different European countries.
- A weighting of the different territorial trends should be made for the regional application in order to adjust the approach to regional circumstances, possibly applying the Delphi method to representatives of the region (Helmer 1966). Consequently, the weighting parameter is kept in the model but not applied on the European scale. Thus, the weighting parameter has to be seen as a regional parameter.
- The recognised cause-effect chains might not be valid for all European regions, for example policy mechanisms targeted at coastal areas are not of interest to Austrian regions. Thus, the whole cause-effect chain could be left out if it is not applicable in a region (variable $PI_{r,c}$). This selection shall also be done by representatives of the region.

5 Application of the TIA methodology

In the following, the TIA methodology of scoping, analysing and assessing is applied to the example of EU environmental policy, which has to be seen as one of the most controversial policies related to a serious impact on territorial development.

EU environmental policy covers a large variety of policy areas. In some of these areas, the environmental strategies have an explicit "territorial relevance" or even an "explicit spatial planning dimension." A territorial relevance of EU environmental policy exists whenever its implementation has a territorial dimension or, in other words, the policy is addressed differently with respect to different spatial areas (e.g. certain objectives for protected areas in the context of the Natura 2000 Network and others for buffer zones). An explicit spatial planning dimension can be stated whenever the implementation of an environmental policy might lead to a conflict, duplication or to coherence with spatial development goals and/or spatial planning policies (this distinction is rather academic, but it shall be mentioned here for analytical reasons) and might finally in so doing influence spatial structures.

By looking at these policies, specific differences in the spatial dimension of the respective policy claims can be observed:

- *Site*: Some territorially-relevant EU policies relate to certain installations that exist on certain sites. Thus, the territorial aim of the policy is site-specific (e.g. SEVESO II Directive).
- *Network*: Other EU policies relate to a spatial network. Here, the territorial aim is network-specific (e.g. Natura 2000 Network).
- *Area-wide*: A third group relates to the whole EU territory, meaning that in any place within the EU territory, the policy shall be applied. This territorial aim can be characterised as being area-wide (e.g. WFD, Air Quality Directive).
- *Cross-sectoral*: Further policies reveal territorial effects but cannot be characterised as typically spatially specific. Moreover, they aim at a good implementation of EU environmental policies ("support to policy"; Tamborra 2005) by ensuring a proper identification and assessment of effects on the environment, and thus are cross-sectoral (e.g. SEA, EIA).

In order to cover the whole range of possible territorial relevant policies, the methodology was tested for the three environmental policy areas: *civil protection*, *water* and *nature and biodiversity*. This article will focus on European civil protection policy. The results for the

territorial impact assessment at the European level for civil protection are presented in detail, whereas there is only a short overview of the TIA for water policy and nature and biodiversity policy. There are other environmental policy elements that are more territorially relevant, but the relatively simple example of civil protection policy is able to illustrate how the TIA methodology works in practice. Moreover, the empirical basis is nearly complete and the policy already implemented.

The estimation and judgement of the cause-effect chains that will be presented in the following has been done by selected experts (EU policy researchers as well as practitioners in the case study areas, see also Camagni 2006). These experts were qualitatively interviewed and confronted with the first cause-effect relations that were hypothesised by the authors.

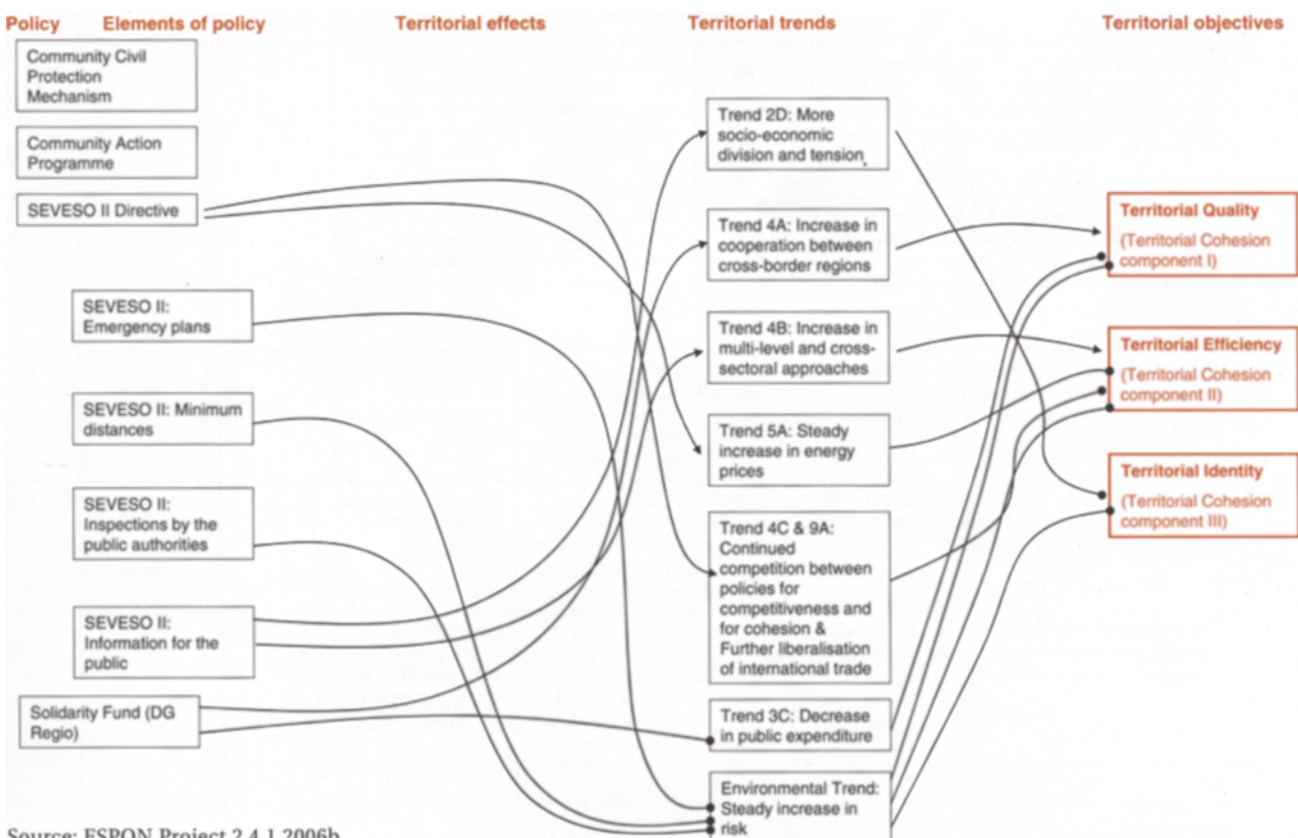
The results of the TIA application for the two other policy elements, water and nature, are also promising, but more in relation to the material contents than to methodological details (see Chapters 5.2 and 5.3 and for a more detailed assessment the final report, ESPON Project 2.4.1 2006b).

5.1 Civil Protection Policy

Civil protection policy encompasses the whole disaster circle. In particular, disaster prevention is highly relevant for territorial development (see ESPON Project 1.3.1 2005). In addition, instruments like the Solidarity Fund can be understood as a possibility for the integration of environmental aspects in territorial development. The ecological, social and economic impact of environmental policy could be properly assessed by this example. Finally, with Art 12 the SEVESO II Directive contains a spatial and environmental component.

The EC's civil protection policy is interpreted by ESPON project 2.4.1 by means of the following cause-effect chains: When looking at the concrete tools encompassed by civil protection policy, it becomes obvious that the Community Civil Protection Mechanism and Community Action Programme are not of territorial relevance. Moreover, the forthcoming EU Directive on Flood Risk Management is excluded from further analysis, since it belongs to the Category C elements under regulation development at the EU level. Here, the impact assessment of the Commission should be used in order to avoid unwanted negative side effects on territorial cohesion. All other identified policy elements have been linked with territorial trends and

Figure 3
Cause-effect chains of EU civil protection policy. Arrows show positive, circles negative links



objectives as illustrated by Figure 3 and explained by Table 1 below.

The TIA for the impacts of European civil protection policy on the territorial development comprises 15 cause-effect chains (see Figure 3). Four indicators at the national level were identified that are available and suitable for nine of the recognized cause-effect chains.

These indicators are

- the existence of internal and external emergency plans,
- the percentage of inspected SEVESO II establishments in relation to overall number,
- information issued to the public, and
- money from the EU Solidarity Fund after a disaster event.

Table 1
Story lines, indicators and impact values for the policy area of civil protection

No.	Story line	Best needed indicator (BNI)	Best available indicator (BAI)	Impact of policy on trend	Impact of trend on objective	PIM
1	The territorial quality of the living and working environment may suffer from a steady increase in risks related to natural and technological hazards, but the Seveso II emergency plans (Art. 11) aim at avoiding major accidents	Performance of emergency plan according to triennial tests	Existence of emergency plans (available at NUTS0 level)	- 2	- 2	+ 4
2	Territorial efficiency (i.e. competitiveness and accessibility) may suffer from a steady increase in risks related to natural and technological hazards, but the Seveso II emergency plans (Art. 11) aim at avoiding major accident hazards	Performance of emergency plan according to triennial tests	Existence of emergency plans (see above)	- 2	- 2	+ 4
3	Territorial identity (i.e. social networks) may suffer from a steady increase in risks related to natural and technological hazards, but the Seveso II emergency plans (Art. 11) aim at avoiding major accident hazards	Performance of emergency plan according to triennial tests	Existence of emergency plans (see above)	- 2	- 1	+ 2
4	The territorial quality of living and working environment may suffer from a steady increase in risks related to natural and technological hazards, but inspections by the public authorities (Art. 18) aim at avoiding major accident hazards	Effect of Art. 18 on attention paid to Seveso requirements	Percentage of inspected establishments in relation to the overall number (available at NUTS0)	- 1	- 2	+ 2
5	Territorial efficiency (i.e. competitiveness and accessibility) may suffer from a steady increase in risks related to natural and technological hazards, but inspections by the public authorities (Art. 18) aim at avoiding major accident hazards	Effect of Art. 18 on attention paid to Seveso requirements	Percentage of inspected establishments in relation to overall number (available at NUTS0)	- 1	- 2	+ 2
6	The territorial identity (i.e. social networks) may be negatively influenced from a steady increase in risks related to natural and technological hazards, but inspections by the public authorities (Art. 18) aim at avoiding major accident hazards	Effect of Art. 18 on attention paid to Seveso requirements	Percentage of inspected establishments in relation to overall number (available at NUTS0)	- 1	- 1	+ 1
7	Territorial identity may be negatively influenced by more socio-economic division and tension, but the information for the public can be seen as in line with risk governance principles	Changes in community's perception of risks related to major accident hazards	Information issued to the public (Available at NUTS0)	- 1	- 1	+ 1
8	Territorial efficiency may benefit from an increase in multi-level and cross-sectoral approaches that may be stimulated by the information for the public	Existing cooperation in the context of projects under the regime of Seveso II	Information issued to the public (Available at NUTS0)	+ 1	+ 1	+ 1
9	Territorial quality may suffer from a decrease in public expenditures, but aid spent by the solidarity fund may counterbalance this effect	Financial aid spent/year by the solidarity fund in relation to population of NUTS3 area	Financial aid spent/year by the solidarity fund in relation to pop. of a member state	- 1	- 2	+ 2
	Sum					+ 19

Source: ESPON Project 2.4.1 2006a

These nine cause-effect chains and the related story lines are presented in Table 1. Values are given to the links between a) policies and trends and b) trends and objectives based on experts' opinions (of the ESPON project 2.4.1). The given values are multiplied to obtain a PIM parameter for the cause-effect chain and related story lines, i.e. parameter PIM_c in the TEQUILA model.

Even though the result of +19 for these nine cause-effect chains remains only fictional without looking at a concrete region, it becomes clear that the overall territorial effect of the civil protection policy can be estimated as quite positive. There are only minor possible conflicts and opponents, and the acceptance of this policy element generally seems to be very high.

The results of the TIA applying the equation as displayed in Figure 2 are shown at the NUTS0 level on Maps 1, 2 and 3. According to the TIA, the Czech Republic, Luxembourg, Hungary, Lithuania and Austria can expect the most positive influence of European civil protection policy on the development of territorial quality, while at the other end of the scale, Slovenia, Slovakia, Malta and Cyprus have only a very small positive impact.

The results for the development of territorial quality in Austria and the Czech Republic were positively influenced by the money the countries received from the EU solidarity fund in the years 2002 to 2004. Germany,



Map 1
TIM values territorial quality
at the European level

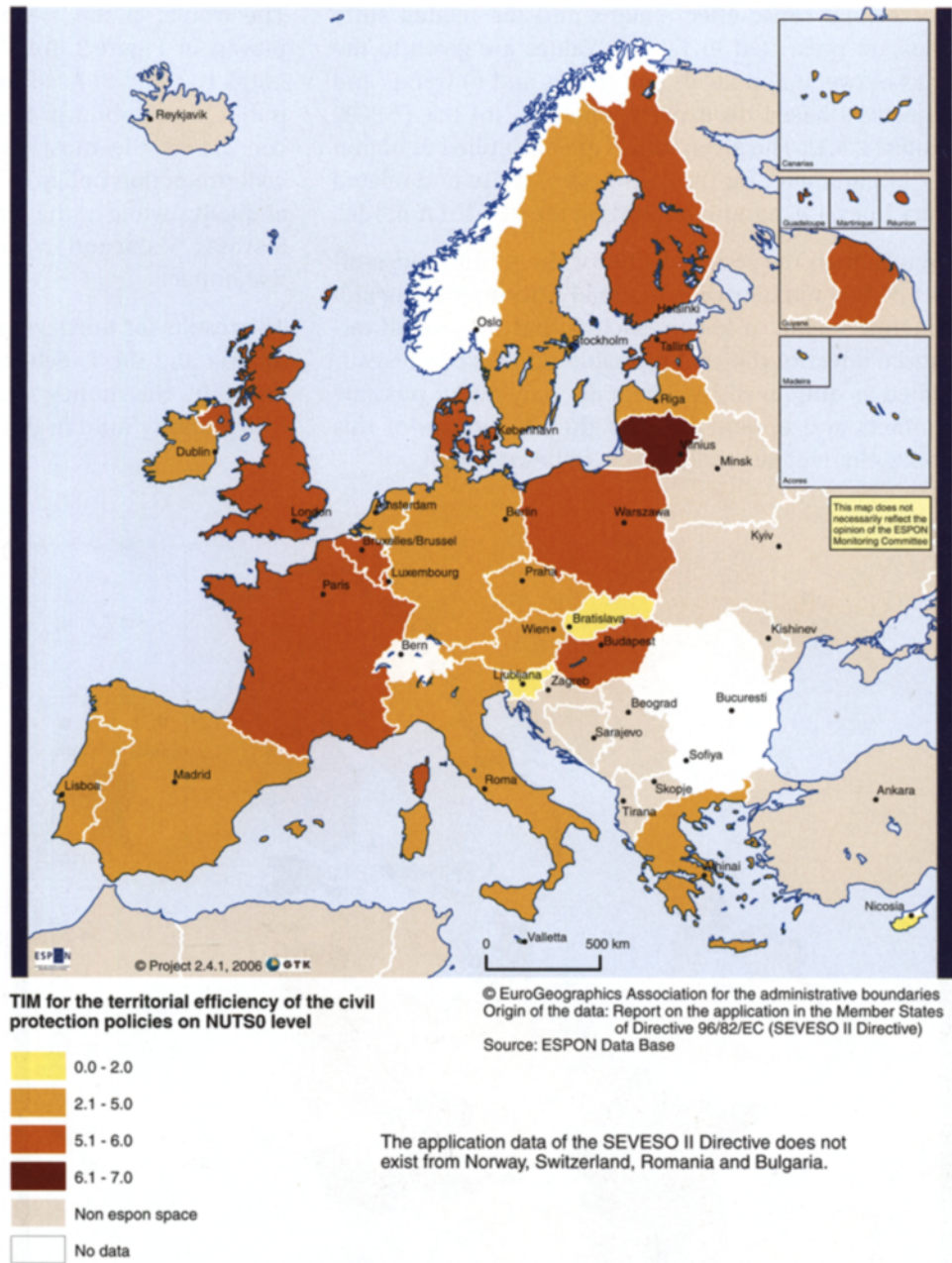
TIM for the territorial quality of the civil protection policies on NUTS0 level



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Origin of the data: Report on the application in the Member States of Directive 96/82/EC (SEVESO II Directive)
European Union Solidarity Fund Annual report 2004
Source: ESPON Data Base

The application data of the SEVESO II Directive does not exist from Norway, Switzerland, Romania and Bulgaria.

Map 2
TIM values for territorial
efficiency at the European level

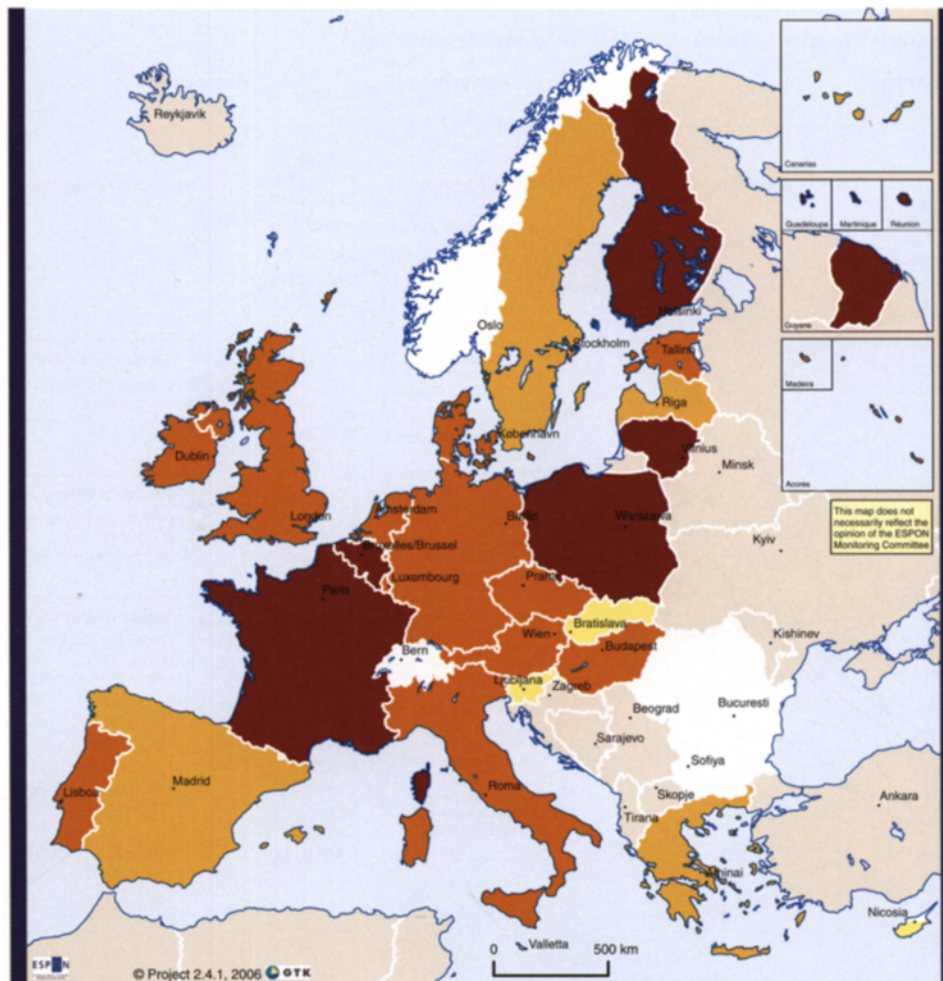


Spain, France, Italy, Malta and Portugal also received funding, but the amount per capita was considerably smaller (see Map 1).

Concerning territorial efficiency, Slovenia, Slovakia, Malta and Cyprus gain the least advantage from civil protection policy, while the territorial development of Lithuania gains the most benefit (see Map 2).

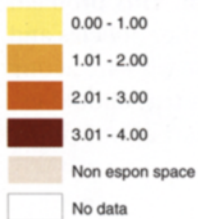
The most favourable conditions for a positive development in territorial identity are seen in France, Belgium, Poland, Lithuania and Finland, while in Slovenia, Slovakia, Malta and Cyprus hardly any positive impact is expected based on the TIA results (see Map 3).

Slovenia, Slovakia and Malta obtain low TIA results for all three territorial objectives, because none of these countries had inspected its SEVESO II facilities or developed emergency plans (in 2002). The situation of Cyprus is slightly better, because the inspection of SEVESO II facilities has been completed. On the other hand, Luxembourg, Hungary and Lithuania have inspected all facilities and also implemented internal and external emergency plans.



Map 3
TIM values for territorial identity
at the European level

**TIM for the territorial identity of the civil
protection policies on NUTS0 level**



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Origin of the data: Report on the application in the Member States
of Directive 96/82/EC (SEVESO II Directive)
Source: ESPON Data Base

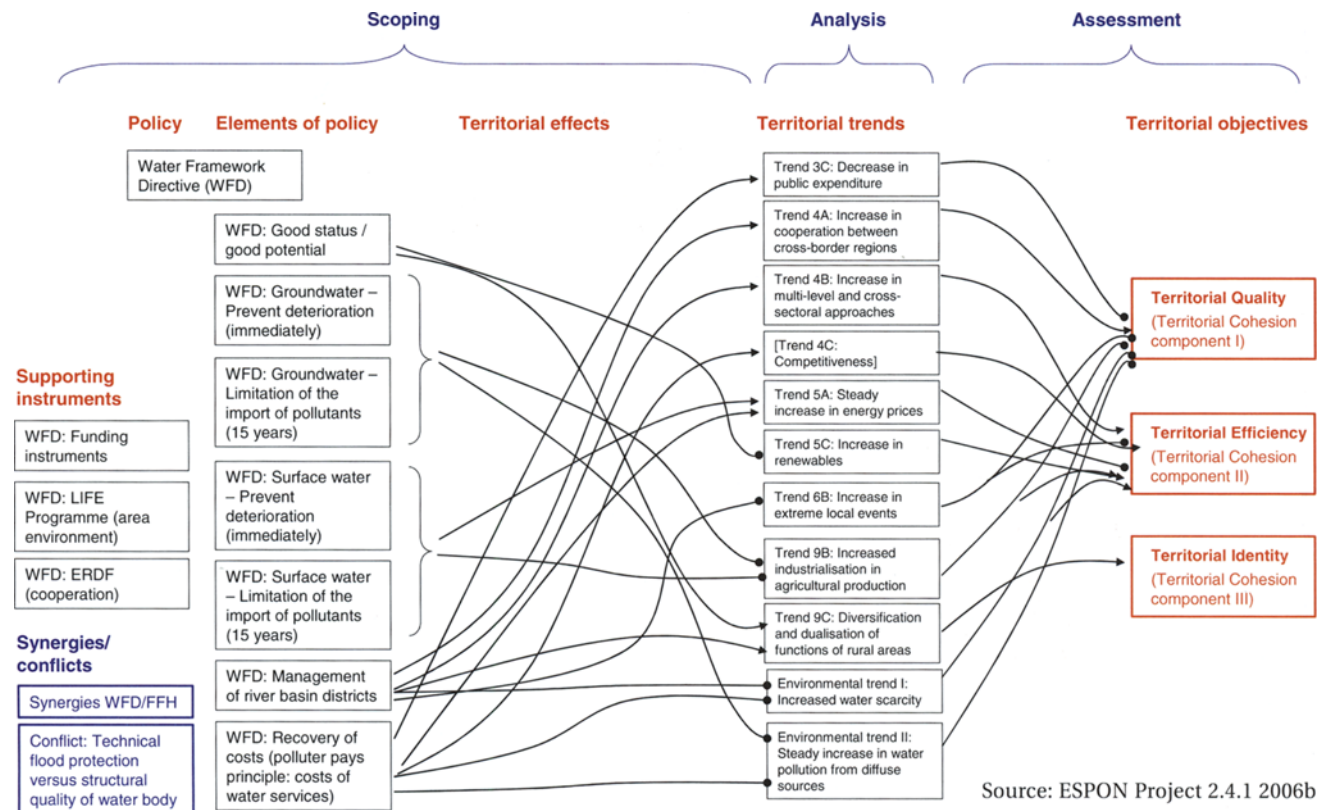
The application data of the SEVESO II Directive does not
exist from Norway, Switzerland, Romania and Bulgaria.

5.2 Water Policy

Water policy belongs to the policies that aim at the whole territory (i.e. area-wide). The Water Framework Directive (WFD) follows a comprehensive spatial approach. It makes use of a broad mix of instruments and measures. Although in the present stage the monitoring process is the focus of the responsible authorities, the coming programmes of measures and management plans will seriously influence territorial development. In addition, with Art. 9 ("Recovery of costs for water services") the Water Framework Directive itself has an economic aspect.

Regulative elements (such as EU Directives) are not the only instruments that may have territorial effects in the context of water policy. The LIFE programme with the sub-group "Environment" as well as the ERDF with the sub-group "Cooperation" might have territorial effects. They can provide funding for the implementation of the WFD in terms of measures that will be chosen by a management plan in the future. However, such effects are not considered as cause-effect chains because the policies do not belong to water policy, but have a broader scope.

Figure 4
Cause-effect chains of the Water Framework Directive (Arrows show positive, circles negative links)



Moreover, it has to be stressed that the relationship between EU water policy and other policy fields shows synergies – between WFD and Habitats Directive –, as well as potential conflicts – between WFD and Civil Protection Policy (technical/structural flood protection measures versus a good quality of the structure of aquatic ecosystems).

Again, this connection cannot be considered as a cause-effect chain, but has to be taken into account in case studies with the example of single plans/projects.

The EC's water policy is interpreted by the following cause-effect chains: Most of the identified cause-effect relations may occur in the future after the management plans and programme of measures have been implemented. Therefore, water policy belongs to a certain extent to the Category B policy elements. For an ex-ante assessment, the classical indicators, showing the state of the environment, are not suitable.

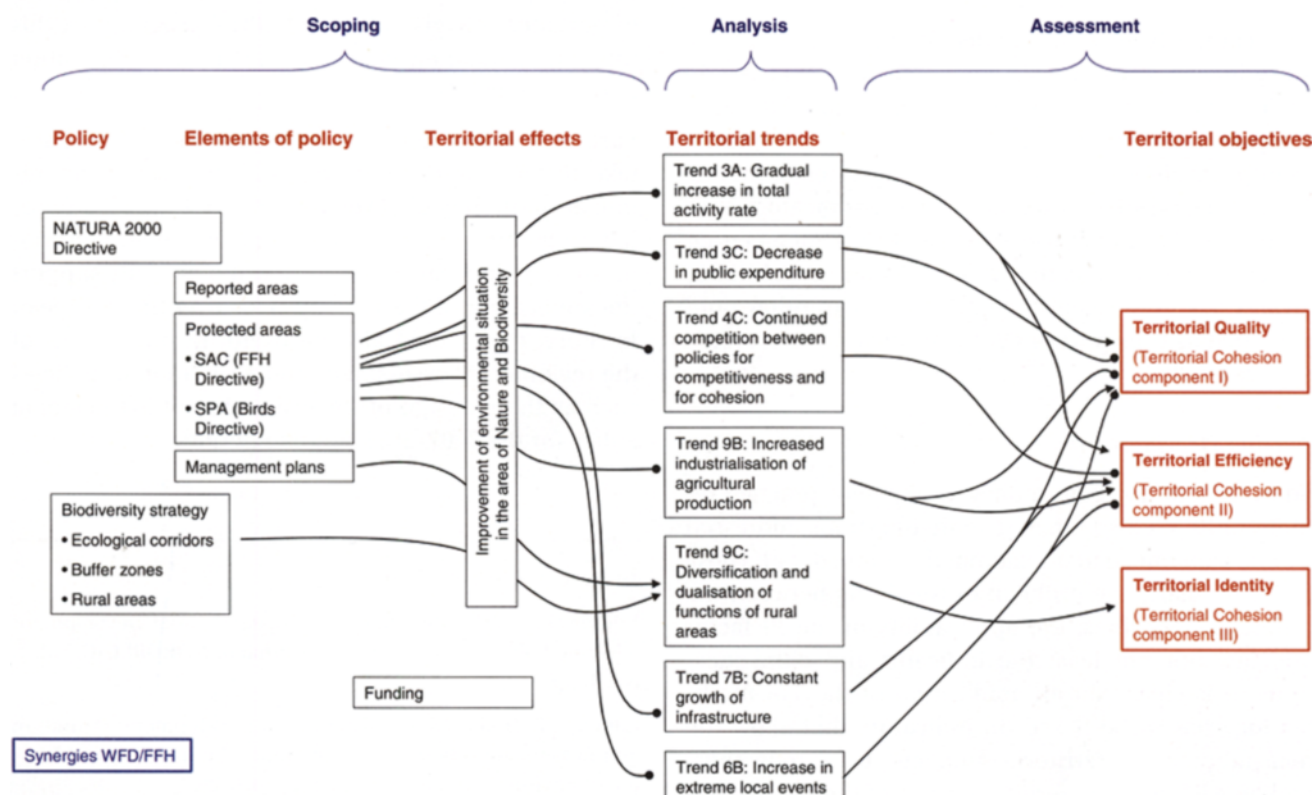
Unlike civil protection policy, water policy is associated with several negative side effects, in particular for territorial efficiency. However, the envisaged positive effects on given environmental trends are more important than these negative side effects. Here, a period of

time has to be passed, because most of the negative side effects will be realised before the expected positive effects of the WFD start to appear. This problem might also be relevant to habitat and other policies and be associated with restrictions for those who are acting in space. Therefore, an appropriate strategy should explicitly be addressed, particularly as part of our policy recommendations.

5.3 Nature and biodiversity

Habitat protection can be seen as an example of environmental policy that concentrates on certain areas (coherent net of protected areas, Natura 2000 Network). Since the reporting process is mainly completed, the influence of the protection of certain areas on territorial development can be examined. In addition, the starting management process allows the economic aspects of the directive to be analysed, in particular the financing of the continuing fostering of the areas. The strategy is in the first instance command and control oriented. Habitat protection is complemented by the more programmatic biodiversity strategy.

Figure 5
Diagram of cause-effect chains of EU nature and biodiversity policy



Source: modified after ESPON Project 2.4.1 2006b

The EC's policy for nature and biodiversity is interpreted by cause-effect chains as shown by the following Figure 5. The establishment of the Natura 2000 Network according to Birds and Habitats Directives with their requirements to create protection areas is of high spatial and territorial relevance. Management of the designated Natura 2000 areas has raised the need for the implementation of specific management plans. For example, many of the projects financed by the LIFE Nature programme have included management plans (European Commission 2005b). The Biodiversity Strategy of the Commission, in turn, defines relevant territorial concepts from the view of the sustainable use of biodiversity across territories that do not constitute protected areas, such as ecological corridors and buffer zones.

EU nature and biodiversity policy is associated with several negative side effects for territorial quality as well as territorial efficiency. In civil protection and water policies, the positive effects such as security for the people or improved drinking water quality may in a positive way directly influence social and economic trends (as part of territorial development). The advantages of preserving habitats and biodiversity might be-

come obvious in the long run, while restrictions in a certain area or region can take effect rather immediately. However, some effects such as an increasing (or preserved) resilience towards extreme events, when protected areas serve as buffer zones or compensate impacts, elevate territorial quality and efficiency directly. The overall result for the potential impact does not show a clear positive or negative tendency for the impact on the territory.

6 Conclusion and outlook

Lessons learned from the application

The presented methodology for a territorial impact assessment of policies has to be seen as the first existing applied approach concerning ESDP- and ESPON-specific requirements.

This approach can be seen as transparent and pursuable for everybody engaged in policy-making (ex-ante assessment) as well as for those who are responsible for the implementation of certain plans or programmes. This means that the methodology, applied to the example of certain environmental policy areas, is transferable to all other policies. Moreover, it can principally be

applied at each spatial level from global to local when using local indicators and data.

The comparison of the added impact values of the story lines already reveals a general trend that not all policies have impacts in the same direction. However, the pure numbers of one policy area cannot be taken as impact values alone. The TIM surely differs from one NUTS3 region to another, because the indicators have different values. Moreover, the assessment of a certain policy area as well as the whole environmental policy always has to be seen in comparison with other policies such as transport or CAP and must be interpreted very carefully.

Further Development

Some criteria for good policy assessment practice remain unfulfilled so far, and some questions addressed by this paper need to be examined in more detail. These are particularly the problem of weighting between the different story lines, the applicability of the PI factor and last but not least the indicator and data questions. It is clear that an application of the TIA methodology has to be based on indicators that allow the measurement of territorial impacts, both repeatedly and on a longer time series. As many of the key analytical elements of the TIA approach are based on trends (see Chapter 5), it has to be ensured that the variables analysing the territorial impact can be adjusted and refined, also including regular validation and possible correction of the involved trends when applying the TIA at a regional level. Here, the PI factor has to be considered in order to be aware of the relevance of certain policies for the different existing types of territory (e.g. urban, rural, coastal, mountainous, peripheral, etc.). Moreover, the different territorial trends have to be weighted, ideally by those who are responsible for the implementation of the relevant policy at the level the TIA has to be carried out. Indicator selection also includes questions of comparability and scale. The ESPON three-level approach to policy analysis (ESPON 2003; 2004, see also Chapter 3.1) focuses on the macro (European), the meso (transnational/national) and the micro (regional/local) levels. Indicators chosen for the TIA should take into account that these levels are properly addressed in order to obtain assessments that reflect the territorial perspectives appropriately.

The most important questions concerning indicator selection, however, concern data availability. First, TIA approaches can follow the approach that most other assessments on the European scale and use the best available data. This approach is the most pragmatic in order to achieve comparable results, but is also difficult to apply, as it may lead to a distortion of results

(ESPON Project 1.3.1 2005). If the TIA approach receives a positive response, which is possible due the importance it is given by the ESPON programme, this might lead to a new chance to call for the preparation of best needed data.

Further development of the TIA approach should also take the necessary indicators and data set structures into account. It could even be a part of future EU funding programmes to support the collection and harmonisation of data. Such data sets would not only support the application of the TIA approach over the European territory; they would also be useful in other areas of the regionalised assessment and evaluation of policies such as the redesign of the evaluation of EU Regional Policy for the 2007–2013 funding period.

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