

ESPON

TERMS OF REFERENCE SCIENTIFIC SUPPORT PROJECT

THE MODIFIABLE AREAS UNIT PROBLEM (MAUP) (2005-2006)

o) Political challenges for the ESPON projects

The Second and Third Report on Economic and Social Cohesion, published in January 2001 and February 2004 respectively, presented for the first time a third territorial dimension of cohesion (beside the economic and social cohesion), which calls for a better co-ordination of territorially relevant decisions. Stressing the persistence of territorial disparities within the Union, the report stated the need for a cohesion policy not limited to the less developed areas as well as the need to promote a more balanced and more sustainable development of the European territory.

The Cohesion Reports represent in that respect a follow up of the European Spatial Development Perspective (ESDP), adopted at ministerial level in May 1999, calling for a better balance and polycentric development of the European territory. The projects launched under the ESPON programme shall follow an integrated approach and, seen together, cover a wide range of issues, such as:

- Identifying the **decisive factors relevant for a more polycentric European territory**; accessibility of a wide range of services in the context of enlargement; integration of wider transnational spaces¹; promotion of dynamic urban growth centres; linking peripheral and disadvantaged areas with those centres; etc.
- Developing **territorial indicators and typologies** capable of identifying and measuring development trends as well as monitoring the political aim of a better balanced and polycentric EU territory
- Developing **tools supporting diagnoses of principal structural difficulties as well as potentialities**, such as disparities within cities and regenerating deprived urban areas; structural adjustment and diversification of rural areas; strategic alliances between neighbouring cities at transnational, national and regional scale; new partnerships between rural and urban areas; potential support from infrastructure networks in the field of transport, telecommunication, energy; etc.
- Investigating **territorial impacts of sectoral and structural policies** in order to

¹ Please be aware that the term “transnational” in this Terms of Reference should not be interpreted as Interreg III B transnational spaces. In this Terms of Reference the word “transnational” indicates contiguous spatial patterns or territories across national borders, which the analysis at transnational scale will display, and which might be different for different indicators and analytical contexts.

enhance synergy and well-co-ordinated decisions relevant for territorial development within policy fields such as Structural Funds, agriculture, transport, fisheries, environment, research and development as well as impacts to be taken into account in Integrated Coastal Zone Management activities; developing methods for measuring the territorial impact of sectoral and structural policies; etc.

- Developing **integrated tools in support of a balanced and polycentric territorial development**; approaches to enhance the potential of cities as drivers of regional development, new tools for integrated urban-rural development and planning, etc.

The Third Report on Economic and Social Cohesion included new scientific knowledge and information from a series of ESPON projects. As such the ESPON programme has met one of its objectives by delivering new scientific knowledge and information on European spatial issues as basis for future policy development at EU-level and within Member States.

With the results of all ESPON projects, the Commission and the Member States expect in particular to have at their disposal: **a diagnosis of the principal territorial trends** at EU scale and of the difficulties and potentialities within the European territory as a whole; **a cartographic picture of the major territorial disparities** and of their respective intensity; a number of **territorial indicators and typologies assisting a setting of European priorities** for a balanced and polycentric enlarged European territory; some **integrated tools and appropriate instruments** (databases, indicators, methodologies for territorial impact analysis and systematic spatial analyses) to improve the spatial co-ordination of sector policies.

In this respect, the ESPON projects will serve as a strong scientific basis for the propositions of the Commission in view of the reform of post-2006 Structural Funds.

Further information on the ESPON programme and single ESPON projects is available at www.espon.lu.

The intention of the ESPON support project on the modifiable areas unit problem (MAUP) is to test methodologies for improved spatial analysis and to open doors for future projects analysing European spatial development. Furthermore, the project is to check possible solutions regarding their use and acceptance by the main policy actors in the field.

i) Relation to the ESPON 2006 Programme

The priorities describing the work-programme of the ESPON 2006 Programme are structured in four strands plus minor ESPON studies and support projects:

1. **Thematic projects** on the major spatial developments on the background of typologies of regions, and the situation of cities.

2. **Policy impact projects** on the spatial impact of Community sector policies and

Member States' spatial development policy on types of regions with a focus on the institutional inter-linkages between the governmental levels and instrumental dimension of policies

3. **Co-ordinating and territorial cross-thematic projects** represent a key component of the programme. These projects evaluate the results of the other projects towards integrated results such as indicator systems and data, typologies of territories, spatial development scenarios. The cross section projects help to thematically co-ordinate the whole programme and add value to the results and to fill gaps, which are unavoidable when different themes are dealt with in different projects.

4. **Scientific briefing and networking** in order to explore the synergies between the national and EU source for research and research capacities.

5. **ESPON studies** in order to deepen results already achieved and/or explore ESPON results and issues in a targeted way in response to demands from policy development.

6. **Scientific support** projects address issues of a technical and/or scientific nature that should be developed into "state of the art" documents, and as well serve as preparatory work for a continuation of ESPON activities after 2005.

This specific scientific support project belongs to a series of feasibility studies. The aim of this study is to explore possibilities of improved spatial analysis related to the modifiable areas unit problem (MAUP) within the ESPON space (EU 25 plus Bulgaria, Romania, Norway and Switzerland). The intention is to open doors for future projects analysing European spatial development, but also to check possible solutions regarding their use and acceptance by the main policy actors in the field.

The project shall be conducted as part of the ESPON network by a transnational team representing at least three Member States. The participation of an ESPON Contact Points as partner(s) in the project is recommended (a list of ECP's can be found on www.espon.lu).

Finally, a close coordination will be required with both the ESPON Co-ordination Unit and the Monitoring Committee of the programme.

ii) General objectives of this project

Currently all ESPON project are asked to carry out their spatial analysis at NUTS 3 level. However, first results have raised the question as to whether this is the most appropriate approach for spatial analysis. Indeed, it is sometimes impossible to find a proper mixture of analytical units which insure the comparability of territorial division in different countries.

The Modifiable Areas Unit Problem (MAUP) has been recognised since the 1970s. The cartographical pattern of spatial distribution of variables or the level of correlation between two variables distributed in space can be completely modified according to the

level of aggregation of spatial units or more generally the spatial grid used for collecting and presenting spatial information. The MAUP has very deep consequences, from theoretical, methodological and practical points of view and is a major challenge when using spatial information for statistical or cartographical purposes.

This has also been experienced within the SPESP (Study Programme on European Spatial Planning) and the ESPON. In both the work with NUTS 3 and 2 levels has been criticised by many researchers who prefer to use a combination of NUTS 2 and 3 levels in order to achieve a better homogeneity of surfaces and population or even approach not at all related to NUTS. In addition also other possibilities related to functional regions, travel to work areas etc. have been considered at various occasions.

Indeed, within the work of spatial integration (action 1.4) under the SPESP and the ESPON 3.1 (and also 1.2.1) project, different solutions for the delineation of areas have been discussed.

In order to assess MAUP and the implications of possible solutions for future ESPON research, it has been decided to launch an ESPON support study on this issue. This study shall investigate possible solutions and their implications on research findings, policy recommendations and the dialogue with practitioners in further detailed. Here, one needs to keep in mind that a proposed methodology needs to serve both the purpose of spatial analysis and application through existing institutional settings. Furthermore, it needs to focus on the specificities of the geographical area to be covered by the research, which is EU25 plus Bulgaria, Romania, Norway and Switzerland.

The aim of the study is thus to provide input for improving the spatial analysis in current ESPON studies and future research in the field. With regard to this, the key issue for the study is the assessment of the possible policy acceptance of an improved spatial analysis. ESPON maps are an important element in the dialogue with policy-makers at European and national level and within various sectors addressed by ESPON. Therefore it is important that the format in which ESPON maps are presented is understood and accepted by these policy-makers.

iii) Primary Research Issues envisaged

1) Different approaches for overcoming the MAUP challenge

The first step of the study will be to identify and present different solutions for overcoming MAUP. This should include the mixing of NUTS 2 and NUTS 3 levels as well as other possible approaches such as the use of functional areas, local labour market areas, grid net data and/or localised information (e.g. residences or places of work). Each approach needs to be described and analysed according to its possibilities and limits (advantages and disadvantages) for achieving a better comparability between countries constituting the ESPON space.

2) New map collection

Following the approaches identified 10 to 15 existing ESPON maps are to be reworked for each of the viable alternatives identified in the first step of the project. The selection of maps is to be made in co-operation with the ESPON Coordination Unit. Special attention has to be paid to maps which are important means for communication with other policy sectors. Accordingly, maps on transportation/accessibility, ICT, R&D and CAP need to be part of the new map collection.

3) Implications on findings and policy messages

Having produced a new map collection, the various approaches to overcoming MAUP need to be assessed regarding their implications on (a) research findings and (b) policy messages deriving from the new maps. A thorough assessment of the differences in findings and policy messages deriving from the various approaches needs to be provided based. This implies an interpretation of the “old” and “new” maps and the differences between them.

4) Assessment of implications for policy dialogue and acceptance

An important part of the study is the assessment of the acceptance of maps based on approaches overcoming MAUP. The main challenge of ESPON is to communicate research findings to practitioners and policy-makers in various sectors. Thus the implications of policy dialogues and the acceptance of new types of maps need to be tested and assessed. For this a series of maps from the new map collection are to be selected in co-operation with the ESPON CU and tested according to their readability and acceptance by policy-makers in various policy fields. The policy fields to be covered are at least regional policy, transportation policy, telecommunication policy, research and development policy, common agricultural policy. The focus will be on European level policy makers but to a certain extend also national policy makers are to be included. This assessment of acceptance needs to be carefully planned and documented and concluded by a comprehensive assessment leading to recommendations on the approach to be used in future ESPON projects.

5) Resume on the methodologies and recommendations for future ESPON projects

Finally, the various steps of the study need to be summed up in a resume on the MAUP problem, possible solutions and their implications. Summing up the main advantages and disadvantages and the limits of the new methodology recommendations for future ESPON project are to be elaborated.

The study team should seek contact and co-operation with other relevant actors in the field, such as Eurostat, EEA, JRC and the INSPIRE programme.

Points of departure for the project are the work developed under the action 1.4 – spatial integration of the SPESP and the ESPON project 3.1.

iv) Expected results and timetable

The study is expected to provide assistance for improvements of the comparability of NUTS analysis between different countries. The recommendations of the study are to

inspire current ESPON projects regarding their spatial analysis and lay the ground for improved analysis in future research.

This calls for a timing of reporting deadlines and expected results in accordance with the timetable below.

September 2005: Interim Report

(a) Presentation and analysis of the MAUP problems and possible approaches to overcoming it (cf. step 1 primary research issues envisaged).

(b) New map collection elaborated by using possible approaches for overcoming MAUP (cf. step 2 primary research issues envisaged).

(c) Assessment of implications on findings and policy recommendations deriving from the new map collection (cf. step 3 primary research issues envisaged).

(d) Presentation of a detailed proposal for assessing the implications for policy dialogues and acceptance of maps from the new map collection (cf. step 4 primary research issues envisaged).

January 2006: Final

Deepening of elements provided in the first Interim report, and new key elements:

(e) Assessment of the implications of alternative mapping approaches for policy dialogues and acceptance of such maps by policy-makers in various sectors (cf. step 4 primary research issues envisaged).

(f) Resume on the methodology and recommendations for future ESPON projects (cf. step 5 primary research issues envisaged).

ix) Estimated budget

The budget for this study should not exceed €50.000.

The budget shall also cover the participation in three ESPON seminars, one Luxembourg, one in the UK and one in Austria.