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Authors:
Peter Weingarten, Stefan Neumeier, Andrew Copus,
Demetrios Psaltopoulos, Dimitris Skuras, Eudokia Balamou
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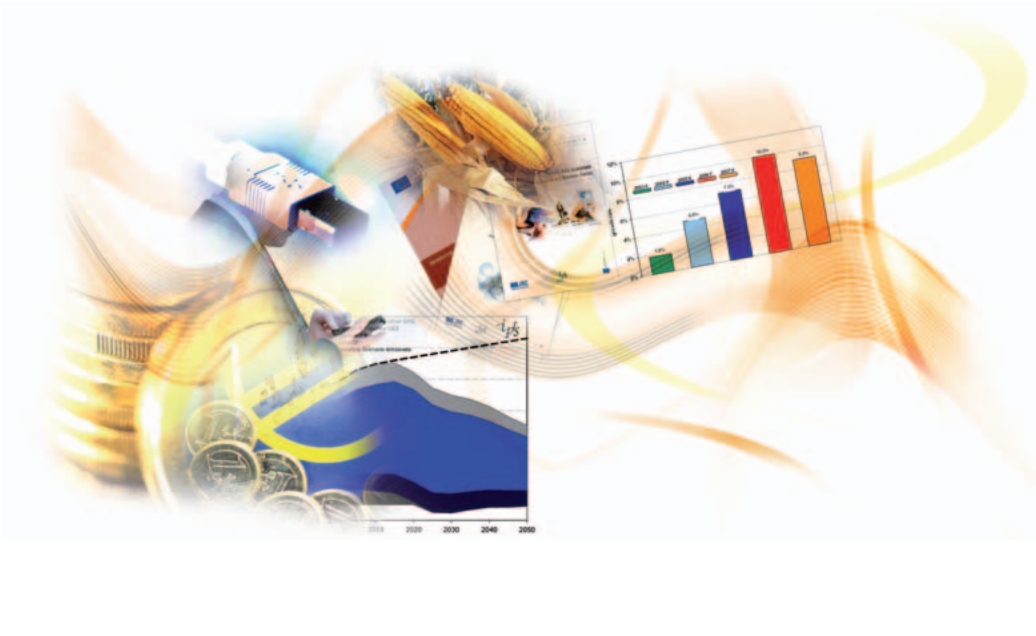

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European Commission
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Contact information
Address: Edificio Expo. c/ Inca Garcilaso, 3. E-41092 Seville (Spain)
E-mail: jrc-ipts-secretariat@ec.europa.eu
Tel.: +34 954488318
Fax: +34 954488300

http://ipts.jrc.ec.europa.eu
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Building a Typology of European Rural Areas for the Spatial Impact Assessment of Policies (TERA-SIAP)

Peter Weingarten and **Stefan Neumeier,**
Johann Heinrich von Thünen-Institut (vTI), Braunschweig, Germany

Andrew Copus,
UHI Millennium Institute, Inverness, Scotland

Demetrios Psaltopoulos, Dimitris Skuras and **Eudokia Balamou,**
University of Patras, Greece

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Peter Weingarten, Braunschweig, July 2009
(peter.weingarten@vti.bund.de)

Abstract

Within the TERA-SIAP project, we developed a set of regional typologies (at NUTS3 level) which provide a suitable basis for Spatial Impact Assessments of a range of current and possible kinds of intervention (Generic Policy Issues) for rural areas. From a range of socio-economic models, we selected Regional Input-Output Models for the Spatial Impact Assessment of two Axis 3 measures (diversification of rural economy, and renovation and development of villages). One of the seven typologies developed, which focused on economic diversification, was used to identify a set of representative case study regions. The modelling results for the 16 case regions illustrated the fact that different types of rural economies are clearly associated with different patterns of policy impacts and that typologies can assist in the choice of appropriate representative regions. The combination of typologies and models are shown to have the potential to enhance the capacity for quantitative Spatial Impact Assessment of rural policy.

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List of Abbreviations

AWU	Annual working unit
CAP	Common Agricultural Policy
CGE	Computable General Equilibrium
CMEF	Common Monitoring and Evaluation Framework
ED	Economic Diversification
ESPON	European Spatial Planning Observation Network
ESU	Economic size unit
FADN	Farm Accounting Data Network
GAMS	General Algebraic Modelling System
GPI	Generic Policy Issue
GRIT	Generation of Regional Input-Output Tables
GVA	Gross value added
HNV	High nature value
I-O	Input-Output
IRENA	Indicator Reporting on the Integration of Environmental Concerns into Agriculture Policy
ISCED	International Standard Classification of Education
KRP	Key rural socio-economic and environmental perspectives
LAU	Local Administrative Unit
LFA	Less favoured area
NUTS	Nomenclature des Unités Territoriales Statistiques
OGA	other gainful activities
PAIS	Proposal on Agri-Environmental Indicators
PPP	Purchasing Power Parity
QoL	Quality of life
RDP	Rural Development Program
RDR	Rural Development Regulation (RDR 1698/2005)
SAM	Social Accounting Matrices
SBS	Structural Business Statistics
SD / δ	Standard deviation
SDMT	Simple data mapping tool
SERA	Study on employment in rural areas
SIAP	Spatial Impact Assessment of Policy
SIT	Single issue typology
SQL	Structured Query Language
SWOT	Strengths, weaknesses, opportunities and threats
TERA	Typology of European Rural Areas
UAA	Utilised agricultural area

Executive Summary

Section 1: Introduction

1. The project was brought into being in light of the increased importance of Pillar 2 of the Common Agricultural Policy (CAP), in the context of both Agenda 2000 and the recent fundamental CAP reforms. It was also necessary in order to assess the need for, and evaluate the effectiveness and efficiency of broader rural development policy, as represented by the Axis 3 measures of the Rural Development Regulation (RDR) 1698/2005.

2. Against this background, the objectives of this study are: (a) to build a Typology of European Rural Areas (TERA) which will provide a suitable basis for Spatial Impact Assessment of a range of current and possible policies for rural areas; (b) to provide guidelines for its potential use, particularly, in conjunction with a set of models; (c) to test the suitability of the TERA for providing Spatial Impact Assessment of at least two different policy measures of the Axis 3 of the RDR.

Section 2: Some Comments on the Evaluation and Modelling Context, and implications for the Rationale for the TERA-SIAP Typology

3. In the Commission's Common Monitoring and Evaluation Framework (CMEF) the term "impact" is defined in terms of the more indirect, final effects of RDR measures on the rural economy. The TERA-SIAP typology is effectively an attempt to capture the regional pattern of the causes of variation in "impact", i.e. in the measure-specific direct effects (depending on the regional absorption capacity), in the indirect and induced economic effects, and in other effects (leakages, displacement, dead weight).

4. A single "structural" typology may allow a single model to address the issue of regional indirect and induced income/employment effects across the full range of rural development policy measures. A family of single issue typologies is further required to describe regional variations in absorption capacity. These variations in absorption capacity are reflected in the direct economic impact of rural development interventions.

Section 3: Generic Policy Issues (GPIs)

5. By studying the policy documents issued by Directorate Agriculture and Rural Development to accompany the RDR, seven Generic Policy Issues (GPIs) were identified in the TERA-SIAP project. These are both compatible with the measure structure of the RDR and with the needs of the TERA. Following our definition, GPIs are themes within rural development policy. They relate to short-term (RDR programme period) objectives, i.e. the kind of development problems, weaknesses or barriers, to which measures are addressed. However GPIs are generic, rather than measure-specific. In other words a GPI, by definition, will normally underlie several individual RDR measures, and most

measures will address more than one GPI. GPIs determine the selection of appropriate indicators and form the basis of the single issue typologies.

6. The following GPIs were identified: (i) Human Capital (sectoral/territorial), (ii) Quality of Life, (iii) Economic Diversification (sectoral/territorial), (iv) Competitiveness (primary sector), (v) Support for Quality Products, (vi) Sustainable Agriculture, (vii) Protecting or Enhancing the Environment.

Section 4: Key socio-economic and environmental perspectives (KRPs)

7. The key rural socio-economic and environmental perspectives (KRPs) are a means of structuring the TERA-SIAP database from which the typologies were generated. They are essentially "families" of indicators. The following 13 KRPs were defined considering the "scope" of the concept of rural policy (here the RDR), the availability of harmonised data and the requirements of the models: (a) Accessibility, (b) Demography and migration, (c) Labour market, (d) Education and training, (e) Cultural heritage, (f) Access to services, (g) Sectoral structure of employment and value added, (h) Pluriactivity (especially tourism), (i) Farm structures, (j) Supply chains, (k) LFA, (l) Intensity and HNV farming, (m) Landscape and nature resources.

Section 5: Models for Spatial Impact Assessments compatible with the typology themes

8. In this section, different assessment instruments (i.e. models) which would be compatible with the GPIs and typology themes specified above, and more specifically with the Quality of Life and Rural Economic Diversification GPI which are related to Axis 3 of the current Rural Development Programmes (RDPs), are discussed. The capacity of different types of models to assess policy impacts, the degree to which these models can be used for spatial impact analysis, and their constraints in relation to the level of geographical detail are investigated.

9. Socio-economic models which could deal with the assessment of the impacts of policy measures related to the Quality of Life GPI include (a) Econometric Residential Choice Models, (b) Economic Base Models, and (c) Regional Input-Output Models. Socio-economic models which could deal with the assessment of the impacts of policy measures related to the Economic Diversification GPI include (a) Regional Input-Output Models, (b) Regional Social Accounting Matrices (SAM), (c) Regional Computable General Equilibrium (CGE) Models, (d) Gravity Models, (e) Shift-Share Analysis, (f) Econometric Residential Choice Models, (g) Economic Base Models, and (h) Keynesian Multiplier Analysis.

10. Taking into account the characteristics of these different models and their capacity to assess the impacts of Axis 3 measures, and after extensive consultation with both JRC-IPTS and the DG AGRI, it was decided to choose Regional Input-Output (I-O) Models for the TERA-SIAP tests. These models are a rather popular and useful tool for the territorial assessment of economic impacts associated with rural policy measures, including Axis 3 measures which particularly interest the TERA-SIAP project.

11. This type of model can demonstrate that the potential effects of policy are not equally distributed amongst EU rural regions. Regional I-O models can produce a wide range of indicators specific to

the territorial impact assessment of Axis 3 policy measures and can estimate policy-specific impacts (investment effects and capacity adjustment effects) on sectoral and economy-wide output, income and employment.

12. For constructing regional I-O tables, the hybrid Generation of Regional I-O Tables (GRIT) was chosen as using a full survey-based method to generate regional I-O tables was prohibitively expensive. The main data requirements for the application of GRIT are a national I-O table and sectoral employment data (at NACE 2-digit level) at the national and regional levels.

Section 6: TERA-SIAP database

13. The TERA-SIAP database contains 60 indicators identified as being potentially useful for the construction of TERA-SIAP typologies. These indicators are thematically structured according to the KRPs. Data are available for all KRPs except for (e) Cultural heritage, and (j) Supply chains data. Regionally, the data is structured according to the 2008 NUTS nomenclature. The database covers the EU Member States with NUTS3 being the smallest regional level. Data were gathered for the most recent year available. A detailed metadata document allows the original data sources to be traced and shows how data were processed. The database also contains the calculation of the typologies.

14. Technically, the database was built as a MS-Access database and a MS-Excel datasheet. If the core "All Indicators" datasheet is updated all interlinked single-issue typologies data sheets will be automatically re-calculated. The database is complemented by a graphical database interface, the Simple Data Mapping Tool. With this interface, the spatial distribution of single attributes/indicators contained in a database can be easily classified and visualised onscreen.

15. The following data sources formed the basis for the specification of potential rural typology indicators: (a) the Eurostat New Cronos REGIO Database; (b) the statistical annexes of the Common Monitoring and Evaluation Framework (CMEF) associated with the 2007-13 RDR; (c) the ESPON Database Public Files; and (d) DG Agriculture's "Rural Development in the European Union - Statistical and Economic Information - Report 2007" (Regional tables).

Section 7: TERA-SIAP typologies

16. The structure and rationale of the typology (or typologies) derives from the distinction between (a) measure/GPI-specific "absorption capacity" effects with associated direct economic impacts, and (b) indirect and induced (income and employment) impacts of RDP. This suggests a "two-layer" suite of typologies. One layer is a set of typologies (single issue typologies), one for each GPI, which groups regions according to the socio-economic characteristics which affect the scale of the demand (absorption capacity) for support through the measures associated with that GPI, and the other is a single typology, to be applied across all GPIs, which captures the main aspects of the regional economy which are likely to determine the indirect/induced impact of each € of CAP Pillar 2 expenditure. These could conveniently be termed "Absorption Typologies" and "Structural Typology" respectively.

17. Against the background of the practical policy environment of the proposed TERA-SIAP typologies, a transparent and commonly understandable approach, that allows the typology building and region grouping steps to be easily retraced, seems more appropriate than the more sophisticated and complicated multivariate approaches, such as cluster analyses. Therefore, the typology building approach applied is based on simple cross-tabulation procedures, and/or calculation of z-transformed means. Regions are allocated to a specific type according to how their score relates to the EU27 mean. For the Structural Typology (territorial component) a Shannon diversity index of employment was calculated.

18. The following Absorption Typologies were developed: (a) economic diversification typology, (b) territorial human capital typology, (c) sectoral human capital typology, (d) farm competitiveness typology, and (d) LFA typology. All of these typologies can be characterised as "performance" typologies comprising a set of types of regions for which there is a fairly obvious order ranging from "good" to "bad".

19. The structural typology was differentiated into (a) a sectoral component (reflecting the relative size of agriculture and agriculture-related industries in the regional economy) and (b) a territorial component (reflecting the degree to which a regional economy is "self-contained").

20. For each typology the related RDP measures, the KRPs, the overview of the rationale, the outline of the methodology and the key results are presented at the beginning of the respective section in this report. The results are illustrated by maps, and detailed statistics relating to the typologies are provided in Annex 5.

21. The development of the typologies in this report followed a specific objective ("to provide a suitable basis for Spatial Impact Assessment of a range of current and possible policies for rural areas") and has to be seen in this context. Before these typologies are used in other scenarios careful consideration should be given to whether they are appropriate for each specific purpose.

Section 8: Spatial Impact Assessment of two Axis 3 Measures in 16 case regions

22. In order to test the suitability of the TERA for providing Spatial Impact Assessment, the economic impacts of two Axis 3 measures (Quality of Life and Economic Diversification measures) were analysed in 16 case regions (selected based on the diversification typology) with one specific modelling approach (I-O model).

23. The 16 case regions were selected in such a way that four of the types of the diversification typology were represented by four regions each. Respectively 2 of the 4 regions per type are characterised by specific economic conditions (above EU average development in terms of GDP p.c. and below EU average growth in terms of GDP change versus below EU average GDP p.c. and above EU average GDP growths). The 16 case regions are from 11 EU Member States.

24. The policy shocks modelled are based on real data obtained from two projects (implemented in 2005, in the context of the 2000-2006 Crete RDP). A project to establish an agrotourism unit was used as an example of diversification of rural economy measures and a project for the renovation and development of villages as an example of a quality of life measure.

25. In the first simulation the sizes of the investment shocks were normalised in order to reflect the size of each local economy. Model results showed that, in the vast majority of the 16 test regions, output effects are more significant, while in most regions income effects exceed employment effects. In 15 out of 16 regions the highest impacts are those generated by the extra tourism demand associated with village renovation projects, and the next highest by investment in agrotourism, while the capacity-adjustment effects of rural diversification (agrotourism in this example) projects are comparatively low. On the other hand, when comparing the impacts of shocks of a similar size (the second, uniform shock analysis), findings clearly showed that in the vast majority of areas investment in rural diversification generates considerably higher effects than investment in village renovation. When capacity-adjustment effects are compared, results show that in 15 out of 16 areas agrotourism creates higher economy-wide effects than village renovation projects.

Section 9: Modelling Results and Typologies: Differences in the Analysed Policy Impacts among different types of regions

26. The modelling results revealed significantly different paths of "regional reaction" to the two selected Axis 3 policy shocks. In turn these differences in impacts can be rather well associated with different types of rural areas, as specified by the TERA-SIAP Economic Diversification Typology.

27. In areas characterised by a rather lower level of development (i.e. agriculturally dependent regions and diversified regions with low levels of pluriactivity), much higher policy impacts are associated with less prosperous regions with high growth rates. This can be attributed to the comparatively closed nature of these economies.

28. In more developed regions (i.e. diversified economies with high pluriactivity and diversified economies with high pluriactivity and potential for diversification), higher policy impacts are associated with more prosperous regions, even though these growth rates seem to increase relatively below average. This can be attributed to the fact that these economies have progressed to another stage of development, characterised not only by their economic integration into the rest of the world (other regions), but also by the creation of rather strong internal linkages (i.e. a widening of their economic base).

29. If the focus is on the effects of investment action, the analysis has generally shown that diversified economies with a high potential for diversification of agricultural holdings are associated with high policy impacts. In the case of agrotourism capacity-adjustment effects, then policy impacts are higher in "not-so-open" regional economies with rather low potential for diversification. However, this ranking is reversed in the uniform shock analysis, where again diversified economies with high pluriactivity and high potential for diversification are associated with the largest impacts. Finally, in the case of the fairly important capacity-adjustment effects of increased tourism demand, significant policy impacts mostly occur in highly diversified economies (in terms of both status quo and potential).

30. The findings of this analysis indicated that different types of rural economies are clearly associated with different patterns of policy impacts. However, it seems that this type of policy intervention is to some extent destined to generate comparatively lower effects in areas which are in need of high policy impacts, and much higher effects in areas characterised by a high level of economic development. On the other hand, the significant contribution of policy measures analysed here to creating the necessary conditions for rural development must not be underrated.

Section 10: Summary and conclusions

31. Within the TERA-SIAP project, we developed a set of regional typologies (at NUTS3 level) which provide a suitable basis for Spatial Impact Assessments of a range of current and possible kinds of intervention (Generic Policy Issues) for rural areas. From a range of socio-economic models, we selected Regional Input-Output Models for the Spatial Impact Assessment of two Axis 3 measures. Based on one of the 7 typologies developed, the suitability of the typologies was successfully tested. The modelling results for the 16 case regions showed that different types of rural economies are clearly associated with different patterns of policy impacts.

1. Introduction

The project was brought into being in light of the increased importance of Pillar 2 of the Common Agricultural Policy (CAP) in the context of both Agenda 2000 and the recent fundamental CAP reforms, as well as in view of the profound requirement to assess the need for, and evaluate the effectiveness and efficiency of broader rural development policy, as represented by the Axis 3 measures of the Rural Development Regulation (RDR) 1698/2005.

Thus, there is a strong need for Spatial Impact Assessments (SIAs) based on socio-economic models. However, due to the variety of rural regions across the EU27 and the necessity to adapt models to regional characteristics in order to obtain meaningful results, it is currently not realistic to suppose that such model analyses can be carried out for all regions of the EU. Typologies of European rural regions can help to overcome this problem. If there is a typology which is developed a) taking into account the socio-economic, demographic, etc. characteristics which are relevant for the specific policy measure(s) to be evaluated, and b) to be specified at a regional level which is appropriate for models to be used in the Spatial Impact Assessment, it is possible to select a number of regions to adapt the models to these specific regions and to obtain model results which are indicative of other regions with the help of the typology. In this context, and in the words of the Technical Specifications, the objectives of this study are:

- to build a Typology of European Rural Areas (TERA) which will provide a suitable basis for Spatial Impact Assessment of a range of current and possible policies for rural areas;
- to provide guidelines for its potential use, particularly, in conjunction with a set of models;
- to test the suitability of the TERA in providing Spatial Impact Assessment of at least two different policy measures of the Axis 3 of the Rural Development Regulation.

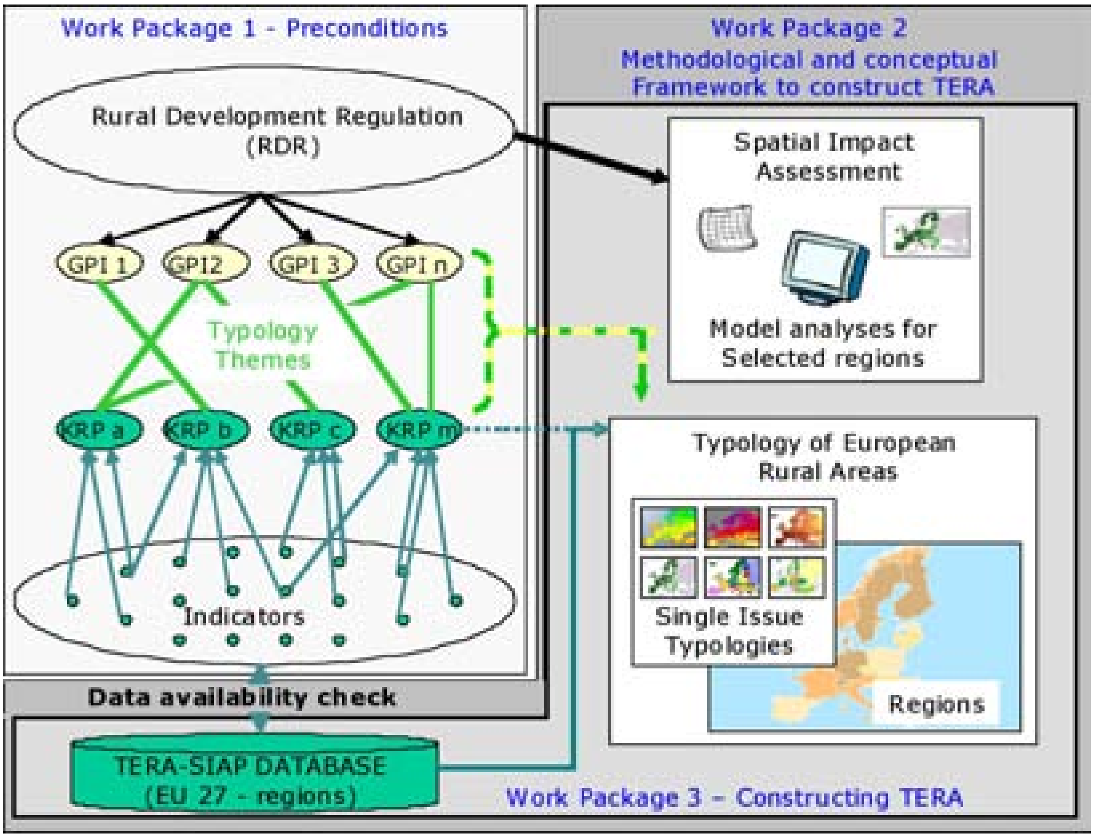
The overall structure of the TERA-SIAP project and its four work packages is illustrated by Figure 1. The objective of work package 1 was to define the policy measures to be analysed and socio-economic perspectives (indicators) to be taken into account, as well as to specify the appropriate models to be used in the Spatial Impact Assessment. Thus the objective of work package 1 was to develop the components and logical sequence upon which the typology construction would later be based.

Work package 2 consisted of two tasks: the specification of a methodological approach; and the exploration of data availability for constructing the typologies specified in work package 1.

Work package 3 aimed to provide the TERA database and to allow the technical realisation of the methodology set up in work package 2, and to assess their suitability for providing Spatial Impact Assessment of at least two different policy measures of the Axis 3 of the Rural Development Regulation.

The objective of work package 4 (which is not depicted in Figure 1) was to summarise the outcomes of the project and to validate them using a team of experts.

Figure 1: Structure of the TERA-SIAP project



GPI: Generic Policy Issues
KRP: Key Rural Socio-Economic and Environmental Perspectives.

The Report at hand is organised as follows:

Section 2 introduces some comments on the evaluation and modelling context and discusses their implications for the rationale for the TERA-SIAP typology.

Section 3 describes the Generic Policy Issues, which are used to structure the Spatial Impact Assessment.

Section 4 develops key socio-economic and environmental perspectives (KRPs), essentially "families of indicators", and introduces the typology themes from which the typologies are generated.

Section 5 investigates the capacity of the different types of models to assess policy impacts, the degree to which these models can be used for spatial impact analyses, and their constraints in relation to the level of geographical detail.

Detailed regional data is the linchpin of the typology construction underlying the Spatial Impact Assessment. Thus Section 6 provides an overview of data availability and the database set up in the TERA-SIAP project.

Section 7 describes the methodology for typology building, as well as the typologies constructed.

As an example, Section 8 carries out a Spatial Impact Assessment of two Axis 3 measures for 16 case regions selected based on one of the TERA-SIAP typologies.

Section 9 illustrates differences in the impacts of the specified policy shocks among the different types of regions.

Section 10 concludes the report.

2. Some comments on the evaluation and modelling context, and implications for the rationale for the TERA-SIAP typology

"Impact" in the context of the CMEF

The Commission's Common Monitoring and Evaluation Framework (CMEF), developed to support European Rural Development Policy, incorporates both an "intervention logic" and a monitoring and evaluation framework. The former describes the application of baseline and SWOT analyses, and the "hierarchy of objectives" used in the design of a programme for each region. Of these elements the baseline analysis is the one of most interest to TERA SIAP.

The regional SWOT analyses are supposed to take into account two kinds of baseline indicators, which are described as follows (cp: http://ec.europa.eu/agriculture/rurdev/eval/guidance/document_en.pdf, P 8):

– Objective-related baseline indicators: These are directly linked to the wider objectives of the programme. They are used to develop the SWOT analysis in relation to the objectives identified in the Regulation. They are also used as a baseline (or reference) against which the programme's impact will be assessed. Baseline indicators reflect the situation at the beginning of the programming period and a trend over time. The estimation of impact should reflect that part of the change over time that can be attributed to the programme once the baseline trend and other intervening factors have been taken into account.

– Context-related baseline indicators: These provide information on relevant aspects of the general contextual trends that are likely to have an influence on the performance of the programme. The context baseline indicators therefore serve two purposes: (i) contributing to the identification of strengths and weaknesses within the region and (ii) helping to interpret impacts achieved within the programme in light of the general economic, social, structural or environmental trends.

Baseline indicators are thus intended to reflect the situation in the programme region prior to intervention. They are, by nature, simply a way of measuring socio-economic patterns and trends, and they can therefore be derived from published secondary statistics. They are in this sense distinct from the other indicators specified under the monitoring and evaluation aspect of the CMEF.

The CMEF follows a "bottom-up" monitoring and evaluation model, distinguishing "financial inputs", "outputs", "results" and "impacts". Outputs relate to the specific beneficiaries of each measure, while results are more generalised at the Axis level. The term "impact" is defined in terms of the more indirect, final effects on the rural economy. Impacts are also free of any deadweight/duplication, and take into account any displacement and multiplier effects. The Common Result and Impact Indicators are listed in Table 1 and Table 2.

A cursory examination of the result indicators above will reveal that they are very specific to the interventions envisaged under the RDR, and therefore few of them are likely to be available from published secondary sources. They are also specified as net of deadweight, etc.

It is reasonable to assume that TERA-SIAP only relates to the first three Common Impact Indicators (and not the last four environmental impacts).

It is important that we are clear whether in TERA-SIAP the word "impact" is used in the

Table 1: CMEF result indicators

Axis/Objective	Indicator
Improving the competi-tiveness of the agri-cultural and forestry sector	1. Number of participants that successfully ended a training activity related to agriculture and/or forestry 2. Increase in agricultural gross value added in supported farms 3. Number of holdings introducing new products and/or new techniques 4. Value of agricultural production under recognised quality label/standards 5. Number of farms entering the market
Improving the environment and the countryside through land management	6. Area under successful land management contributing to: a) biodiversity and high nature value farming/forestry b) water quality c) mitigating climate change d) soil quality e) avoidance of marginalisation and land abandonment
Improving the quality of life in rural areas encouraging diversification of economic activity	7. Increase in non-agricultural gross value added in supported businesses 8. Gross number of jobs created 9. Additional number of tourists 10. Population in rural areas benefiting from improved services 11. Increase in internet penetration in rural areas 12. Number of participants that successfully ended a training activity

Source: http://ec.europa.eu/agriculture/rurdev/eval/guidance/note_i_en.pdf.

Table 2: CMEF common impact indicators

	Indicator	Measurement
1	Economic growth	Net additional value added expressed in PPS
2	Employment creation	Net additional Full-time Equivalent jobs created
3	Labour productivity	Change in Gross Value Added per Full-time Equivalent (GVA / FTE)
4	Reversing biodiversity decline	Change in trend in biodiversity decline as measured by farmland bird species population
5	Maintenance of high nature value farming and forestry areas	Changes in high nature value areas
6	Improvement in water quality	Changes in gross nutrient balance
7	Contribution to combating climate change	Increase in production of renewable energy

Source: http://ec.europa.eu/agriculture/rurdev/eval/guidance/note_j_en.pdf.

specific sense of the CMEF, or in a more generic "common-usage" way (which might include some of the CMEF results and outputs, and some of the baseline indicators). The narrow CMEF meaning implies that most, if not all, measures can be covered by a model in the I-O/SAM/CGE family. The broader definition of impact would mean that different models would be needed for different GPIs (see Section 3). This implication was reflected in the review of models carried out in the earlier project carried out for IPTS (Copus. et al. 2007).

However, it became evident during the early stages of TERA-SIAP that resource constraints would necessitate a relatively focused approach to modelling. This resulted in the interpretation of "impact" in its narrower (CMEF) sense.

Different kinds/Sources of regional variation in "impact"

The TERA-SIAP typology is effectively an attempt to record the regional pattern of the causes of variation in "impact". The impact depends on the following effects:

(a) Direct effects depending on the absorption capacity – this is measure-specific; e.g. more direct impact from early retirement in regions with an extreme age structure, more direct impact from training where the average level of education is lower.

(b) Indirect and induced economic effects – the structure of the rural economy affects the extent to which policy expenditure has indirect and induced effects on employment and income.

(c) Other effects, such as:
  - Leakages – (e.g. investments in human capital which result in out-migration),
  - Displacement – a policy-supported investment in one region at the expense of reduced activity in other regions -, and
  - Deadweight – if the RDP expenditure pays for things which would have happened anyway the real impact is overstated.

Implications for modelling

– It will be argued later on (see Section 5) that a single kind of economic model may be able to reflect/measure both the first two kinds of variation in impact, i.e. the variations in direct impact which relate to absorption capacity, and the variations in indirect and induced impact due to structural differences in the regional economy.

– This is not to deny that to fully reproduce/explain regional variations in absorption capacity for different kinds of intervention would require different kinds of socio-economic modelling, each tailored to the specific issue addressed by each measure.

– However, it is beyond the scope of this project to carry out modelling of absorption capacity associated with the range of forms of intervention which are incorporated into the EU Rural Development Policy. Instead such differentiation will be accommodated by implementing a single (or limited number of) model(s) on a range of representative regions, selected by the typology. The issue of variations in absorption capacity is thus addressed at the typology stage, rather than by the modelling element of TERA-SIAP.

– The third type of variation mentioned above (displacement, deadweight, leakages) may be considered largely the inverse of the direct, indirect and induced impacts which will be reflected by the modelling element of TERA-SIAP. There will always, of course, be a residual "random noise" aspect which cannot be either modelled or captured in a typology.

Implications for the typologies

A single "structural" typology may allow a single model to address the issue of regional indirect and induced income/employment effects across the full range of rural development policy measures. A family of Single Issue Typologies (SITs) is also required to describe regional variations in absorption capacity. These variations in absorption capacity are reflected in the direct economic impact of rural development interventions.[1]

1 In addition the SITs will also suggest regional potential for a broader range of "impacts" (i.e. including results and outputs), although these will not be addressed by the modelling effort of TERA-SIAP.

3. Generic Policy Issues (GPIs)

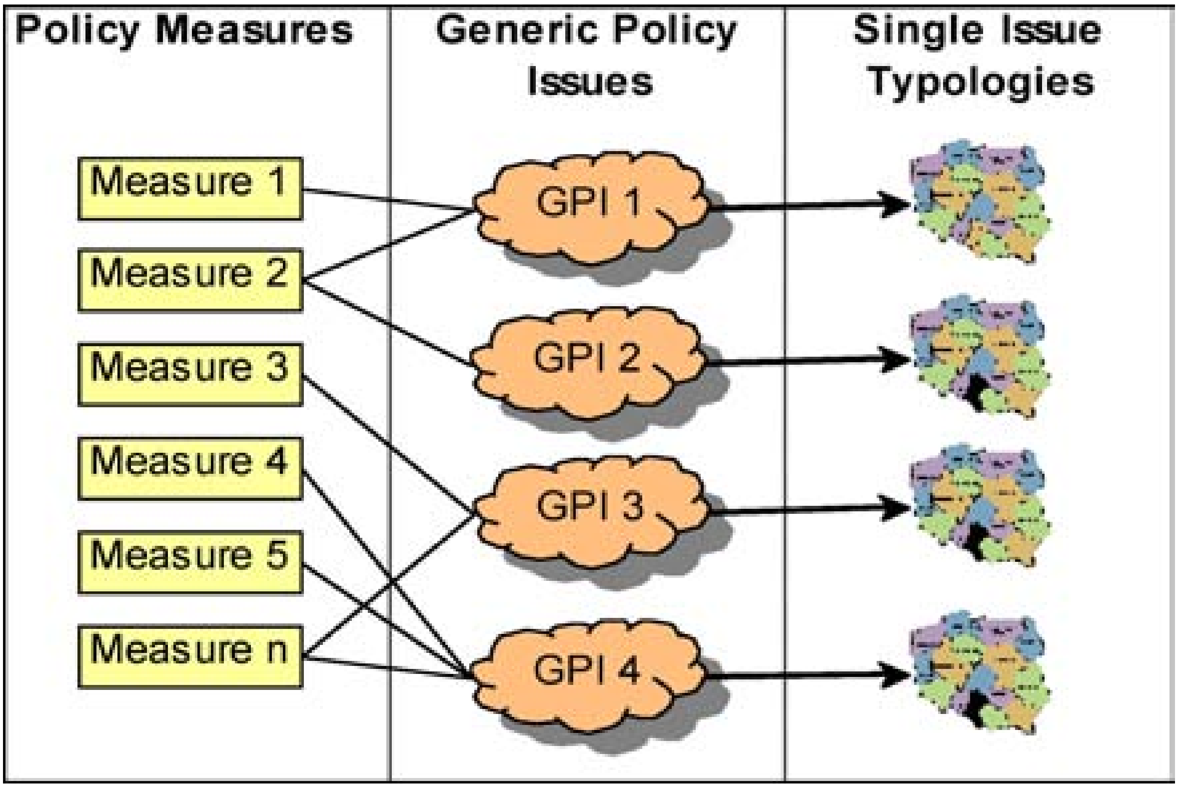
This section begins with a definition of Generic Policy Issues (GPIs) and their role in the specification of the TERA. This is followed by an explanation of the "boundaries" for our review of GPIs, which derive from the technical specification, and the policy context of this work. Finally, a set of GPIs is proposed, which is both compatible with the measure structure of the Rural Development Regulation (RDR - 1698/2005) and with the needs of the TERA.

3.1 Definition of GPIs and their role in specifying TERA

It is possible to distinguish themes within rural development research at several different levels of abstraction and at different points along the continuum between medium/long-term conceptual viewpoints and immediate tangible concerns. For example, at a "higher" (more abstract) level one might consider the "big issues" such as globalisation, economic restructuring, post-productivism, or the commodification of environmental public goods. At a more "concrete" level other issues might be considered, such as diversification, access to services, (farm business) adaptation to changing market environments, succession and age structure, etc.

Generic Policy Issues (GPIs) are themes within rural development policy; they relate to short-term (programme period) objectives, i.e. the kinds of development problems, weaknesses or barriers, which measures address. As such they are rather closer to the lower-level, more concrete end of the research spectrum.

Figure 2: The relationship between policy measures, GPIs and SITs



However GPIs are generic, rather than measure-specific. In other words a GPI, by definition, will normally underlie several individual RDR measures, and most measures will address more than one GPI.

GPIs determine the selection of appropriate indicators and, later in this study (see Section 7), form the basis of the "single issue typologies" (SITs).

3.2 Boundaries to the discussion of GPIs

The list of GPIs presented below could be relatively long and varied, or quite short and specific, depending upon the boundaries which are intrinsic to the rural development policy which is adopted. The broadest definition would be associated with an inclusive territorial view of rural policy which might, for example, consider all forms of policy intervention which have some impact upon the rural environment, rural economic activities, social welfare and quality of life. At the other extreme, a narrow sectoral view would consider only issues relating directly to the farming community.

The policy context of the project specification is Pillar 2 of the CAP, as specified by the RDR (1698/2005). The forty-three measures included in the regulation represent a position somewhere between the two extremes described above, including more than simply agricultural issues, but stopping short of the more inclusive versions of the territorial perspective.

The scope of the RDR encompasses a rather unique combination of policy issues; farm structures and competitiveness, landscape and environment, diversification and rural community development, which is very much a product of its history. The origin of most of the component measures can be traced back to particular policy debates or exigencies.

The task of defining GPIs essentially consists of clustering the forty-three current RDP measures into a limited number of thematic groups, each of which might be served by a single issue typology.

3.3 Generic issues in the 2005 Rural Development Regulation

There are at least three ways to identify the GPIs which lie behind the 2005 RDR:

– By considering the historical accretion of measures and the policy debates which surrounded each stage in the accumulation.

– By considering the classifications suggested in the academic literature.

– By studying the policy documents issued by DG Agriculture to accompany the RDR.

The first two of these are described in detail in Annex 1. Since (c) is carried forward within the TERA-SIAP methodology, a more detailed account is provided below.

The key Commission documents, from which GPIs may be deduced, are:

– The Impact Assessment Report, and its Update.

– The Rural Development Regulation (1698/2005).

– The Community Strategic Guidelines.

– The Common Monitoring and Evaluation Framework, and the Commission factsheet "EU Rural Development Policy 2007-2013".

The first three of these contain discussions about objectives, which provide clues to the thinking of the Commission, and the evolution of the main themes within the current Pillar 2 policy envelope. The last two present the three Axes, and the sub-sections within them. It is helpful to review the various lists of objectives, and to try to understand the conceptual structures behind them. It is also instructive to note the evolution of a "matrix" of policy "objects" and "subjects". In this context, the term "object" refers to the aspect of the rural socio-economic environment which the policy seeks to change, whilst the "subject" is the social group or economic sector at which it is directed. We will suggest that the "objects" identified in the various policy documents form the starting point for the definition of GPIs. For a detailed account of the implications of these documents see Appendix 1. For the sake of clarity, only the broad conclusions will be recounted here in the main text.

(a) Impact Assessment Report [SEC(2004)931), Update [COM(2005)304 final]

The Impact Assessment Report of 2004 (updated 2005) served as a review of the current situation and provided a perspective for the future, as a background to Council discussions on CAP reform. It was, in a sense, one of the steps in working towards the RDR, which followed in 2005, and the Strategic Guidelines which interpreted the Regulation for the Member States as they drafted their national programmes. Section 3 of the Impact Assessment Report reviews the role of rural development in "The realisation of Community Priorities", i.e. the Lisbon (employment and competitiveness) and Gothenburg (environmental) agendas. The four main functions of rural development policy can be identified as follows:

– Infrastructure and other supports for economic diversification

– Knowledge transfer and innovation to support a shift towards a focus on quality and value added in the agri-food sector

– Human capital investment to support diversification into tourism, crafts and rural amenities.

(b) Environmental protection and enhancement by farming and forestry.

The last of these is clearly different, in that it relates primarily to the environment (Gothenburg), rather than to socio-economic issues (i.e. Lisbon). The rationale or principles by which the first three (socio-economic) functions are defined is rather less clear-cut. However we may perhaps borrow/extend the terminology of Van der Ploeg and Roep (2003), and summarise the first and third as "Broadening", and the second as a combination of both "Deepening" and "Regrounding". The first and third are distinguished in that the first relates to infrastructure investment, and the third to human capital.

(c) The Rural Development Regulation (1698/2005)

Article 4 of the Regulation sets out the three objectives which later become the first three Axes of the Regulation:

– "improving the competitiveness of agriculture and forestry by supporting restructuring, development and innovation;

– improving the environment and the countryside by supporting land management;

– improving the quality of life in rural areas and encouraging diversification of economic activity."

These three objectives/Axes equate (roughly) with the first four "functions" of the Impact Assessment Report. However there seems to be a more pronounced sectoral/territorial polarisation between the first two objectives/Axes, and the third.

(d) The Community Strategic Guidelines (2006/144/EC)

The Community Strategic Guidelines were subsequently derived from the 1698/2005 regulation, to assist Member States (and regions) in the process of designing the national (regional) development programmes. The three objectives/axes become the first three of six "guidelines".[2] They are illustrated by 22 "key actions". The key actions described as illustrating Axis 1 are almost all designed to enhance competitiveness, mainly through increased efficiency, but also by developing new markets. They are exclusively sectoral –being directed at the agricultural, food and forestry sectors. In terms of Van der Ploeg's classification they are designed to "deepen" and "reground" the activities of these sectors.

As might be expected, the majority of actions cited under Axis 2 are designed to protect or enhance the rural environment, though competitiveness is associated with the fifth key action and cohesion is the main objective of the sixth key action. With the exception of one key action, all the actions cited under Axis 2 are sectoral rather than territorial.

Axis 3 has a rather heterogeneous collection of key actions. Competitiveness and environmental protection are almost absent as primary objectives. More important are objectives such as Quality of Life, Diversification (of the rural economy), Human Capital Investment, and Cohesion. With two exceptions, the actions are territorial, rather than sectoral. They are predominantly of a "broadening" nature, though with some potential for deepening too.

(e) Handbook on Common Monitoring and Evaluation Framework, (CMEF) Guidance document and Commission Factsheet "The EU Rural Development Policy 2007-2013"

The CMEF Guidance Document, published in September 2006, provides a classification of objectives and measures, not only by Axis, but according to 9 themes within the Axes. These themes also feature in the Commission Factsheet "The EU Rural Development Policy 2007-2013". In this version the measures of Axis 2 are grouped in a slightly different way to that shown in the CMEF.

The "intervention logic" provides a very important insight into the Commission's view of the Generic Policy Issues which are our concern here.

Table 3 shows the list of themes and measures (Factsheet version), with the additional classification (as above) by "object" and "subject". The categories are the same as in the Community Strategic Guidelines with two exceptions; marketing is replaced by support for quality products (Qual.), whilst cohesion is replaced by Sustainable Agriculture (Sust. Ag.). There are two fewer "object" classifications (7) than there are "themes" in the Commission Factsheet classification (9).

2 The remaining three relate to implementation and compatibility with other EU policies and need not concern us here.

Table 3: Axes, themes and measures – Commission factsheet: EU Rural Development Policy 2007-2013

Code	Theme and measure names	Object	Subject
	Axis 1		
11	Human resources:		
111	Vocational training and information actions	Hum.Cap.	Agri. Food. For.
112	Young farmers	Hum.Cap.	Agri.
113	Early retirement	Hum.Cap.	Agri.
114	Use of farm advisory services	Comp./Hum.Cap.	Agri.
115	Setting up of farm management, relief and advisory and forestry advisory services	Comp./Hum.Cap.	Agri. For.
12	Physical capital:		
121	Farm/forestry investments	Comp.	Agri. For.
122	Improvement of economic value of forests	Comp.	For.
123	Processing and marketing	Qual./Comp.	Agri. For. Food
124	Co-operation for innovation	Comp.	Agri. Food
125	Agricultural/forestry infrastructure	Comp.	Agri. For.
126	Restoring agricultural production potential	Comp./Env.	Agri.
13	Quality of agricultural production and products:		
131	Meeting standards temporary support	Comp./Hum.Cap.	Agri.
132	Food quality incentive scheme	Qual./Comp	Agri.
133	Food quality promotion	Qual./Comp.	Agri.
14	Transitional measures:		
141	Semi-subsistence (only for new MS)	Comp.	Agri.
142	Setting-up producer groups (only for new MS)	Comp./Hum.Cap.	Agri.
	Axis 2		
21	Sustainable use of agricultural land:		
211	Mountain LFA	Env./Sust. Ag..	Agri.
212	Other areas with handicaps	Env./Sust. Ag.	Agri.
213	Natura 2000 agricultural areas	Env.	Agri.
214	Agri-environment	Env.	Agri.
215	Animal welfare (compulsory)	Env.	Agri.
216	Support for non-productive investments	Env.	Agri.
22	Sustainable use of forest land:		Agri.
221	Afforestation of agricultural land	Env./Divers.	For.
222	Agroforestry establishment	Env./Divers.	For./Agri.
223	Afforestation of non-agricultural land	Env./Divers.	For.
224	Natura 2000 forest areas	Env.	For.
225	Forest environment	Env.	For.
226	Restoring forestry production potential	Env.	For.
227	Support for non-productive investments	Env.	Agri./For.
	Axis 3		
31	Economic diversification:		
311	Diversification to non-agricultural activities	Divers.	Agri.
312	Support for micro-enterprises	Diverse/Comp.	Territ.
313	Encouragement of tourism activities	Divers.	Territ.
32	Quality of life:		

Code	Theme and measure names	Object	Subject
321	Basic services for the rural economy and population (setting up and infrastructure)	QoL	Territ.
322	Renovation and development of villages	QoL	Territ.
323	Protection and conservation of the rural heritage	QoL	Territ.
33-34	Training, skills acquisition and animation:		
331	Training and information	Hum.Cap.	Territ.
341	Skills acquisition, animation and implementation	Hum.Cap.	Territ.
	Axis 4		
41	Local development strategiesds		Territ
421	Cooperation projectsp	Mixed	Territ.
431	Skills and animation of LAGs		Territ.

Key:

Object:
Comp. – Competitiveness
Qual. – Support for quality products
Env. – Protecting or enhancing the environment
Divers. – Diversification
QoL – Quality of Life
Hum. Cap. – Enhancing Human Capital
Sust. Ag. – Sustainable Agriculture

Subject:
Agri. – Directed mainly to farmers
Food – Available to food sector companies
For – Available to the forestry sector
Territ. – Available to all sectors, or non-sectoral bodies

Source: Based on: http://ec.europa.eu/agriculture/publi/fact/rurdev2007/en_2007.pdf.

3.4 GPIs for TERA-SIAP

Cross tabulating the individual measures according to the Object and Subject classification in Table 3 results in the set of 17 "clusters" shown in Figure 3 (11 of the potential 28 combinations are empty). Several measures appear in several clusters within the matrix, reflecting the fact that they relate to more than one object or more than one subject, or both.

The object classification is considered the primary one and largely determines the GPI structure. The resulting seven objects/GPIs can be grouped into four "dimensions". The first comprises Human Capital and Quality of Life, and is termed "Rural Preconditions" (for development). The second comprises just one GPI, Rural Diversification. The third consists of Competitiveness, Quality of agricultural products, and Sustainable Agriculture (LFA) measures, which are directed exclusively at agriculture, forestry, fishing and food industries. The fourth dimension covers environmental measures.

The secondary distinction in Figure 3 (subject) may be simplified into a sectoral-territorial dichotomy. This dichotomy affects the first two dimensions (the remaining two are purely sectoral). Whilst A(ii) (Quality of Life) is purely territorial in focus, both A(i) (Human Capital) and B(iii) (Diversification) feature both sectoral and territorial interventions. It is thought that the objectives and intervention activities of the territorial and sectoral groups of measures are sufficiently different to justify the subdivision of these two GPIs (i.e. a = sectoral, b = territorial).

The seven GPIs identified above represent fairly distinct strands of rural development policy, for which the TERA-SIAP project will devise single issue typologies (they are devised in Section 7).

Figure 3: GPIs (A (i) to D (vii)) and RDR measure clusters

		SUBJECT			
	OBJECT (GPIs)	**Agri.**	**For.**	**Food.**	**Territ.**
A. Rural Preconditions	(i) Hum. Cap. (a = sectoral, b = territ.)	111, 112, 114, 115, 131, 142	111, 115	111	331, 341
	(ii) QoL				321, 322, 323
B. Rural Diversification	(iii) Divers (a = sectoral, b = territ.)	311	221, 222, 223		312, 313
C. Primary Sector Competitiveness	(iv) Comp.	114, 115, 121, 123, 124, 125, 126, 131, 132, 133, 141, 142	115, 121, 122, 123, 125	123, 124	
	(v) Qual.	123, 132,133,	123	123	
	(vi) Sust. Ag.	211, 212			
D. Environment	(vii) Env.	126, 211, 212, 213, 214, 215, 216, 221, 222, 223, 227	221, 222, 223, 224, 225, 226, 227		

Note: Programmes structured around Axis 4 measures could feature in any/all cells of the matrix (see above), and are omitted for the sake of clarity.

4. Key rural socio-economic and environmental perspectives (KRPs)

The Key Rural socio-economic and environmental Perspectives (KRPs) are essentially "families" of indicators, and a means of structuring the database from which the typologies will be generated. In this section the contents of the KRPs, the individual indicators, are considered in more detail, and grouped into "typology themes" (TT) to reflect their potential role in each of the SITs, which are associated with the GPIs.

The KRPs were defined after consideration of three issues which are specific to the research context:

(a) The "scope" of the concept of rural policy: (in this case the 1698/2005 RDR). As we have already seen, CAP Pillar 2 represents a specific combination of sectoral, environmental and territorial issues. The Wye Group, in its recent report "Rural Households' Livelihood and Well-Being; Statistics on Rural Development and Agriculture Household Income" (UNECE 2008), reported a number of thematic indicator lists, which are essentially KRPs. However it is immediately clear, for example, that the list devised by the World Bank, in a Developing Countries context, contains a number of KRPs which would not be appropriate in an EU context.

(b) Availability of harmonised data. The Wye Group Handbook also reports an indicator schema from the PAIS report (Eurostat 2001). There are aspects of the PAIS proposal which represent a "wish list", rather than an operational reality, since EU-wide harmonised data are as yet unavailable. The KRPs proposed below have been devised with the

Table 4: KRPs for the TERA-SIAP database

Most closely linked GPIs	Proposed KRPs	Examples of characteristics to be covered
(i)-(vi)	(a) Accessibility	Distance from nearest city
(i) Hum. Cap.	(b) Demography and migration	Demographic, age structures, migration
	(c) Labour market	Activity, employment/unemployment rates
	(d) Education and training	Levels of education, training, etc.
(ii) QoL	(e) Cultural heritageh	Built heritage? Cultural events/activities? Associated economic activities
	(f) Access to services	Public service indicators (schools, hospitals, etc. Private sector services – shops, banks, post offices, etc.
(iii) Divers.	(g) Sectoral structure of employment and value added	Sectoral employment and value added indicators
	(h) Pluriactivity (especially tourism)	Other gainful activity (OGA) data (FADN) Tourism activity indicators (e.g. bed spaces)
(iv) Comp.	(i) Farm structures	Farm size, age of farmers, farm employment, etc.
(v) Qual.	(j) Supply chains	Food processing employment?
(vi) Sust. Ag.	(k) LFA	LFA area, income and employment on LFA farm types, etc.
(vii) Env.	(l) Intensity and HNV farming	IRENA indicators, intensity, HNV farming indicators
	(m) Landscape and nature resources	Protected areas, national parks, etc.

Table 5: Proposed typology themes (groups of KRPs and GPIs)

	GPI	Typology themes (Constituent KRP's)
A. Rural Preconditions	**(i) Hum. Cap.**	(a), (b), (c), (d)
	(ii) QoL	(a), (b)? (e), (f), (m)?
B. Rural Diversification	**(iii) Divers.**	(a), (g), (h), (m)?
C. Primary Sector Competitiveness	**(iv) Comp.**	(i)
	(v) Qual.	(h), (j)
	(vi) Sust. Ag.	(a), (k)
D. Environment	**(vii) Env.**	(l), (m)

easy availability of harmonised EU data at an appropriate regional level in mind.

(a) The requirements of the models which will be used in conjunction with the typologies. At this point it is perhaps worth reiterating the logic of the TERA-SIAP project, in order to emphasise the need to keep our sights on the ultimate objective, when considering the KRPs: the intended role of the TERA-SIAP typology (typologies) is to highlight dimensions of differentiation which seem likely to be associated with different levels of impact from rural development measures, grouped according to the GPIs. It is therefore necessary to consider and hypothesise in advance what those dimensions of differentiation may be. At this point we refer back to the GPIs (Figure 3), and in light of these, outline an overall database structure (KRPs).

The typology themes (TTs) are combinations of KRPs which are incorporated into the Single issue typologies (SITs). The final definition of the typology themes is the result of a process of trial and error. However, it should also be remembered that each single issue typology will actually be constructed from individual indicators within the KRPs. There is therefore scope for variation of the single issue typologies within the typology themes.

5. Models for Spatial Impact Assessments compatible with the typology themes

According to the Technical Specifications of this project, the tender submitted by the research team and our consultation with the IPTS, the objective of this section is to match up the assessment instruments (i.e. models) which would be compatible with the GPIs and typology themes specified above, and more specifically with the Quality of Life and Rural Economic Diversification GPI which are related to Axis 3 of the current RDP. More analytically, the capacity of different types of models to assess policy impacts, the degree to which these models can be used for spatial impact analyses, and their constraints in relation to the level of geographical detail is investigated.

This assessment utilizes extensive reviews of these models and their association with the territorial impact assessment of rural policy issues (Copus *et al.,* 2007) and mainly deals with issues such as model inputs, outputs and interpretation. Furthermore, the most "appropriate" (in terms of both conceptual issues and data availability) territorial unit which should be used in reference to model indicators is designated. The ability of different models to capture the effects of Axis 3 policy measures alone (i.e. estimated policy impacts should not include effects attributed to pre-existing autonomous patterns and trends and/or national horizontal policies) is discussed. Also, the "suitability" of the different models to estimate policy effects (where appropriate) is approached in a manner which deals with all possible types of policy impacts (i.e. micro, macro and meta; see Copus *et al.,* 2007, p. 11).

Finally, the types of models chosen to be applied for the TERA-SIAP tests are indicated in Section 8.

5.1 The Quality of Life Generic Policy Issue

The Quality of Life (QoL) GPI is associated with the following rural development policy (2007-2013) measures:

– 321: Basic services for the rural economy and population;

– 322: Renovation and development of villages; and

– 323: Protection and conservation of rural heritage.

Typology themes specified above (see Section 4) to link with the QoL GPI include KRPs such as:

– (a) Accessibility;

- (b) Demography and Migration;

– (e) Cultural Heritage (including associated activities);

– (f) Access to Services; and

– (m) Landscape and Nature Resources.

According to the bibliography, socio-economic models which could deal with the assessment of the impacts of the above policy measures include (a) Econometric Residential Choice Models; (b) Economic Base Models; and (c) Regional Input-Output Models.

(a) Econometric Residential Choice Models

An Econometric Residential Choice Model can be applied to the assessment of impacts of

RDP measures related to QoL (see Berloni and Esposti, 2002; Esposti, 2004). Such a model has the ability to assess territorial impacts at the "meta" level, via the determination of changes in residential choices which induce an upgrade in QoL through these particular measures.

Inputs to this type of model include population, migration, population density, territorial average income, share of agricultural employment, and distances between the chosen areas (in the Esposti example, distances between municipalities). Also, data on policy measures expenditure are required. On the output side, the model estimates parameters which indicate interactions between migration and the above-mentioned explanatory variables. In addition to direct effects, indirect effects between endogenous and exogenous variables can be estimated. On the issue of interpretation, it seems that (at least according to Esposti, 2004), further improvements to the model are required in order to improve the explanation of (exclusive) policy impacts and spatial spillovers. Otherwise, the interpretation of results is quite straightforward.

Such models have been applied to LAU2 areas, but due to spatial spillovers they could be more suitable at the NUTS3 level.[3] In terms of their links with the typology themes specified above, typologies of rural areas based on these dimensions of differentiation can be applicable to this modelling approach. Moreover, the specified typology themes could be distinguished in terms of their correspondence to the model output (KRP (b) – Demography and Migration) and the characteristics of the areas (the rest). To the latter, one could add structural characteristics (e.g. sectoral employment) of the local economy which affect migration rates.

(b) Economic Base Models

The Economic Base Model could also be utilised in order to assess the impacts of RDP measures related to QoL and upgrading residential functions (see Vollet, 1998). Such an approach breaks down regional economic activities into those that serve external demand (basic sector) and those that meet local demand (derived expenditure). Within this framework, the economy-wide employment impacts of QoL projects, which have brought more tourists, secondary residents, commuters and retired people into the area (i.e. economy-wide, macro impacts), can be estimated.

Inputs to this type of model include the specification of such types of occupation at the direct level. This can be achieved through business and household surveys (questions on employment and annual expenditure), hypotheses on the specification of the basic sectors, or through the estimation of employment location quotients. On the output side, the model estimates direct and indirect employment effects and multipliers attributed to an increase in external demand for the sector specified as basic. On the issue of interpretation, difficulties include the exact specification of policy measures-induced expenditure and employment, spillover and feedback effects from tourism growth at the national level, and labour market rigidities which may reduce real impacts. Also, it is rather unlikely that the specified productive structure will remain stable for a long period.

In terms of their application, Economic Base Models have been widely used due to their simplicity and have been applied even at the NUTS5 level. In terms of their links with the TT specified above, typologies of rural areas based on these dimensions of differentiation can be applicable to this model approach. However, none of the KRPs specified above for the QoL GPI correspond to the model output.

3 The NUTS nomenclature valid from 1 January 2008 subdivides the economic territory of the EU into 97 regions at NUTS1 level, 271 regions at NUTS2 level and 1303 regions at NUTS3 level. Below that, two levels of Local Administrative Units (LAU) have been defined. The upper LAU level (LAU level 1, formerly NUTS level 4) is defined only for 17 Member States. The lower LAU level (formerly NUTS level 5) consists of around 120 000 municipalities or equivalent units in the 27 EU Member States (as of 2007) (http://ec.europa.eu/eurostat/ramon/nuts/mainchar_regions_en.html).

(c) Regional Input-Output Models

A Regional Input-Output (I-O) Model can also be applied to the assessment of the economic impacts of RDP measures related to QoL (see Efstratoglou and Psaltopoulos, 1999). Such an approach can divide regional economic impacts into those deriving from investment activity (investment effects) and those attributed to an increased flow of tourism in an area induced by these specific projects (estimated through the traditional Leontief procedure). Thus, as in the case of Economic Base Models, impacts recorded are of an economy-wide nature.

Model inputs first include a national I-O table. If a standard regionalisation technique such as GRIT (Jensen *et al.,* 1979) is chosen, then inputs should also include employment data at the national and regional level and according to the sectoral classification adopted in the national I-O table. These data can be applied to the estimation of simple location quotients and cross-industry location quotients, and ultimately to the 'mechanical' estimation of a regional I-O table. The accuracy of this table can be further improved through area-specific surveys of households and businesses, and collection of secondary data on income and expenditure patterns and/or knowledge of local experts on the structural characteristics of the local economy. Also, data are needed on the estimates of direct impacts of RDP projects on tourism flows, as well as on the expenditure patterns of tourists attracted to the area. On the output side, this model estimates direct, indirect and induced impacts on sectoral and economy-wide output, income and employment; these can be distinguished at the construction stage of RDP projects and at the stage of their operation. The interpretation of results is quite straightforward, as estimated effects are attributed to policy "alone". On the other hand, shortcomings include the assumptions of fixed input structure, unlimited capacity of primary factors to each and every sector, and no price effects in the system. Hence, estimated effects can be rather higher than actual ones.

A Regional I-O Model can be a useful tool for the territorial assessment of economic impacts associated with rural policy measures. This type of model can depict the fact that the potential effects of policy are not equally distributed amongst EU rural regions. Most of these areas have distinctly different development paths, and there is significant diversity in terms of population change and densities, natural resource endowments, economic and social structures, and environmental conditions. It has also been argued that the comprehensiveness of policies that target rural areas is rather limited, due to the various interconnections and interdependencies between rural and urban space, and these leakages can be captured by I-O models. Regional I-O Models link satisfactorily to the QoL TT specified above, as they can be applied to rural areas which are characterised by specific policy-related characteristics. Such models can be particularly useful for a NUTS3 level analysis, but they can also be applicable to LAU2, especially if they aim to estimate leakage effects.

5.2 The Rural Economic Diversification Generic Policy Issue

The Rural Economic Diversification (ED) GPI is associated with the following Rural Development Regulation (2007-2013) measures:

- 311: Diversification to non-agricultural activities;
- 312: Support for micro-enterprises;
- 313: Encouragement of tourism activities;
- 221: Afforestation of agricultural land;
- 222: Agroforestry establishment; and
- 223: Afforestation of non-agricultural land.

Measures 221, 222 and 223 are associated with Axis 2; however, as one of the objectives of those measures is to diversify the economic base of rural areas, they can be also included in this context.

Typology themes specified above (see Section 4) to link with the ED GPI include KRPs such as:

– (a) Accessibility;

– (g) Sectoral structure of employment and value added;

– (h) Pluriactivity; and

– (m) Landscape and natural resources.

Socio-economic models which could deal with the assessment of the impacts of ED policy measures include (a) Regional Input-Output Models; (b) Regional Social Accounting Matrices (SAM); (c) Regional Computable General Equilibrium (CGE) Models; (d) Gravity Models; (e) Shift-Share Analysis; (f) Econometric Residential Choice Models; (g) Economic Base Models; and (h) Keynesian Multiplier Analysis.

(e) Regional Input-Output Models

The characteristics, properties, advantages and weaknesses of Regional I-O Models have already been presented in Section 5.1.

In the context of their application to the assessment of the territorial impacts of ED policy measures, a Regional I-O Model can be an even more useful tool. This is because, in addition to its ability to estimate economy-wide impacts of investment, it can also estimate capacity-adjustment effects (i.e. effects related to economic activity generated through the utilisation of productive resources stimulated by RDP expenditure). In contrast to the direct tourism flow estimates, which can be rather subjectively generated, direct impacts of a new productive capacity (i.e. a newly established agro-tourism unit) are available from the relevant project feasibility study, while investment expenditure data can be easily available. Thus, by adopting a rather supply-side approach and utilizing the mixed endogenous-exogenous version of the Leontief model, economy-wide impacts of the operation of RDP projects can be estimated.

Additionally, a Regional I-O Model can also portray the economy-wide impacts of afforestation measures. In this context, estimated impacts can be distinguished into the contribution of forestry to a regional economy (McGregor and McNicoll, 1989; Psaltopoulos and Thomson, 1993) and to their variation by woodland type (Thomson and Psaltopoulos, 2000; Eiser and Roberts, 2002). However, although the rather straightforward GRIT (I-O regionalisation) technique can easily produce Regional I-O Models which can focus on a "forestry application", the special characteristics of the forestry sector (long cycle, variation of impacts by tree species) can trigger a demanding data collection process, especially if an impact exercise attempts to deal with the economic impacts of policy-induced changes in land use.

In terms of their links with the TTs specified above, typologies of rural areas based on these dimensions of differentiation can be applicable to the regional I-O approach. Furthermore, the specified TTs could be distinguished in terms of their correspondence to the model output (KRP (g) – Sectoral Employment and Value Added) and the characteristics of the areas (the rest).

(f) Regional Social Accounting Matrices (SAM)

It is well known that an I-O Table constitutes a significant part of a SAM. However, in addition to this, a SAM expands the I-O activity/commodity matrix of production to other ("social") sectors or "institutions", such as households, government, capital (investment) and trade (exports and imports). The method represents all monetary flows for the modelled economy in double-entry row and column accounts which balance to represent a comparative static equilibrium. In principle (i.e. if data are available), the structure of a SAM is flexible, because sectors (e.g. agriculture, services, households) can each be treated at the desired appropriate level of aggregation.

The main effect of these SAM characteristics is that modelling based on the SAM technique allows the identification of the economic effects of RD policy funding on both investment and direct income transfers in a local economy (see Psaltopoulos *et al.,* 2004). Also, in addition to the "output" produced by an I-O model, impacts of RDP policy measures on the income of different types of local firms, labour and households can also be estimated. In this way, distributional impacts of policy measures can be captured. In turn, an interregional SAM model can discern the relative importance of all linkages within a locality but also the significance of spatial interdependencies amongst localities (see Mayfield and van Leeuwen, 2005; Psaltopoulos *et al.,* 2006), but it requires an even more demanding data-collection effort.

To sum up, compared to a Regional I-O Model, a Regional SAM requires more data (i.e. on the interactions between institutions portrayed by such a model), but it also has the ability to produce a much wider range of spatial policy impacts which (as in the case of the I-O) can be distinguished into investment and capacity-adjustment effects. In the case of resources prohibiting a survey effort for data collection, Regional SAMs can be constructed for only NUTS2 areas, as data related to institutional activity and interactions is often publicly available at this level. Advantages of the Regional SAM approach include its scope (multiple economic and social sectors), simplicity (structure and linear behaviour), ability to isolate policy effects from those of other influences, techniques (e.g. GRIT) for data generation, software (spreadsheet or GAMS) and regional differentiation. Disadvantages include rather significant data needs (implying that just a few regions can be handled), no real modelling of the growth process (development), and the fact that some policies (e.g. "soft" enterprise aids) apply to many sectors in a statistically not quantifiable way. Others include the assumptions of fixed input structure, unlimited capacity of primary factors to each and every sector, and no price effects in the system.

Finally, the links between the Regional SAM and the typology theme specified above for the diversification GPI resemble those associated with the Regional I-O Models.

(g) Regional Computable General Equilibrium (CGE) Models

The impacts of rural ED measures can also be captured through a Regional CGE Model and several studies aim at capturing spatial interactions (see Gillespie *et al.,* 2001; Balamou *et al.,* 2008). Such a model offers a comprehensive representation of the regional economy, with a regional SAM acting as the "data base". The CGE approach built on fundamental microeconomic principles and included non-linear feedback mechanisms which can be used to model both price and volume changes. CGEs deal with the endogeneity of relative prices and quantities as all markets equilibrate simultaneously. This approach assures the possibility of focussing on a wide range of effects which are of interest to policy makers, and of producing internally consistent results, while allowing concentration on sectors of primary concern.

Inputs to a Regional CGE Model include those already specified for a Regional SAM, but also include the parameterisation of several types of case study-specific elasticities (e.g. Armington, CET, production elasticities, output aggregation function elasticity, LES elasticities of demand for commodities, household-specific Frisch parameters). Also, in order to operate such a model, case study-specific closure (equilibrium) rules have to be set for both the factor markets and macroeconomic balances, and more specifically, for the labour market (factor mobility), the Rest of the World, Government and Savings/Investment. These extra tasks are very demanding in terms of resources and need to be carried out with much care, so that the calibrated case-CGE reflects the study area conditions.

Outputs produced by a Regional CGE Model resemble those associated with a Regional SAM, and thus, a Regional CGE can be safely characterised as suitable for estimating the economy-wide, spatial impacts of RDP policy. In principle, a CGE approach built on fundamental microeconomic principles and including non-linear feedback mechanisms can be used to model both price and volume changes. However, difficulties in calibration (especially at a small-area level) may lead to aggregated CGE models that can address efficiency questions but are perhaps not so suitable for sectoral analysis. In the case of small, open economies, resource competition cannot be regarded as very intense; and labour and capital can be considered fairly flexible (elastic) in supply, as can land, except for agriculture where its use can be viewed as rather static. Also, it is unlikely that modest external shocks (typical of policy) would induce significant changes in prices, volumes and factor distributions of every sector. Also, in terms of interpretation of findings, the existence of countervailing forces makes it difficult to assess the exact cause of estimated net effects.

To recap, despite their applicability even at a small area level, there is a strong trade-off between the analytical capacity of CGE models and their ability to analyze rural development (i.e. adjustment) policies at a small area level (NUTS5 and perhaps, NUTS3). Also, the introduction of a typology might (in some cases) enhance model complexity, especially in terms of its calibration and (possibly) data demands.

(h) Gravity Models

A Gravity Model can be applied to the assessment of the spatial impacts of RDP measures related to ED (see Mitchell, 1996; Doyle *et al.*, 1997). In this approach three steps are applied to the estimation of policy impacts. First, the impact of support expenditure on regional sectoral output (direct impacts) was estimated through the use of an econometric model for a given sector. In the application by Doyle et al. (1997) a profit function was used to model production decisions; model input requirements included data on commodity inputs and output, input and output prices, as well as estimates of elasticities of output with respect to input. Second, indirect and induced effects of policy support were estimated through the construction of a Regional I-O Model (for data requirements, see above). Finally, to estimate policy-relevant impacts at the sub-regional level, a gravitational pull estimate for each sub-region was calculated, utilising data on distances between sub-regions, sectoral employment (at the same level) and input requirements for the sector of interest. Then, the probability of regional income growth being attracted to a particular sub-region was estimated through the estimation of a gravitational pull function. Data requirements also include policy measure expenditure details.

On the output side, the model estimates policy impacts on sectoral and economy-wide output for adjacent geographical units, as well as impacts on employment. On the issue of interpretation, possible shortcomings include linear responses to change, adopted by both the econometric and I-O models and their inability to capture displacement effects. Also, the use of a partial equilibrium supply response technique for the estimation of production options raises questions about the ability of this approach to model single policy impacts.

In terms of its application, the Gravity Model can be useful for the appraisal of the distribution of the benefits of diversification investments at the small-area level (NUTS5). However, as a regional I-O is a major component of such an approach, its application at a higher area level might be preferable. On the other hand though, this type of model can estimate the impacts of diversification policies in different types of rural areas (even at the

NUTS5 level), which are distinguished in terms of rurality, peripherality and economic structure, and thus it is compatible with the typology theme specified for the diversification GPI.

(i) Shift-Share Analysis

Shift-share analysis is more of an analytical than a modelling technique, which standardizes employment-change data between two time periods. The original method identifies three components of sectoral change at the regional level, namely the national, structural and differential components. Data requirements include sectoral data at the regional and national levels for two points in time. On the output side, shift-share analysis provides estimates of employment change which would have occurred in a region,

- if this had grown at the same rate as employment in the country as a whole;
- if each of the industries in that region had changed its employment at the same rate and not the national employment country rate as a whole.

Also, an estimated differential component provides the difference which is left over of the actual net change after calculation of the national and regional components.

Despite its simplicity and thus its attractiveness, the technique is characterised by weaknesses in interpretation. Firstly, the fact that it cannot accommodate causal relationships makes it rather more suitable for ex-ante exercises; secondly, the fact that it neglects sectoral inter-dependence within an economy often leads to overestimation of the impacts of regional economic structures; and thirdly, its flexibility in terms of sectoral specification can generate significant deviations in impact estimates.

As shift-share has been applied at the small area level, it may be compatible with the typology themes specified above for the diversification GPI, in terms of both output (employment structures) and input KRPs.

(j) Econometric Residential Choice Models

The characteristics and properties of Econometric Residential Choice Models have been already presented in Section 5.1, dealing with the assessment of impacts of RDP measures related to QoL. In the same way, such a model can be utilised for the assessment of ED policy impacts at the "meta" level, as well.

Data requirements and model output do not change, and the interpretation of findings is characterised by the same advantages and weaknesses. Also, such an approach, which can be applied at the small area level, may link with the TT specified above for ED measures, and thus typologies of rural areas based on these dimensions of differentiation can be applicable.

(k) Economic Base Models

The characteristics of the Economic Base Model have also been described in Section 5.1, dealing with the impacts of RDP measures related to QoL. Defining the sector of ED policy interest as the one serving external demand (basic sector) and those that meet local demand (derived expenditure) make this technique applicable in the context of ED measures.

Inputs to this type of model are easy to obtain (compared to the QoL application of this type of model) as the specification of such type of employment at the direct level can be found in the project-feasibility studies. On the issue of interpretation, difficulties relating to the exact specification of policy measures-induced expenditure and employment can be overcome, but the problems of spillover and feedback effects persist.

In terms of their links with the TT specified above, typologies of rural areas based on these dimensions of differentiation can be applicable to this model approach, even in terms of the model output (KRP (b) – Demography and Migration).

(I) Keynesian Multiplier Analysis

Finally, the impacts of ED RDP measures can be estimated through the use of a Keynesian Multiplier Analysis. Such an analysis can be particularly relevant when policy measures induce the expansion of new forms of rural economic activity (McCann, 2001). In a simple regional multiplier model, the operation of a new activity or enterprise creates additional regional income due to its regional exporting activity (first round of impacts). In a second round, additional expenditures of the firm in the local economy create more local income as the firm uses local inputs. These inputs trigger the regional multiplier which takes into account marginal propensities to consume, invest in the local economy and reduce government spending. Last, there is a third and subsequent round of impacts of a new enterprise, accounting for the effects of the firm's exporting activities and its marginal propensity to consume locally produced products.

Despite the relative simplicity of this approach, data requirements are demanding and include private consumption expenditure, autonomous government consumption, autonomous exports, imports, autonomous investment, average taxation rates. Expenditure data is also used for the estimation of marginal propensities to consume and import. Model output concentrates on impacts on regional income.

On the issue of interpretation, the model performs satisfactorily but the size of the multiplier can vary considerably due to the size of the region, its degree of remoteness and interregional trade effects.

In terms of application, the Keynesian Multiplier Analysis has been applied to small area level, but data requirements make its application to a higher area level (NUTS3 or even NUTS2) more attractive. In terms of their links with the TT specified for the ED GPI, typologies of rural areas based on these types of differentiation can be applicable to this approach. However, none of the KRPs specified above for the ED GPI correspond to the model output.

5.3 Models chosen for the application of TERA-SIAP tests

Taking into account the above review of the characteristics of different models and their capacity to assess the impacts of Axis 3 measures, and after extensive consultation with both JRC IPTS and DG AGRI, it was decided that the most appropiate models for the TERA-SIAP tests are Regional Input-Output (I-O) Models.

This selection can be justified by a number of reasons, some of which were anticipated by the research team in their proposal document. More specifically, Regional I-O Models are a popular and useful tool for the territorial assessment of economic impacts associated with rural policy measures (see Psaltopoulos and Thomson, 1993; Doyle *et al.,* 1997; Psaltopoulos and Efstratoglou, 2000; Thomson and Psaltopoulos, 2000; Eiser and Roberts, 2002), including Axis 3 measures which particularly interest the TERA-SIAP project. This type of model can demonstrate the fact that the potential effects of policy are not equally distributed amongst EU rural regions, as most of these areas begin from distinctly different starting points in terms of their development, and there is significant diversity in terms of population change and densities, natural resource endowments, economic and social structures, and environmental conditions. Hence, I-O models can be particularly useful in cases where it is desirable to use pre-defined or official rural typologies. The only "real" prerequisite is that the models constructed refer to administrative regions for which sectoral employment data is available.

Regional I-O Models can produce a wide range of indicators specific to the territorial impact assessment of Axis 3 policy measures and can estimate policy-specific impacts on sectoral and economy-wide output, income and employment.

Also, impacts estimated can be distinguished into those deriving from investment activity (investment effects) and those attributed to a change in production capacity specific to policy measures (capacity-adjustment effects), while I-O models are suitable for the estimation of impacts of measures associated with the Quality of Life and Economic Diversification GPIs.

In addition, impacts estimated using I-O models are solely attributed to policy. These impacts arise through a linear behaviour and the absence of price effects, which implies the ready availability of primary factors to each sector. These assumptions are rather necessitated by the lack of knowledge about non-linear relationships; at the regional level, this should be treated with caution if study-area limitations imply diminishing productivity and/or if labour and capital are not fairly flexible in supply (at least in the long term). On the other hand, avoiding these assumptions or the provision of stochastic estimates by using a parametric approach would involve alternative assumptions, equally or more subject to criticism.

For the purpose of TERA-SIAP and for constructing regional I-O tables, the hybrid Generation of Regional I-O Tables (GRIT) was chosen (Jensen *et al.,* 1979). This method was chosen mainly because the cost of using a full survey-based method to generate regional I-O tables is prohibitive, while regional I-O tables constructed via non-survey techniques are not sufficiently accurate (Richardson, 1972). Also, GRIT is a regionalisation technique based on the concept of "holistic accuracy" and can be applied to the construction of regional I-O tables which are "free from significant error". Furthermore, as noted by Johns and Leat (1987), GRIT is particularly suitable even for smaller regions, as it enables a more accurate estimation of the (expectedly) smaller multipliers that characterise small regional economies. Within this context, GRIT can be applied to the generation of regional I-O tables even for very small areas. Finally, GRIT has been a popular I-O regionalisation technique applied in several policy impact assessment studies (see Johns and Leat, 1987; Psaltopoulos and Thomson, 1993; Doyle *et al.,* 1997; Psaltopoulos and Efstratoglou, 2000; Thomson and Psaltopoulos, 2000; Mattas, 2001; Ciobanu *et al.,* 2004).

The main data requirements for the application of GRIT are a national I-O table and sectoral employment data at national and regional levels. The availability of these data "guarantees" the "mechanical" construction of a regional I-O table. As a next step, GRIT generates an initial regional transactions matrix by using employment-based Simple Location Quotients (SLQ) and Cross Industry Location Quotients (CILQ) to "mechanically" adjust the national direct requirements matrix. The data which should be available to perform these estimations includes NACE 2-digit sectoral employment at national and regional level respectively. Then "superior" estimates of the input-purchasing and output-selling behaviour of enterprises can be usually further generated through business surveys and inserted into the mechanical GRIT table, in order to improve the accuracy of estimated coefficients.

Finally, as noted in a TERA-SIAP working paper (Psaltopoulos *et al.,* 2009), and as is the case with several relevant research efforts (e.g. Doyle *et al.,* 1997; Mattas, 2001), time and financial constraints often do not allow the fulfilment of business surveys and thus the insertion of superior data to the constructed regional I-O tables.

6. TERA-SIAP database

In the following section, after an introductory overview of data availability, the TERA-SIAP project database and the Simple Data Mapping Tool (SDMT) Interface complementing the database are introduced.

6.1 Overview of data availability

The analysis of the territorial impacts of policies requires not just a detailed database at an appropriate geographical level, but also a typology of regions classified in the form of one or more territorial typologies. In particular, a framework which allows regions to be allocated to a limited number of territorial types is required (ESPON, 2003).

Detailed regional data are the linchpin of typology construction underlying the Spatial Impact Assessments the TERA-SIAP project aimed at as overall goal. Therefore an assessment of data availability for indicator construction was carried out alongside the specification of the KRPs and the decision as to the regional level at which each single issue typology may be implemented.

Due to resource constraints, it was necessary to concentrate solely on data already publicly available for the entire EU, following the NUTS nomenclature. In this context, the following data sources formed the basis for the specification of potential rural typology indicators:

– the Eurostat New Cronos REGIO Database;

– the statistical annexes of the CMEF associated with the 2007-13 Rural Development Regulation;

– the ESPON Database Public Files;

– Rural Development in the European Union - Statistical and Economic Information - Report 2007 (Regional tables).

The NUTS nomenclature was introduced in the EU in 1980 as a basis for statistical data collection. Working with NUTS as a spatial and statistical reference, the following should be borne in mind. Firstly, NUTS units are based on national statistical units. While for example the size of NUTS3 areas averages out to approximately 5000 km² in the New Member States, they come down to 1000 km² in rural and 100 km² in urban areas in Germany. Thus, cross-country comparisons may be distorted by the differing sizes of the NUTS units. Secondly, many NUTS units consist of both urban and rural areas. Applying these units when analysing rural areas will, therefore, provide neither genuine urban nor genuine rural area results (see Bjørnsen et al. 2007). Thirdly, the 2008 revision of the NUTS nomenclature[4] reduced data availability at the NUTS3 level.[5]

(a) Eurostat New Cronos REGIO Database

The REGIO database, a domain of the General Statistics of the New Cronos Database, is a harmonised regional database maintained by the Statistical Office of the European Communities. It contains the following 13 different socio-economic

4 The following countries are affected by the 2008 revision (in parentheses: NUTS level affected): Belgium (3), Czech Republic (3), Denmark (2, 3), Germany (2, 3), Spain (3), Italy (3), Poland (3), The Netherlands (3), Slovenia (2), Finland (3), Sweden (1, 3), United Kingdom (2, 3), Bulgaria (1, 2), Romania (1, 2).

5 For those regions with a new 2006 NUTS code due to changes of their borders (compared with the 2003 NUTS borders), there are no data available until new data has been gathered or computed. However, we were able to reduce this problem (see Section 8) in order that, in the end, there are only 41 NUTS3 regions (out of a total of 1303 regions) without any data in the TERA-SIAP database.

data collections: agricultural statistics, demographic statistics, economic accounts, education statistics, labour market statistics, migration statistics, science and technology, structural business statistics, health statistics, tourism statistics, transport statistics, labour cost statistics and information society statistics. Depending on the specific data topic, data is available at the NUTS0, NUTS1, NUTS2 or NUTS3 levels.

(b) ESPON Database Public Files

The ESPON (European Spatial Planning Observation Network) Database Public Files (version March 2006) provided by the finalised ESPON projects, covering the EU27 as well as Switzerland and Norway, provide regional information on the NUTS0, NUTS1, NUTS2 and NUTS3 levels.

It includes a selection of indicators, summarised in thematic tables organised into two sections - ESPON Basic Indicators (http://www.espon.eu/main/Menu_ScientificTools/ESPON2006Tools/DatabasePublicFiles/basicindicatorsterms.html) and ESPON Project Indicators (http://www.espon.eu/main/Menu_ScientificTools/ESPON2006Tools/DatabasePublicFiles/projectindicatorsterms.html), based on the themes and categories of the ESPON Data Navigator. The status of the indicators is based on the duration and finalisation of different ESPON projects. Therefore, the time range of the indicators presented varies, as does the use of different NUTS references (version 1999 and version 2003).

In general the ESPON Database represents a concerted action of the Transnational Project Groups, and is co-ordinated and maintained by the cross-thematic ESPON projects – Integrated Tools for European Spatial Development (Project 3.1) and Spatial Scenarios and orientations in relation to the ESDP and EU Cohesion Policy (Project 3.2).

(c) Statistical annexes of the CMEF

The CMEF, developed by the EC, provides a single framework for monitoring and evaluating rural development interventions. It can be seen as a kind of handbook that includes evaluation guidelines on common indicators for monitoring and measuring intervention achievements. The purpose of the CMEF is to guarantee a comparable monitoring and evaluation of the rural development policy for all Member States. The statistical annex of the CMEF provides data on indicators describing the development status of regions at NUTS1, NUTS2 and NUTS3 for the EU Member States. Indicators are separated into objective-related baseline indicators and context-related baseline indicators (see Table A 8 and Table A 9 in Annex 3).

Indicators contained in the statistical annex are based on data available from EUROSTAT, DG-AGRI-FADN, the European Environmental Agency, the OECD, the European Commission Joint Research Centre, EuroObserver, Directorate-General for Information Society and Media (DG-INFSO) as well as the Ministerial Conference on the Protection of Forests in Europe 2003 (MCPFE).

(d) Rural Development in the European Union - Statistical and Economic Information - Report 2007

The Rural Development in the European Union report (Directorate-General for Agriculture and Rural Development, 2007) was generated by the Directorate-General for Agriculture and Rural Development in November 2007. It provides, at national and regional levels, statistical and economic information covering the three objectives of Rural Development Policy 2007-2013. It also gives a synthesis of the implementation of Rural Development Policy for the programming period 2000-2006 both in terms of budget and measures monitoring.

The report contains statistical and scientific information on the main features of rural areas, as well as administrative information on the status of the implementation of Rural Development Policy (physical and financial monitoring of the measures). In order to ensure the highest relevance of the data to current issues in rural development, priority has been given to the group of CMEF baseline indicators. Where possible and relevant, time series have been elaborated for these indicators. Prospects are also presented for a selection of some of them (http://ec.europa.eu/agriculture/agrista/rurdev2007/index_en.htm).

6.2 The TERA-SIAP database

The TERA–SIAP database was built as a MS-Access database and a MS-Excel data sheet. In both, the data are regionally structured according to the 2008 NUTS nomenclature. Additionally, information about the parent NUTS level was added to every region contained in the database, along with as far as possible the allocation of the NUTS 2003 and NUTS 1999 geocodes. In order to be able to trace back the original data sources as well as the way in which the data were processed, a metadata document is provided with the database. All in all, it contains data for the following indicators which were identified as potentially useful for the construction of TERA-SIAP typologies.

Accessibility (KRP a)

- Accessibility with respect to population
- Accessibility with respect to GDP

Demography and Migration (KRP b)

- Total population 1995
- Total population 2000
- Total population 2005
- Population < 35 years 2000
- Population < 35 years 2005
- Population 35 to 55 years 2000
- Population 35 to 55 years 2005
- Population 55 to 64 years 2000
- Population 55 to 64 years 2005
- Population > 64 years 2000
- Population > 64 years 2005
- Natural population change 1995 - 2005
- Population change 1995 - 2005
- Net migration rate 1995 - 2005

Labour Market (KRP c)

- Employment rates
- Unemployment rates
- Long-term unemployment rate
- Economic activity rates

Education and Training (KRP d)

- ISCED - Levels

Access to Services (KRP f)

- % households with access to the internet at home
- % households with broadband access
- Doctors per 100000 inhabitants
- Hospital beds per 100000 inhabitants

Sectoral Structure of Employment (KRP g)

- Percentage share of employment in sectors I to III in total employment
- Employment in agriculture
- Gross value added (GVA) in agriculture

Pluriactivity (KRP h)

- Number of bed places
- Number of bed places per employee
- Tourism intensity 2006
- Farmers with other gainful activity
- Tourism intensity 2006

Farm Structures (KRP i)

- Utilised agricultural area
- Physical farm size
- Average physical farm size
- % of holdings with … ha agricultural area
- Economic farm size
- Average economic farm size
- % of holdings with … ESU
- Labour force in AWU
- Age structure in agriculture ratio farmers < 35 years / farmers 55 years and over
- Farmers with basic or full education in agriculture
- GVA per AWU
- Gross fixed capital formation in agriculture
- Part-time holders in AWU

Sustainable Agriculture / LFA (KRP k)

- % Utilised agricultural area (UAA)
- % UAA in LFA mountain
- % UAA in LFA other
- % UAA in LFA specific

Landscape and Nature Resources (KRP m)

- Availability and proximity of nature to population

- Agricultural area
- Forest area
- Natural area
- Artificial area

Other aspects

- OECD urban-rural classification

In order to reduce data gaps and to get the most complete data sets possible, data for the most recent year available is incorporated for every individual region in the database. In cases where ratio indicators were calculated, the indicator was only incorporated in the database if both the individual components of the ratio indicator referred to the same year of reference. Missing NUTS3 data have been replaced by the corresponding NUTS2 values. In order to be as transparent as possible for every indicator, the year of reference of a regional value is indicated, as is the replacement of a NUTS3 value with a NUTS2 value.

6.2.1 MS-Excel database

The core MS-Excel database consists of several tables. The table "TERA_SIAP_DATABASE_CORE.xls" contains all the indicators listed on page. It consists of several table sheets. The sheet "All Indicators" is the main data sheet and contains the raw data of the typology indicators. Besides this, the table also contains an extra sheet for every KRP, which summarizes the KRP specific indicators, plus one data sheet called "Typology Indicators" where all the indicators used for typology construction are merged. The "All Indicators" sheet is central to the other sheets as they are all dynamically linked to it, so that any modification or update of the data contained also affects the other data sheets. That means if an indicator data set in the "All Indicators" sheet is updated all other tables dependent on the "All Indicators" sheet in the "TERA_SIAP_DATABASE_CORE.xls" table are going to be updated automatically[6].

Apart from this core table the database also contains the following four tables that complement the core table:

- Diversification_Typology
- Farm_Competitiveness_Typology
- Human_Capital_Typology
- Sustainable_Agriculture_Typology

Each of these tables is dynamically linked to the core "database" table (more specifically with its "Typology_Indicators" sheet) and contains the calculation of the corresponding absorption typology (see Section 7).

Thus, a modification or update of the core indicator data set (TERA_SIAP_DATABASE_CORE.xls; All Indicators sheet) will also affect the single typology computations so that future typology updates can be performed easily.

In contrast to the absorption typologies, the structural typologies (see Section 9) are stored in the two extra stand-alone Excel workbooks:

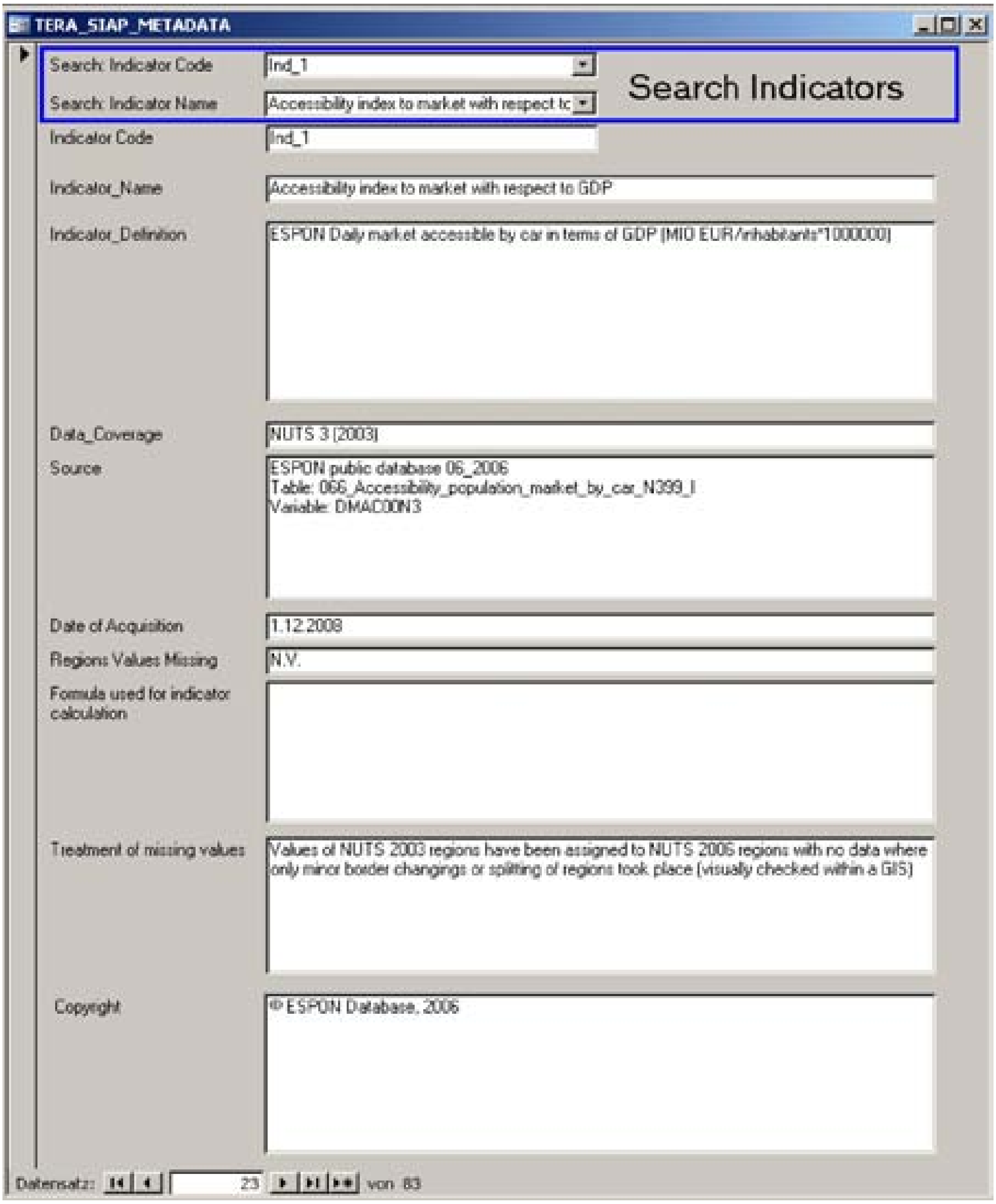
- Sectoral_Structural_Typology
- Territorial_Structural_Typology

Both workbooks have several data sheets containing the raw data on which the typology calculation is based, as well as the typology calculation process and the resulting typology. The structure and functioning can be understood by looking at the formulae and linkings used in the single data sheets of the two workbooks.[7]

6 This requires that MS-Excel is set to automatically perform calculations in the Options/Extra/Calculation preferences. Otherwise the user has to press F9 to manually re-calculate the data sheet/table under consideration.

7 Due to the characteristics of the underlying raw data (NACE classification of the Structural Business Statistics) it was unfortunately not feasible to integrate the raw data of the structural typologies into the core data table. Therefore, an update of these typologies requires that the raw data set within the tables, as well as the data replacement steps, has to be modified manually (see Section 7.3 for more information on the typology calculation process of the structural typologies).

Figure 4: Example of metadata record

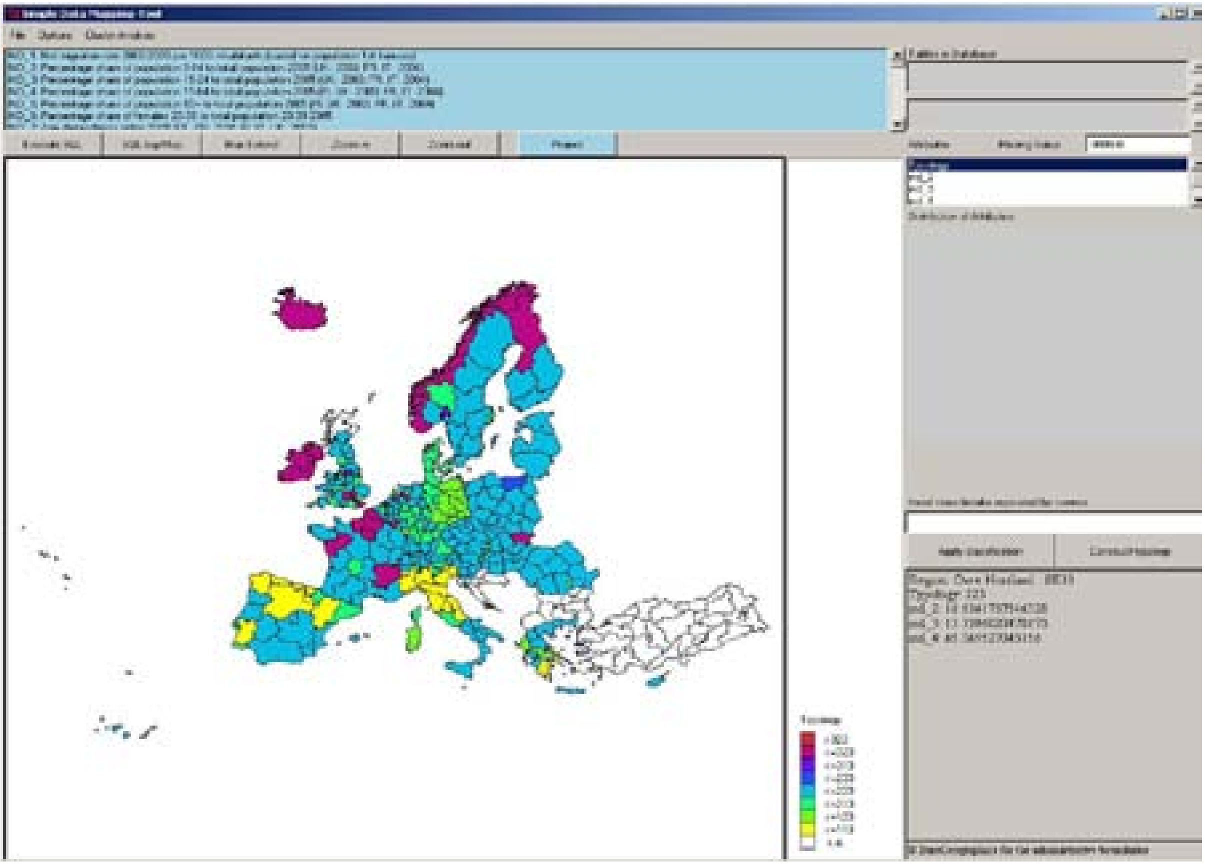

TERA_SIAP_METADATA

Search: Indicator Code: Ind_1
Search: Indicator Name: Accessibility index to market with respect tc
Search Indicators
Indicator Code: Ind_1
Indicator_Name: Accessibility index to market with respect to GDP
Indicator_Definition: ESPON Daily market accessible by car in terms of GDP (MIO EUR/inhabitants*1000000)
Data_Coverage: NUTS 3 (2003)
Source: ESPON public database 06_2006
Table: 066_Accessibility_population_market_by_car_N399_I
Variable: DMAC00N3
Date of Acquisition: 1.12.2008
Regions Values Missing: N.V.
Formula used for indicator calculation:
Treatment of missing values: Values of NUTS 2003 regions have been assigned to NUTS 2006 regions with no data where only minor border changings or splitting of regions took place (visually checked within a GIS)
Copyright: © ESPON Database, 2006
Datensatz: 23 von 83

6.2.2 MS-Access database

The MS-Excel database that is the main project database is complemented by a MS-Access database containing the raw indicator data (table TERA_SIAP_INDICATORS), as well as the calculated typologies (table TERA_SIAP_TYPOLOGIES), and a metadata table (TERA_SIAP_METADATA) containing detailed information about feature characteristics of data categories, last data update, copyright, etc. Furthermore each metadata record contains information on data

Figure 5: Screenshot of the SDMT – database interface



processing applied within the TERA-SIAP project if applicable (see Figure 4). In contrast to the MS-Excel "database", the MS-Access database can be used directly with the Simple Data Mapping Tool (SDMT) that complements the TERA-SIAP project deliverables.

6.3 Graphical database interface – SDMT 1.0

The Simple Data Mapping Tool (SDMT) was developed within the vTI-Institute of Rural Studies in the programming language PERL.[8] The SDMT is an interface capable of visualizing space-oriented SQL[9]-queries. With this interface, the spatial distribution of single attributes/indicators contained in a database can easily be classified and visualised onscreen (see Figure 5). The tool is mainly meant as a front-end visualisation to MS-Access databases but it also enables the user to load data contained in csv-files or MS-Excel sheets. Furthermore, the software is able to perform simple cluster analysis tasks on selected data (still experimental) and to perform simple typology constructions. The program is intended to provide an easily understandable, "on the fly" overview of the spatial distribution of data, and not to perform sophisticated spatial analyses or to draw publication quality maps. For a detailed description of the SDMT, see Annex 4.

8 As this tool was developed independently of the TERA-SIAP project, it remains the sole property of vTI but it may be used and redistributed under the terms stated in the program description in the annex of this report. Annex 4.

9 SQL = Structured Query Language.

7. TERA-SIAP typologies

In the following section, the methodology and the resulting Single issue typologies are described. Section 7.1 addresses the overall methodological approach. Section 7.2 and Section 7.3 describe the exact processes leading to the specific absorption typologies and the structural typologies respectively.

7.1 Overall methodology

The structure and rationale of the typology (typologies) derive from the earlier distinction (see Section 2) between:

– measure/GPI-specific "absorption capacity" effects with associated direct economic impacts on the one hand, and

– indirect and induced (income and employment) impacts of RDP on the other hand.

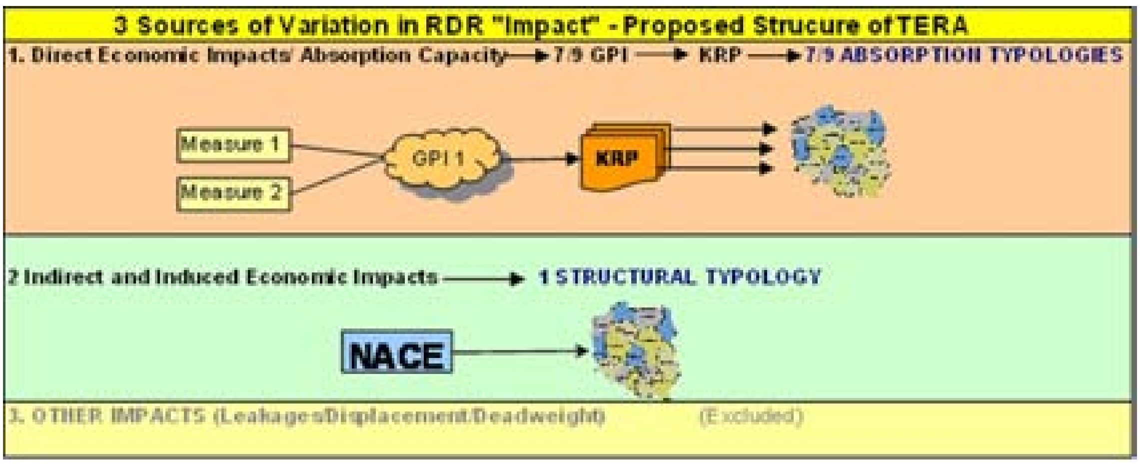
In the case of the measure/GPI-specific "absorption capacity", regions are grouped according to the way in which their socio-economic characteristics are likely to affect the size of the demand (or uptake) for policy expenditure under different Generic Policy Issues (GPIs). In the case of the indirect and induced impacts, the objective is to classify regions on the basis of characteristics which, it is reasonable to assume, affect the way in which the initial policy expenditure moves through (or out of) the regional economy, with or without significant multiplier effects.

This suggests a "two-layer" suite of typologies:

a) A set of typologies, one for each GPI, which group regions according to the socio-economic characteristics which affect the scale of the demand (absorption capacity) for support through the measures associated with that GPI.

b) A single typology, to be applied across all GPIs, which captures the main aspects of the regional economy which are likely to determine the indirect/induced impact of each € of CAP Pillar 2 expenditure.

Figure 6: Sources of variation in RDR "impacts" and kind of typology



These could conveniently be termed "Absorption Typologies" and "Structural Typology" respectively (see Figure 6).

The "home level" (in terms of scale) for the analysis is NUTS3, with missing NUTS3 values being replaced by the corresponding NUTS2 values if available. All regions are included in the typologies.

7.1.1 Absorption typologies – general concept

The absorption typologies incorporate the following elements:

- The Generic Policy Issues (GPIs), which provide an overall thematic framework that is carefully linked back to the RDR measures.

- The Key Rural Socio-Economic Perspectives (KRPs), which are groups of indicators each relating to different components of rural differentiation and change, each presented in the form of a single synthetic index, and;

- The single issue typologies (SITs), which are monothematic typologies, corresponding with each of the GPI. It is perhaps helpful to underline the fact that, although the SITs are monothematic in the sense that they are each tied to one of the GPIs, they nevertheless incorporate several of the KRP indices.

These considerations lead to the following 7 possible SITs: Human Capital, Quality of Life, Diversification, Farm Competitiveness, Support for Quality Products, Sustainable Agriculture, and Environmental Protection.

From these seven possible SITs, the following are not addressed, either due to insufficient data or because they are too far from TERA-SIAP interests:

- (ii) Quality of Life (lack of data)

Figure 7: Possible Single issue typologies (corresponding to the Generic Policy Issues) and Key Rural socio-economic and environmental perspectives (KRPs)

		Accessibility	Demography/migration	Labour market	Education and training	Cultural heritage	Accessibility to services	Sectoral Structura	Pluriactivity (esp. Tourism)	Farm structures	Supply Chains	LFA	Intensity and HNV farming	Landscape and nature
	GPI/KRP	**a**	**b**	**c**	**d**	**e**	**f**	**g**	**h**	**i**	**j**	**k**	**l**	**m**
A. Rural Preconditions	**(i) Hum. Cap.**		x	x	x									
	(ii) QoL	?	?			?	?							?
B. Rural Diversification	**(iii) Divers.**	x						x	x					
C. Primary Sector Competitiveness	**(iv) Comp.**	x	x		x					x				
	(v) Qual.	?									?			
	(vi) Sust. Ag.											x		
D. Environment	**(vii) Env.**												excl.	excl.

Note: "?" = lack of data, "excl." = excluded in accordance with the terms of reference of the TERA-SIAP project.

– (iv) Support for Quality Products (lack of data)

– (vii) Environmental Protection (too far from TERA-SIAP interest).

Building the KRP Indices

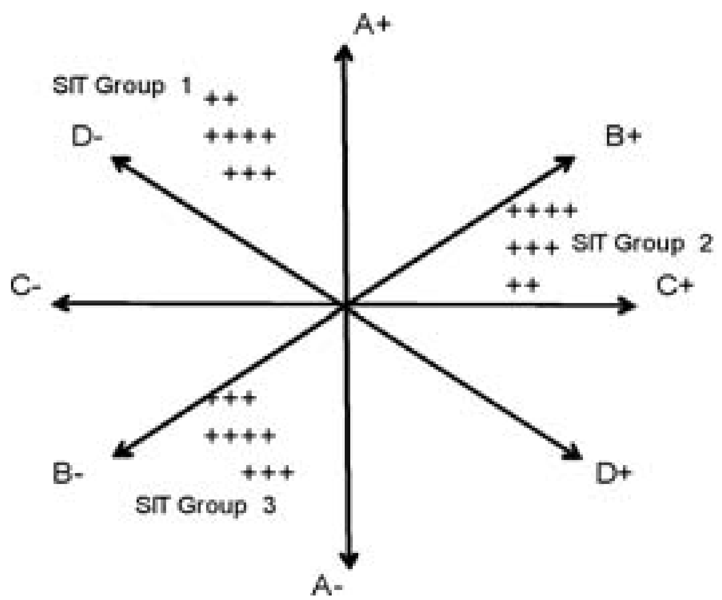
The 13 KRPs proposed in Section 4 were described as "families" of indicators relating to a specific aspect of socio-economic change or differentiation. Another defining characteristic emerges from a consideration of methodological options, and as a consequence of the view that they should be implemented as single "indices": it is preferable that such synthetic indices, based on two or more raw variables, should only combine indicators with broadly similar geographic distributions. Otherwise, the "averaging" effect will run the risk of obscuring both patterns. It may therefore be necessary to separate different components of a KRP. For example, within KRP (b) – Demography and migration – there might be two elements, one capturing regional patterns of population change and migration (as in the SERA project demographic typology), and another reflecting patterns of age structure and gender. Whilst there is an obvious case to be made for keeping these separate if they have different geographical distributions, care should be taken not to increase the number of KRPs except where necessary, in order to avoid distorting the relative "weight" of each KRP in the subsequent clustering process.

Creating the Single issue typologies (SITs)

The SITs correspond to the GPIs (see Section 4), and are each generated from different combinations of KRP indices (Table 6, p. 47). The KRP indices may be thought of as axes of differentiation. Each region is positioned in relation to each of these axes by its KRP scores (A-D in Figure 8). All in all, the procedure chosen to build the SITs should allow groups of regions (e.g. types 1-3 in Figure 8) to be identified, which (because the KRPs are defined in relation to specific GPIs, and hence policy measures) are likely to have similar absorption patterns for the specified GPI.

In order to operationalise the above KRP concept it is useful not only to distinguish the structural typology and the absorption typologies, but also the following two kinds of typologies: "descriptive" typologies and "performance"

Figure 8: The relationship between KRP indices and a SIT



typologies. The former are often "inductive", and the latter "deductive":

– The FADN farm typology is an example of a "descriptive" typology. The different farm types are distinguished by different combinations of enterprises. There is no obvious ordering of the types, low to high, weak to strong, etc. Descriptive typologies are often created as an aid to "making sense" of data. They tend to be "inductive", in the sense that there are no particular preconceptions about what the types should be, and the types are a product of statistical relationships within the data, which are identified by techniques such as cluster analysis.

– By way of contrast, "performance" typologies comprise a set of types for which there is a fairly obvious order, from "good" to "bad". The demographic typology in the SERA project is a good example of this – the types ranged from "double negative" (natural decrease and out-migration) to "double positive" (natural increase and in-migration). Because the operator generally has some preconception (hypothesis) about the nature of the types, and the typology methodology reflects this, such typologies can be described as "deductive".

Against the background of the practical policy environment of the proposed TERA-SIAP typologies, a transparent and commonly understandable approach, that easily allows the typology building and region grouping steps to be retraced, seems more appropriate than more sophisticated, complex multivariate approaches.[10] Therefore, the typology building approach which follows is based on simple cross-tabulation procedures, and/or calculation of z-transformed means.[11]

The KRPs are carefully specified to support the second approach (performance typologies), as the objective is to identify types of regions which range from having low to high absorption capacity in relation to the relevant measures/GPI. In other words, since the constituent SIT types of regions should be easily interpretable in terms of "absorption capacity", it follows that the individual KRP must be defined in terms of indicators which are clearly bipolar, ranging from low to high absorption capacity.

7.1.2 Structural typology – general concept

The objective of the structural typology is to try to capture some key regional characteristics which determine the scale of the economic and employment "impacts" of rural development policy expenditure.

For Sectoral Measures/GPI

For the majority of (sectoral) measures (i.e. those for which the initial beneficiaries are within the primary sector), this boils down to questions about:

– the size of the primary sector, and

– the strength of the indirect effects (on both income and employment) – which means the degree to which the primary sector trades with other parts of the regional economy.

In terms of specific indicators (a) is relatively easy to satisfy, by using primary - sector employment or GVA. (b) is rather more difficult – the most obvious solution is to build an indicator from employment in those activities generally closely linked to the primary sector (wholesaling, food processing, wood processing, parts of the

10 For example, a more sophisticated, but less transparent, approach might be to carry out a Principal Components Analysis, (across all indicators within a single KRP) and then to take the first one (or two) principal components as the KRP index.

11 For an example of the use of this approach see Copus and Crabtree (1992)

chemicals and machinery industries, etc.). The best starting point for this is the Structural Business Statistics (SBS) database (Eurostat REGIO), where employment data for 22 two-character NACE codes in the secondary and tertiary sectors may be found. More than three quarters of the EU27 NUTS2 regions have valid data for all or most NACE codes during the 2000-2005 period (for more information see Table 6 KRP (g)).

For Territorial Measures/GPI

The potential regional multiplier impacts of the territorial measures (those in which the initial beneficiaries are the public sector, or firms across the sectoral spectrum) would, in principle, not be affected by the size of the primary sector, but instead by the degree to which the regional economy is "self-contained" as opposed to reliant upon exogenous inputs and markets. This is obviously very difficult to represent in terms of indicators. However, one point of departure is to assume a relationship with the degree of specialisation/diversity of the regional economy. Thus it is reasonable to assume higher within-region impacts in a more broadly-based, less specialised regional economy. By contrast, a more specialised, less diverse region is probably characterised by larger "leakages". This again points to the potential usefulness of detailed sectoral employment data based upon the SBS database.

7.2 Absorption typologies

Table 6 gives an overview of the indicators chosen to build the single issue typologies outlined above (see Section 7.1.2). Indicator selection is based upon both methodological considerations, and the review of data sources. As well as the chosen indicators, Table 6 also summarizes the idea behind the indicator selection as well as the data indicator sources.

Table 6: Proposed KRP sources for the TERA-SIAP database

GPI	KRP	Indicator / proxy indicator	Rationale behind indicator selection	Source
	(b) Demography and migration	Population change	A decrease in the population of a region can be interpreted as a decrease of human capital in that region and vice versa	Copus, A. et al.: Study on Employment in Rural Areas. 2006 (own calculation with methodology described in the report but with recent data acquired from the Eurostat Regio Database)
		Age ratio of farmers	High values are an indication of a prevalence of young farmers and low values are an indication of aging farmers	Eurostat REGIO Database, Farm structure Survey 2003 (ef_r_nuts)
(i) Human Capital (a) Sectoral and (b) Territorial	(c) Labour market	Economic activity rate	Greater economic activity is an indication for higher edutainment in human capital and / or greater innovative capacity	Eurostat Regio Database, Labour Force Survey (reg_lfp2actrt)
		Long-term unemployment	Long-term unemployment is associated with a loss of earnings and deterioration of individuals' skills and abilities (loss of human capital)	Eurostat Regio Database, Labour Force Survey (reg_lfu2ltu)
	(d) Education and training	Share of population 25-64 with ISCED 3 to 6 (secondary and tertiary education)	The higher the share the better educated the working population	Eurostat Regio Database, Labour Force Survey (reg_lfsd2pedu)
		Share of farm holders with agricultural training to total farm holders	The higher the share of more formally educated farm managers within a region, the higher the primary sector human capital	RDEU07 – Objective Indicator 4
	(g) Sectoral structure of employment and value added	GVA from primary sector as a percentage of total GVA	Indicator allows us to consider the labour productivity per worker in agriculture and thus gives a good impression of the economic positioning of a region's agricultural sector	Eurostat Regio Database (reg_e3vabp95)
		Agricultural employment (in % of total employment)	Indicator allows us to consider the importance of agriculture for the regional economy	Eurostat Regio Database (reg_e3empl95)
(iii) Diversifi-cation (a) Sectoral and (b) Territorial	(h) Pluriactivity (especially tourism)	% of farmers with other gainful activity (OGA)	OGA gives information about farm diversification and agricultural pluriactivity	RDEU07 – Objective Indicator 27
		Tourism beds per employees	The idea behind the selection of the two indicators is that, in order to develop successful rural tourism, the existence of either natural or cultural attractions or both is necessary. The "amount of wilderness" can give some hints due to these prerequisites for most kinds of tourism. Tourism beds indicate that the region is able to service a certain amount of natural or cultural tourism attractions. And this in turn means that there is a potential for developing further tourism attractions and jobs.	Eurostat Regio Database (tour_cap_NUTS3, reg_e3empl95)
		Availability and proximity of nature resources to population		Green Paper Annex (Combined Indicators of Proximity to Natural Areas
	(a) Accessibility	Peripherality with respect to population by car	Peripherality with respect to population by car represents the perspective of service firms and consumers with respect to how many opportunities such as clients, markets or tourist facilities can be reached.	Schürmann, C., Talaat, A.: Towards a European Peripherality Index. Final Report. 2000

GPI	KRP	Indicator / proxy indicator	Rationale behind indicator selection	Source
(iv) Competi-tiveness	(i) Farm structures	GVA per AWU in agriculture	Indicator reflects labour productivity per worker in agriculture, and thus gives a good impression of the economic positioning of a region's agricultural sector	RDEU07 – Objective Indicator 6
		Gross fixed capital formation in agriculture	Indication for capital availability. High values are an indication of high investment willingness and high capital availability and vice versa	RDEU07 – Objective Indicator 7
	(b) Demography	Age ratio of farmers	High values indicate a prevalence of young farmers and low values indicate aging farmers	Eurostat Regio Database, Farm structure Survey 2003 (ef_r_nuts)
	(d) Education and training	Share of farm holders with agricultural training to total farm holders	The higher the share, the more formally educated farm managers exist within a region, the higher the primary sector human capital	RDEU07 – Objective Indicator 4
	(a) Accessibility	Time to market by road and rail weighted by GDP macro scale	Time to market by road and rail represents the perspective of producers on potential markets.	ESPON public database
(v) Support for quality products	(j) Supply chains	Employment in food industry in % of total employment		RDEU07 – Context Indicator 12
	(a) Accessibility	Time to market by road and rail weighted by GDP macro scale	Time to market by road and rail represent the perspective of producers on potential markets.	
(vi) Sustainable Agriculture	(k) LFA	LFA in % UAA		RDEU07 – Context Indicator 8

Note: RDEU07 = Rural Development in the European Union 2007 (http://ec.europa.eu/agriculture/agrista/rurdev2007/index_en.htm)

The methods of typology construction, and the resulting SITs, for each of the GPIs outlined above, are now described.

7.2.1 Diversification typology

ABSORPTION TYPOLOGY 1: DIVERSIFICATION

Related RDP measures: *311, 312, 313.*

Key rural socio-economic and environmental perspectives (KRP): *(g) sectoral structure, (h) pluriactivity, (a) accessibility*

Overview of rationale: This typology is primarily associated with measures designed to promote diversification of agricultural enterprises, support for micro-businesses and for the development of rural tourism.

The main assumption is that current levels of economic diversification and farm pluriactivity can be indicative of a region's potential to absorb such support. Secondary assumptions (to which we accord less weight in the methodology) are that diversification potential is also positively related to accessibility, and that potential for tourism development (a key form of diversification/pluriactivity) is related to access to "natural areas".

Outline of the methodology:

A simple standardised scoring procedure is used to generate three indices, measuring;

(a) Economic diversification level;

(b) Farm pluriactivity level;

(c) Potential for further diversification.

For each of these indices regions are allocated a code according to how their score relates to the EU27 mean. If the score is >.25 standard deviations (SD) below the mean the code is 1. If it is within 0.25 SD (above or below) the mean the code is 2. If the score is more than 0.25 SD above the mean the code is 3. The final typology is composed of the 27 possible permutations of the three codes.

Key results:

The patterns of actual and potential diversification/pluriactivity are rather different, so that the combined typology involves a complex interaction. The most diverse regions with the highest potential for further diversification are in central and northern Europe (southern England, parts of Ireland, southern and central Germany, Sweden, southern Finland.). The least diverse regions with the least potential are in central Spain, Greece, and Lithuania.

The absorption typology depicting economic diversification within regions considers the "actual economic diversification" and the "overall potential for further economic diversification".

The "actual economic diversification" comprises two components: (i) overall economic diversification: measured by the relative importance of agriculture in the regional economy (indicators: primary sector GVA, agricultural employment); and (ii) farm diversification and agricultural pluriactivity: measured by the incidence of other gainful activities (OGA).

The "overall diversification potential" of the region for developing a diversified economy is measured by: (i) accessibility, and (ii) the tourism potential measured by beds per employees (all employees) and the availability and proximity of nature to population.

Rationale behind this "grouping" of indicators

Actual economic diversification: "primary sector GVA", "agricultural employment", as well as OGA, give a good overview of the actual situation with regards to the diversification of the regional economy. The differentiation between the overall importance of agriculture for the regional economy and agricultural pluriactivity allows the typology to be sensitive to the overall diversification of the regional economy on the one hand, and to the diversification of the agricultural sector (whether on-farm or off-farm) on the other. These two aspects are often independent of each other.

Diversification potential: In order to determine the potential for further diversification, we use "accessibility" as one indicator that suggests potential for developing non-agrarian activities, as it is often argued that opportunities for pluriactivity and off-farm employment are greater in more accessible areas, close to urban labour markets. In contrast, peripheral areas are often more dependent upon primary sector activities because they lack other opportunities. In the context of the often assumed importance of tourism for rural development and farm diversification, it seems reasonable to measure the diversification potential not only by accessibility but also, though to a lesser degree, by its potential to develop or strengthen rural tourism activities. Here the two indicators "availability and proximity of nature resources to population" ("amount of nature") and "tourism beds per total employees" seem to be promising indicators. The idea behind the selection of the former indicator is that in order to develop a successful rural tourism industry the existence of natural or cultural attractions is necessary. The "amount of nature" can suggest this potential natural prerequisite for tourism. Tourism beds are an indication that the region is able to provide a certain amount of natural or cultural tourism attractions. And this in turn means that there is potential for developing further lucrative tourism attractions and generating jobs in tourism in the future.

Based on these considerations, the regional diversification potential is calculated by averaging the indicator scores and weighting the potential diversification indicators by multiplying the actual diversification indicators with 0.5.

Method of typology construction

The approach used to construct the diversification typology is as follows:

1. Calculation of z-scores for every indicator, so that it is possible to compare and compute averages, etc. across all indicators independent of their units of measurement.

2. The indicators "primary sector GVA" and "employment in agriculture" are inverted (as a result, the values stand for % of GVA and employment outside the primary sector respectively). This ensures that for all the indicators a large score is associated with diversity or pluriactivity and a small one with (a relatively high) dependence upon

agriculture, forestry and fisheries or low levels of pluriactivity. Primary sector GVA and agricultural employment are good substitutes for each other as a high share of primary sector GVA is associated with a high share of agricultural employment. Therefore for regions with data missing for one of the two indicators the value of the available indicator is entered into the calculation alone in order to reduce the number of regions with missing data.

3. For each region, the simple mean of the z-scores for the "actual economic diversification" indicator (i.e. primary sector importance and agricultural employment) is calculated. Then, for the "diversification potential" indicator, the mean of the z-scores for the "accessibility" indicator, and for the "tourism potential" indicators (availability and proximity of nature resources to population, tourism beds per employees) are calculated. In order to give the accessibility measurement more weight, the tourism potential indicators are both weighted by 0.5.

4. Since these calculated mean values of z-scores are not normally distributed, they are transformed to z-scores.

5. To every region, for every calculated index ("economic diversification", "farm pluriactivity", "diversification potential"), the following codes are allocated: 1 for values below -0.25 standard deviation; 2 for values between -0.25 and +0.25 standard deviation; and 3 for values above 0.25 standard deviation.

6. Last but not least, for every region the resulting values are merged into (sub)ranges. All in all, this leads to 27 possible combinations / categories (see Table 7) describing the performance of a region in each of the following three fields, "importance of agriculture for the regional economy", "farm pluriactivity" and "diversification potential" for further non-agrarian diversification.

This results in the following typologies (see Annex 4, Table A 10 for detailed typology statistics):

Table 7: Coding of the regions in the diversification typology

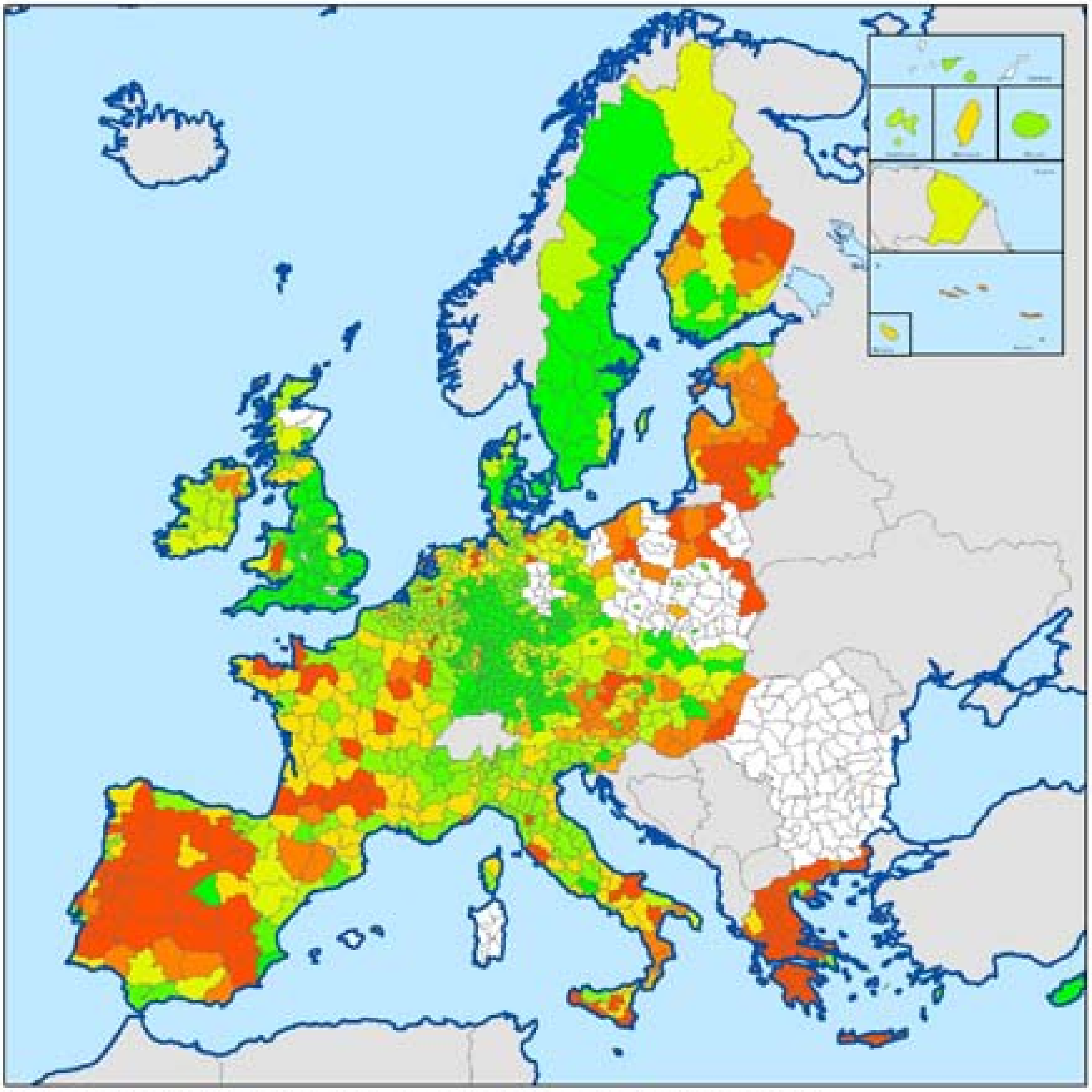
ACTUAL					POTENTIAL		CODE DETAILED
ECONOMY		AGRICULTURE		CODE ECONOMY	(Tourism + Nature + (2*Access))/3	CODE POTENTIAL	
importance of agriculture above average (economy dependent on agriculture, forestry and fisheries)	1	pluriactivity below average	1	11	potential for developing a diversified economy below average	1	111
	1		1	11	average potential for developing a diversified economy	2	112
	1		1	11	potential for developing a diversified economy above average	3	113
	1	average pluriactivity	2	12	potential for developing a diversified economy below average	1	121
	1		2	12	average potential for developing a diversified economy	2	122
	1		2	12	potential for developing a diversified economy above average	3	123
	1	pluriactivity above average	3	13	potential for developing a diversified economy below average	1	131
	1		3	13	average potential for developing a diversified economy	2	132
	1		3	13	potential for developing a diversified economy above average	3	133
average importance of agriculture	2	pluriactivity below average	1	21	potential for developing a diversified economy below average	1	211
	2		1	21	average potential for developing a diversified economy	2	212
	2		1	21	potential for developing a diversified economy above average	3	213
	2	average pluriactivity	2	22	potential for developing a diversified economy below average	1	221
	2		2	22	average potential for developing a diversified economy	2	222
	2		2	22	potential for developing a diversified economy above average	3	223
	2	pluriactivity above average	3	23	potential for developing a diversified economy below average	1	231
	2		3	23	average potential for developing a diversified economy	2	232
	2		3	23	potential for developing a diversified economy above average	3	233
importance of agriculter below average (economy not dependent on agriculture, forestry and fisheries/ prevalence of sector II and sector III activities)	3	pluriactivity below average	1	31	potential for developing a diversified economy below average	1	311
	3		1	31	average potential for developing a diversified economy	2	312
	3		1	31	potential for developing a diversified economy above average	3	313
	3	average pluriactivity	2	32	potential for developing a diversified economy below average	1	321
	3		2	32	average potential for developing a diversified economy	2	322
	3		2	32	potential for developing a diversified economy above average	3	323
	3	pluriactivity above average	3	33	potential for developing a diversified economy below average	1	331
	3		3	33	average potential for developing a diversified economy	2	332
	3		3	33	potential for developing a diversified economy above average	3	333

- Map 1 shows the actual economic diversification and farm pluriactivity situation. The resulting regional pattern is quite striking. Regions in Spain, France and Italy seem, as a whole, to have a less diversified economy and less pluriactive farms than regions in central and northern Europe. The most economically diversified regions and pluriactive farms can be found in Sweden, southern England, southern and central Germany, and southern Finland, as well as in Hungary, the Czech Republic, Slovenia and Slovakia. The majority of regions with less diverse economies and fewer pluriactive farms can be found in Spain, Greece and Lithuania.

- Map 2 depicts the overall diversification potential. The greatest diversification potential can be found in regions in central Europe, as well as regions on the Mediterranean coast, in southern France and northern Italy. The regions with the least diversification potential can be found in Spain, central France, Ireland and Greece, as well as in the New Member States.

- Map 3 combines the actual economic diversification and farm pluriactivity and the diversification potential indicators. Again the east–west pattern is evident. The most diverse regions with the highest potential for further diversification can be found in central and northern Europe (Sweden, southern England, central, West and East Ireland, southern and central Germany, as well as southern Finland). The least diverse regions with the least diversification potential can be found in central Spain, Greece and Lithuania.

Map 1: Actual economic diversification and farm pluriactivity



Actual economic diversification and farm pluriactivity

- no data
- [11] economy dependent on agriculture, farm pluriactivity below average
- [12] economy dependent on agriculture, average farm pluriactivity
- [13] economy dependent on agriculture, farm pluriactivity above average
- [21] average economic importance of agriculture, farm pluriactivity below average
- [22] average economic importance of agriculture, average farm pluriactivity
- [23] average importance of agriculture, farm pluriactivity above average
- [31] diversified economy, farm pluriactivity below average
- [32] diversified economy, average farm pluriactivity
- [33] diversified economy, farm pluriactivity above average

Group	N
no data	162
11	140
12	52
13	24
21	123
22	47
23	85
31	219
32	94
33	357

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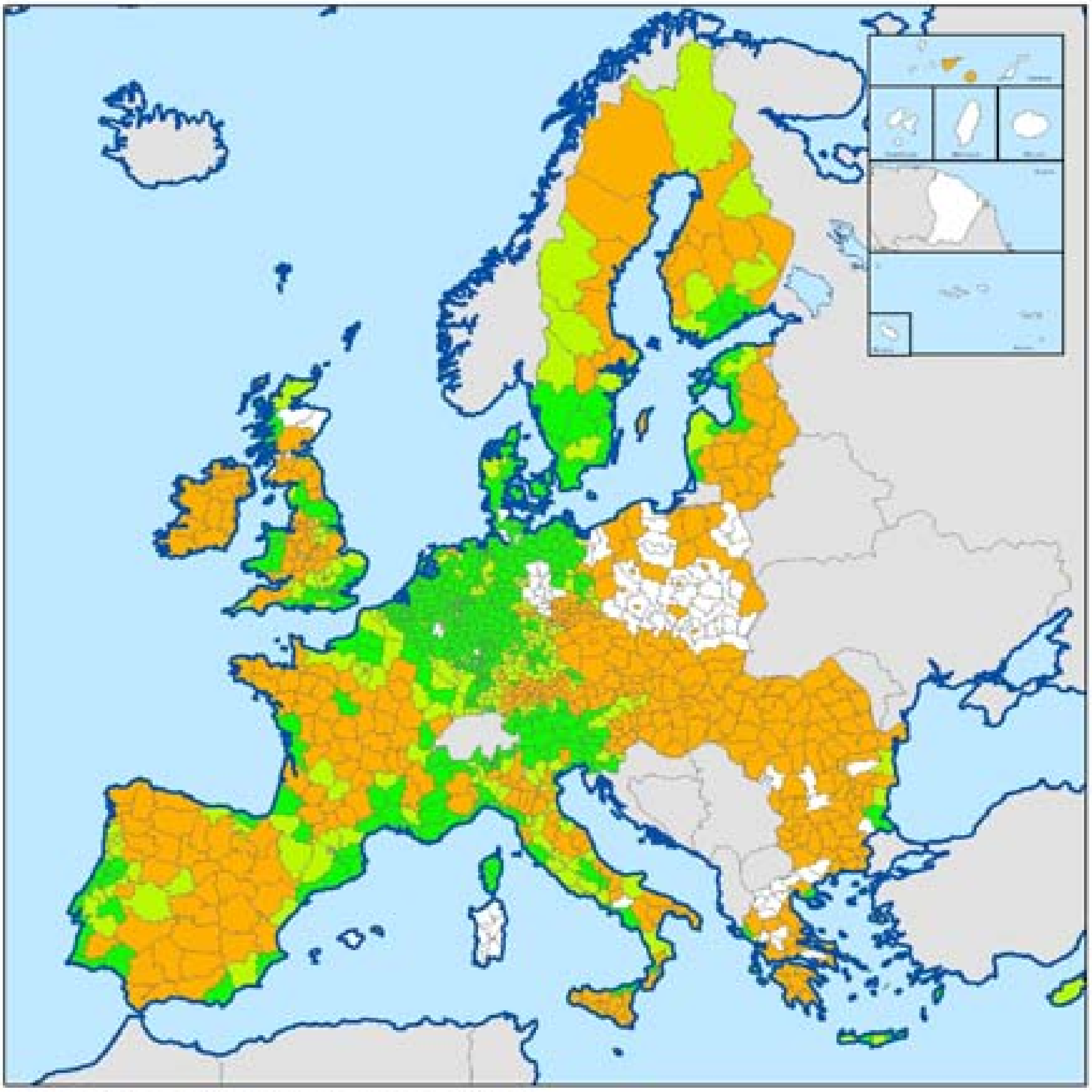
Sources: Eurostat REGIO Database, ESPON public database, RDEU07

Map 2: Economic diversification potential



Economic diversification potential

- no data
- [1] potential for developing a diversified economy below average
- [2] average potential for developing a diversified economy
- [3] potential for developing a diversified economy above average

Group	N
no data	146
1	468
2	218
3	471

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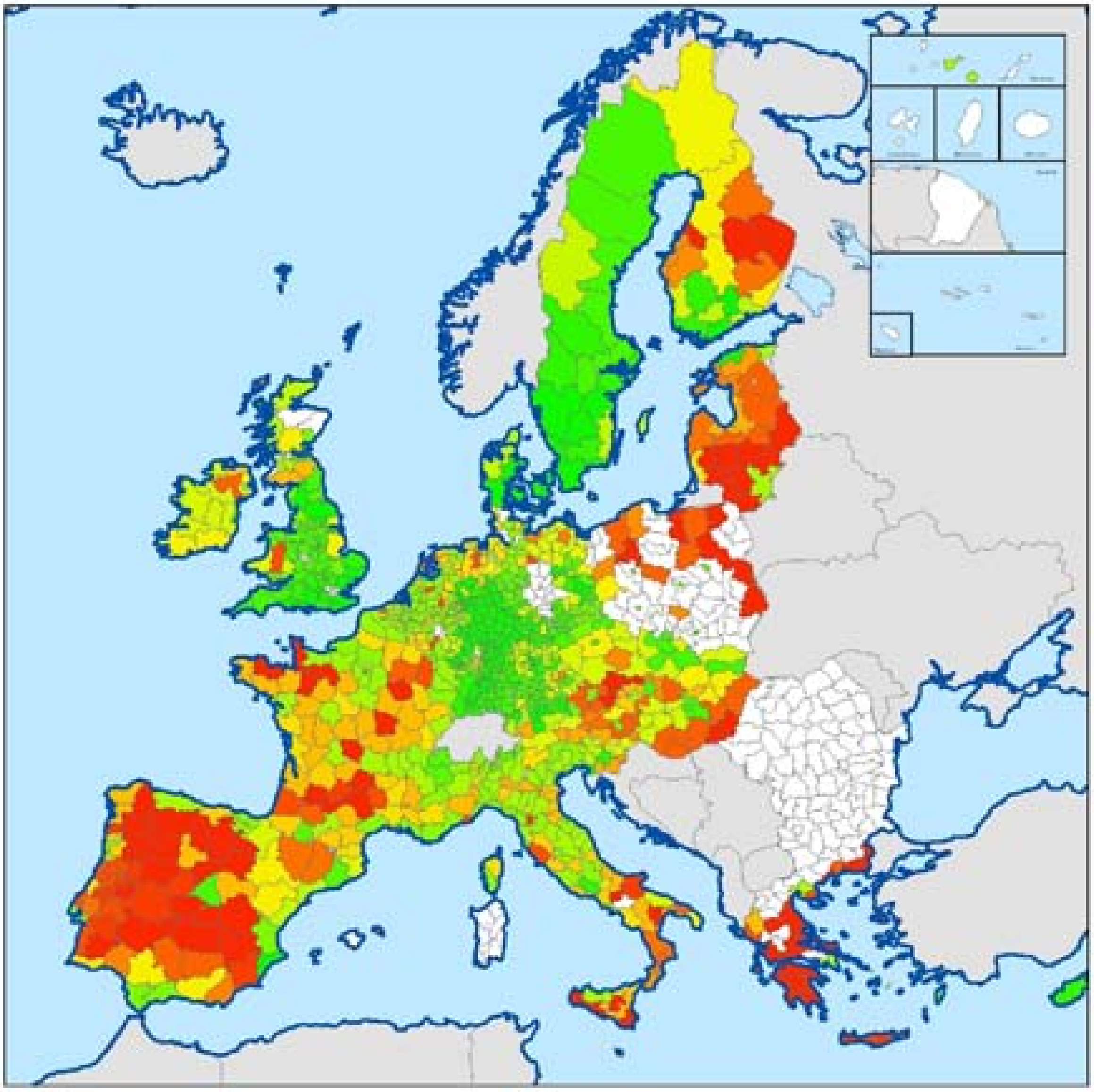
Sources: Eurostat REGIO Database, ESPON public database, RDEU07

Map 3: Diversification typology (economic diversification, farm pluriactivity, diversification potential



Diversification typology

no data

111 211 311
112 212 312
113 213 313
121 221 321
122 222 322
123 223 323
131 231 331
132 232 332
133 233 333

Group	N
no data	225
111	79
112	15
113	31
121	32
122	10
123	7
131	13
132	2
133	9
211	42
212	27
213	50
221	19

Group	N
222	4
223	23
231	35
232	21
233	28
311	41
312	36
313	127
321	32
322	17
323	34
331	107
332	83
333	153

Economy-OGA in agriculture-diversification potential

- 1 below average
- 2 average
- 3 above average

Example:

123: Economy dependent upon agriculture;
Average agricultural pluriactivity;
Potential for further economic diversification above average

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Sources: Eurostat REGIO Database, ESPON public database, RDEU07

7.2.2 Human capital typology

ABSORPTION TYPOLOGY 2: HUMAN CAPITAL

Related RDP measures: *111, 112, 114, 115, 131, 142, 331, 341*

Key rural socio-economic and environmental perspectives (KRP): *(b) demography/migration, (c) labour market, (d) education and training*

Overview of rationale: This typology supports measures relating to vocational training, young farmers, advisory services, meeting standards, producer groups, skills and animation (for rural development initiatives). It is assumed that absorption capacity for territorial human capital measures is likely to have a different regional distribution than that of purely sectoral measures. Two separate typologies were therefore produced. For the territorial typology it was assumed that absorption capacity would be related to levels of education, economic activity and unemployment rates, and population change. In the sectoral context absorption capacity was assumed to be a function of levels of agricultural training, and the age structure of the farmer population.

Outline of the methodology:

Territorial typology: all five indicators were converted to z-scores, and a weighted mean calculated (long term unemployment and economic activity indicators were given a weight of 0.5, reflecting their more indirect relationship to levels of human capital). The resulting synthetic score was summarised in 9 codes, defined in terms of deviation from the mean.

Sectoral Typology: The two indicators were standardised, and coded according to 3 categories (>1 SD below the mean, within 1 SD of the mean, > 1SD above the mean). Cross tabulation of the two codes resulted in a 9 category typology.

Key results:

Territorial typology: conspicuous areas of low human capital: southern Italy, Greece, Bulgaria, parts of Portugal and Spain. Highest levels in parts of Ireland, the Netherlands, Sweden, Austria and Germany.

Sectoral Typology; lowest levels in Spain, Italy, Greece, Cyprus, Hungary and Slovakia. Highest levels in the Netherlands, parts of Germany, and France.

Two human capital typologies were constructed, one reflecting the territorial human capital and one explicitly showing the primary sector human capital. The former is important for the overall rural development, the latter for agricultural development and performance.

Indicators selected for the territorial human capital typology

The following indicators form the basis of the territorial typology:

– *Education:* Share of population aged 25-64 with ISCED 3 to 6 (secondary and tertiary education). The higher the share, the better educated the working population.

– *Economic activity:* The economic activity rate measures the percentage of the population aged 16-64 who are in employment. Greater economic activity is an indication of higher human capital and/or greater innovative capacity (Teixeira and Fortuna, 2003).

– *Long-term unemployment:* Long-term unemployment, defined as people continuously out of work for a year or more (or for more than six months with another definition), is influential on labour market performance and the economy in general, as well as for the individual and social well-being (OECD, 2002). Unemployment, particularly long-term unemployment, in fact, is the main cause of loss of earnings and deterioration of individuals' skills and abilities (i.e. human capital loss), and consequently a fall in the probability of receiving a new job offer (Lynch, 1989; Vishwanath, 1989; Foley, 1997; Arulampalam, 2001 and Arulampalam *et al.*, 2001, cit. in Taşçı and Özdemir, 2005). Long-term unemployment is also one of the causes of the loss of individuals' motivation "necessary to engage in job-search" (Price *et al.*, 2002, p.304, cit. in Taşçı and Özdemir, 2005) and work, depression, poor health, divorce, alienation from society, drug addiction, crime, and even suicide (Sinclair, 1987; Lynch, 1989; Bulutay, 1996; and Price *et al.*, 2002, cit. in Taşçı and Özdemir, 2005).

– *Population change:* A decrease in the population of a region can be interpreted as a decrease of human capital in that region as often the more skilled people in particular are out-migrating.

Method of typology construction (territorial human capital typology):

The regional level of typology construction is NUTS3. Missing NUTS3 values were replaced by values of the corresponding NUTS2 regions. The typology calculation was only performed for regions with values available for all indicators under consideration. For a region for which one indicator value is missing, no type is attributed to that region.

1. Conversion of all indicator values to z-scores so that it is possible to compare and compute averages, etc. across all indicators autonomous from their measurement.

2. Inversion of z-scores for the indicator values of "long-term unemployment", so that for all indicators under consideration high z-scores are associated with "high" human capital and low z-scores are associated with "low" human capital.

3. Calculation of the mean of all z-score values (indicators). The indicators "long-term unemployment" and "economic activity" are weighted by 0.5 as both indicators are a more indirect measurement of human capital whereas the indicators "education" and "population change" reflect the actual situation.

4. Z-transformation of resulting values (mean of indicators), so that the result of the averaging is normally distributed.

5. The resulting range of values (-3.1 to 3.4) is subdivided into the following nine classes:
   - below -3 standard deviations (very low human capital)
   - below -2 standard deviations to -3 standard deviations (low human capital)

- below -1 standard deviation to -2 standard deviations (between below average and low human capital)
- below average to -1 standard deviation (below average human capital)
- average (average human capital)
- above average to 1 standard deviation (above average human capital)
- above 1 standard deviation to 2 standard deviations (medium-level human capital)
- above 2 standard deviations to 3 standard deviations (high human capital)
- above 3 standard deviations (very high human capital)

Indicators selected for the primary sector human capital typology

The following indicators form the basis of the sectoral typology with respect to the primary sector:

– *Age ratio farmers:* The ratio of farmers 35 years and younger to farmers 55 years and over. High values are an indication of a prevalence of young farmers applying up-to-date farming techniques, etc. (high primary sector human capital). Low values are an indication of aging farmers (low primary sector human capital).

– *Managers with agricultural training:* Share of farm holders with agricultural training to total farm holders. The higher the share the more formally educated farm managers exist within a region, and the higher the primary sector human capital.

Method of typology construction (primary sector human capital):

Again, the regional level of typology construction is NUTS3. Missing NUTS3 values were replaced by values of the corresponding NUTS2 regions. The typology calculation was only performed for regions with values available for all indicators under consideration. For a region with one indicator value missing, no type is attributed to that region.

1. Conversion of all indicator values to z-scores so that it is possible to compare and compute averages, etc. across all indicators autonomous from their measurement.

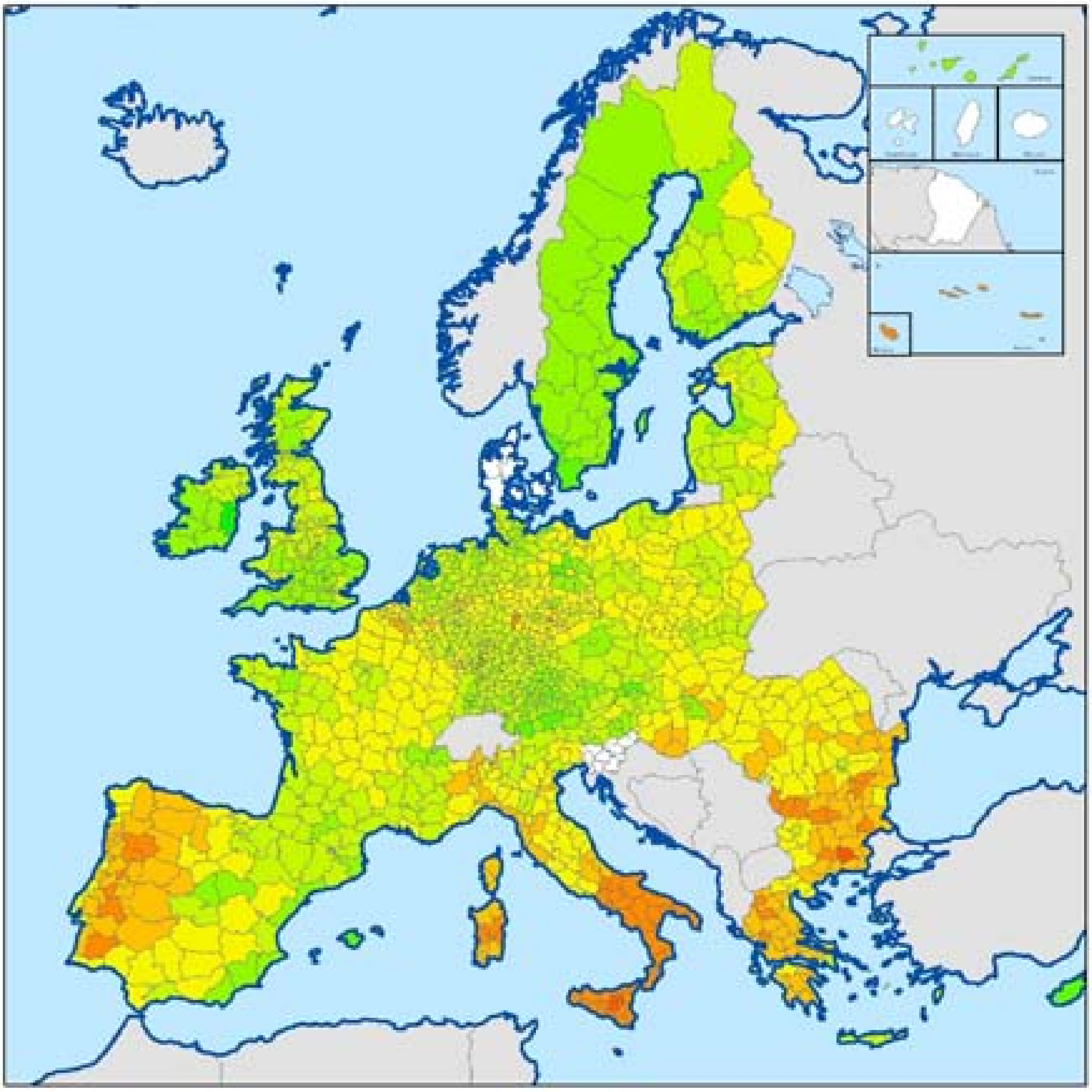
2. Grouping of values in each of the two categories (farmer age ratio, and managers with agricultural training) as follows:
   - below -1 standard deviation as old farmers or low agricultural training (1)
   - between -1 and 1 standard deviations as average aged farmers and agricultural training (2)
   - above 1 standard deviation as young farmers or high agricultural training (3).

3. Cross-tabulation of the grouped variables as following:
   - 11: low agricultural training, old farmers
   - 12: low agricultural training, average aged farmers
   - 13: low agricultural training, young farmers
   - 21: average agricultural training, old farmers
   - 22: average agricultural training, average aged farmers
   - 23: average agricultural training, young farmers
   - 31: high agricultural training, old farmers
   - 32: high agricultural training, average aged farmers
   - 33: high agricultural training, young farmers

Map 4 gives an overview of the overall territorial human capital (see Annex 4, Table A 11 and Table A 12 for detailed typology statistics). The overall territorial human capital is lowest in southern Italy, Greece and Bulgaria, and in the regions around the border of Portugal and Spain. The highest human capital exists in mid-east Ireland (the region adjoining Dublin) and Flevoland in the Netherlands, followed by Halland, Skane and Stockholm in Sweden, Cyprus, the Balearics, Tyrol in Austria, as well as the regions Havelland and Oberhavel in Germany.

Map 5 shows the regional distribution of the primary sector human capital. The primary sector human capital is lowest in Spain, Italy, Greece, Cyprus, Hungary and Slovakia, as well as in Wales and northern Scotland in the United Kingdom. High primary sector human capital can be found in the Netherlands, in the northern part of Germany, especially the “Emsland”, in Upper Bavaria and Rhineland-Palatinate in southern Germany, and in a few regions spread across France. In all other regions, the primary sector human capital is close to the average.

Map 4: *Human capital typology - territorial*



Territorial human capital

- no data
- [1] very low human capital
- [2] low human capital
- [3] between below average and low human capital
- [4] below average human capital
- [6] above average human capital
- [7] medium human capital
- [8] high human capital
- [9] very high human capital

Group	N
no data	27
1	2
2	52
3	130
4	425
6	471
7	179
8	15
9	2

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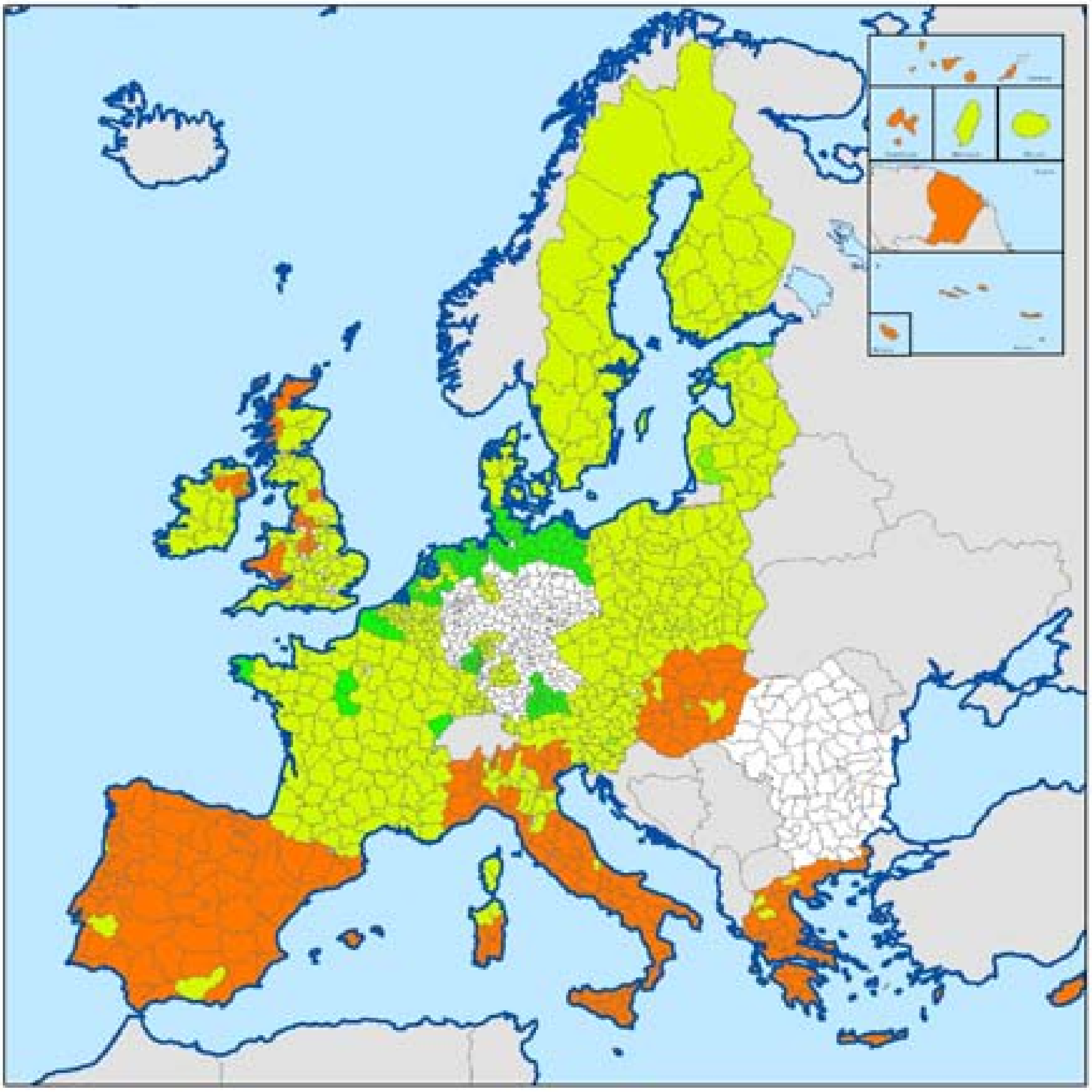
Sources: Eurostat REGIO Database, ESPON public database, RDEU07

Map 5: Human capital typology - sectoral



Primary sector human capital

- no data
- [12] low agricultural training, average aged farmers
- [13] low agricultural training, young farmers
- [22] average agricultural training, average aged farmers
- [23] average agricultural training, young farmers
- [32] high agricultural training, average aged farmers

Group	N
no data	408
12	267
13	1
22	474
23	8
32	145

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Sources: Eurostat REGIO Database, ESPON public database, RDEU07

7.2.3 Farm competitiveness typology

ABSORPTION TYPOLOGY 3: FARM COMPETITIVENESS

Related RDP measures: *114, 115, 121, 122, 123, 124, 125, 126, 131, 132, 133, 141, 142*

Key rural socio-economic and environmental perspectives (KRP): *(i) Farm structures, (a) accessibility, (b) demography/migration, (d) education and training*

Overview of rationale:

This typology supports the large number of measures which address farm competitiveness from a variety of perspectives. It assumes that the absorption capacity of regions will be related to current competitiveness, as reflected in productivity, and capitalisation, the relative level of human capital among the farming population, and access to markets.

Outline of the methodology:

Three synthetic scores were estimated: for "economic strength", for "access to markets" and for "sectoral human capital". These were calculated as weighted averages of normalised indicators. The first two of these were then combined to form an "Economic Competitiveness" score, which was cross-tabulated with the Sectoral Human Capital scores to form the final typology.

Key results:

The mapped typology identifies as least competitive peripheral regions in Greece, Hungary, Portugal, Spain, Italy and Wales. There is a broad core-periphery pattern with highly competitive regions dominating the central parts of Europe.

Indicators selected for the farm competitiveness typology

Farm competitiveness is determined by many factors that are themselves interlinked and interdependent. For the Farm Competitiveness typology the following indicators are taken into account:

– *GVA per AWU in agriculture:* As the indicator for farm production potential, "GVA per AWU in agriculture" is used as it measures the labour productivity per worker in agriculture, and thus gives a good impression of the economic positioning of a region's agricultural sector.

– *Gross fixed capital formation in agriculture:* "Gross fixed capital formation in agriculture" (GFCF) is used as the indicator for capital availability. Statistically, it measures the value of additions to fixed assets purchased less disposals of fixed assets sold off or scrapped. Therefore GFCF in agriculture allows conclusions to be reached on the willingness to further invest in the business, as well as the availability of capital. High values are an indication of high investment willingness and high capital availability and vice versa.

– *Age ratio farmers, managers with agricultural training:* In order to be able to consider the human capital in agriculture (ability, skills, knowledge of farmers, etc.) the following two indicators that also form part of the sectoral component of the human capital typology (see Section 7.2.2) are taken into consideration: age ratio farmers (ratio of farmers 35 years and younger to farmers 55 years and over) and ratio of farm managers with agricultural training (share of farm holders with agricultural training to total farm holders).

– *Accessibility:* According to Schürmann and Talaat (2000), the role of transport infrastructure for regional development is one of the fundamental principles of regional economics. In its most simplified form it implies that regions with better access to the locations of input and output markets are more productive, more competitive and hence more successful than more remote and isolated regions (see Schürmann and Talaat, 2000:17). As an indicator of the accessibility to (potential) markets the "time to market by road and rail weighted by GDP (macro scale)" from the ESPON database is used.

Method of typology construction

The farm competitiveness typology is thus composed of the following three indices:

1. Economic strength: composed of mean of z-transformed "GVA per AWU" and "GFCF". High values stand for high economic strength and low values for low economic strength.

2. Sectoral human capital: composed of "managers with agricultural training" and "age ratio farmers". The sectoral human capital is defined as in Section 7.2.2 resulting in 9 groups.

3. Market access: inverted z-values of time to market by road and rail weighted by GDP (macro scale). Low values stand for bad market access, high values for good market access.

Based on the calculated indices for economic strength and market access, an "economic competitiveness" index is calculated as the mean for each region under consideration. The code of the region is as follows:

– below -1 standard deviation: low "economic competitiveness" (1)
– between -1 and 1 standard deviations: average "economic competitiveness" (2)
– above 1 standard deviation: high "economic competitiveness" (3)

By cross-tabulating the "economic competitiveness" with "sectoral human capital" a detailed "farm competitiveness typology" is obtained (see Table 8). In order to simplify the 27 resulting types, these are finally reduced to nine by first calculating the mean of the two "sectoral human capital" scores (managers with agricultural training and age ratio farmers) and allocating to the resulting sectoral human capital groups the following codes:

– below 2: low sectoral human capital competitiveness
– 2: average sectoral human capital competitiveness
– above 2: high sectoral human capital competitiveness

Next, the "economic competitiveness" is merged with the "sectoral human capital competitiveness" (see merged typology in Table 8), where,

1: stands for below -1 standard deviation (below average competitiveness)

Table 8: Coding of the regions in the farm competitiveness typology

Economic competitiveness (E. C.)		Sectoral human capital (S. H. C.) agricultural training		age		agricultural training + age		Detailed typology	Merged E. C.	Merged S. H. C.	CODE	meaning due to farm competitiveness
							ÿ					
low	1	low	1	old	1	low	1	111	low	low	11	low economic strength and low human capital
				average	2	low	1.5	112	low	low	11	low economic strength and low human capital
				young	3	average	2	113	low	average	12	low economic strength and average human capital
		average	2	old	1	low	1.5	121	low	low	11	low economic strength and low human capital
				average	2	average	2	122	low	average	12	low economic strength and average human capital
				young	3	high	2.5	123	low	high	13	low economic strength and high human capital
		high	3	old	1	average	2	131	low	average	12	low economic strength and average human capital
				average	2	high	2.5	132	low	high	13	low economic strength and high human capital
				young	3	high	3	133	low	high	13	low economic strength and high human capital
average	2	low	1	old	1	low	1	211	average	low	21	average economic strength and low human capital
				average	2	low	1.5	212	average	low	21	average economic strength and low human capital
				young	3	average	2	213	average	average	22	average economic strength and average human capital
		average	2	old	1	low	1.5	221	average	low	21	average economic strength and low human capital
				average	2	average	2	222	average	average	22	average economic strength and average human capital
				young	3	high	2.5	223	average	high	23	average economic strength and high human capital
		high	3	old	1	average	2	231	average	average	22	average economic strength and average human capital
				average	2	high	2.5	232	average	high	23	average economic strength and high human capital
				young	3	high	3	233	average	high	23	average economic strength and high human capital
high	3	low	1	old	1	low	1	311	high	low	31	high economic strength and low human capital
				average	2	low	1.5	312	high	low	31	high economic strength and low human capital
				young	3	average	2	313	high	average	32	high economic strength and average human capital
		average	2	old	1	low	1.5	321	high	low	31	high economic strength and low human capital
				average	2	average	2	322	high	average	32	high economic strength and average human capital
				young	3	high	2.5	323	high	high	33	high economic strength and high human capital
		high	3	old	1	average	2	331	high	average	32	high economic strength and average human capital
				average	2	high	2.5	332	high	high	33	high economic strength and high human capital
				young	3	high	3	333	high	high	33	high economic strength and high human capital

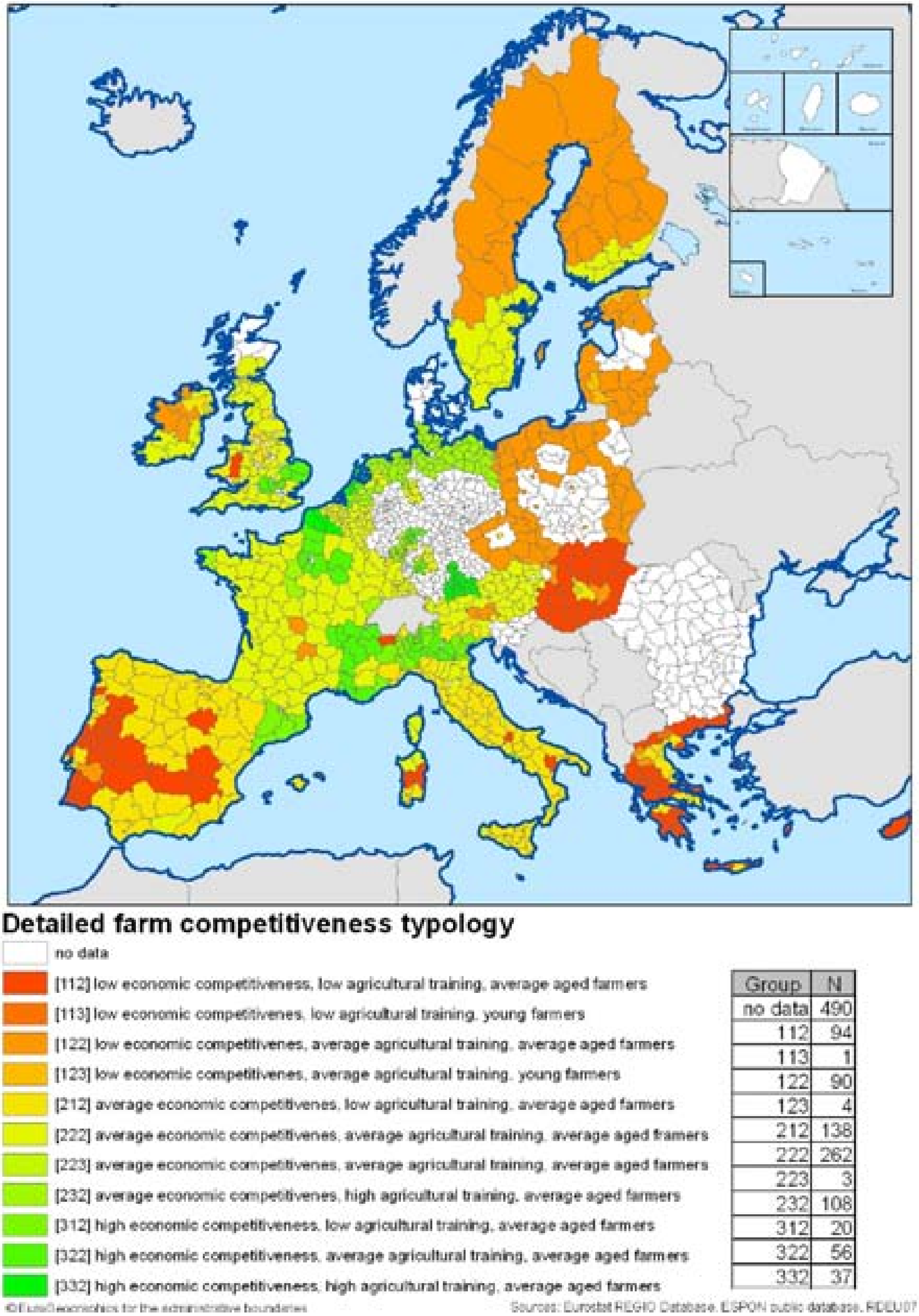
2: stands for between -1 and 1 standard deviation (average competitiveness)

3: stands for above 1 standard deviation (above average competitiveness)

As the comparison of Map 6 and Map 7 shows, the overall result is not affected much by the simplification. The maps show that the least competitive regions can be found in Greece, Cyprus, Hungary, and Slovakia, as well as in some regions in Portugal and Spain, central Sardinia, the region Powys in Wales, United Kingdom, and Isernia and Matera in Italy. The maps suggest that (in broad terms) the regions of central Europe are more competitive than those in the north-western, southern and south-eastern periphery. See Annex 4, Table A 13 for detailed typology statistics.

Map 6: *Detailed farm competitiveness typology*

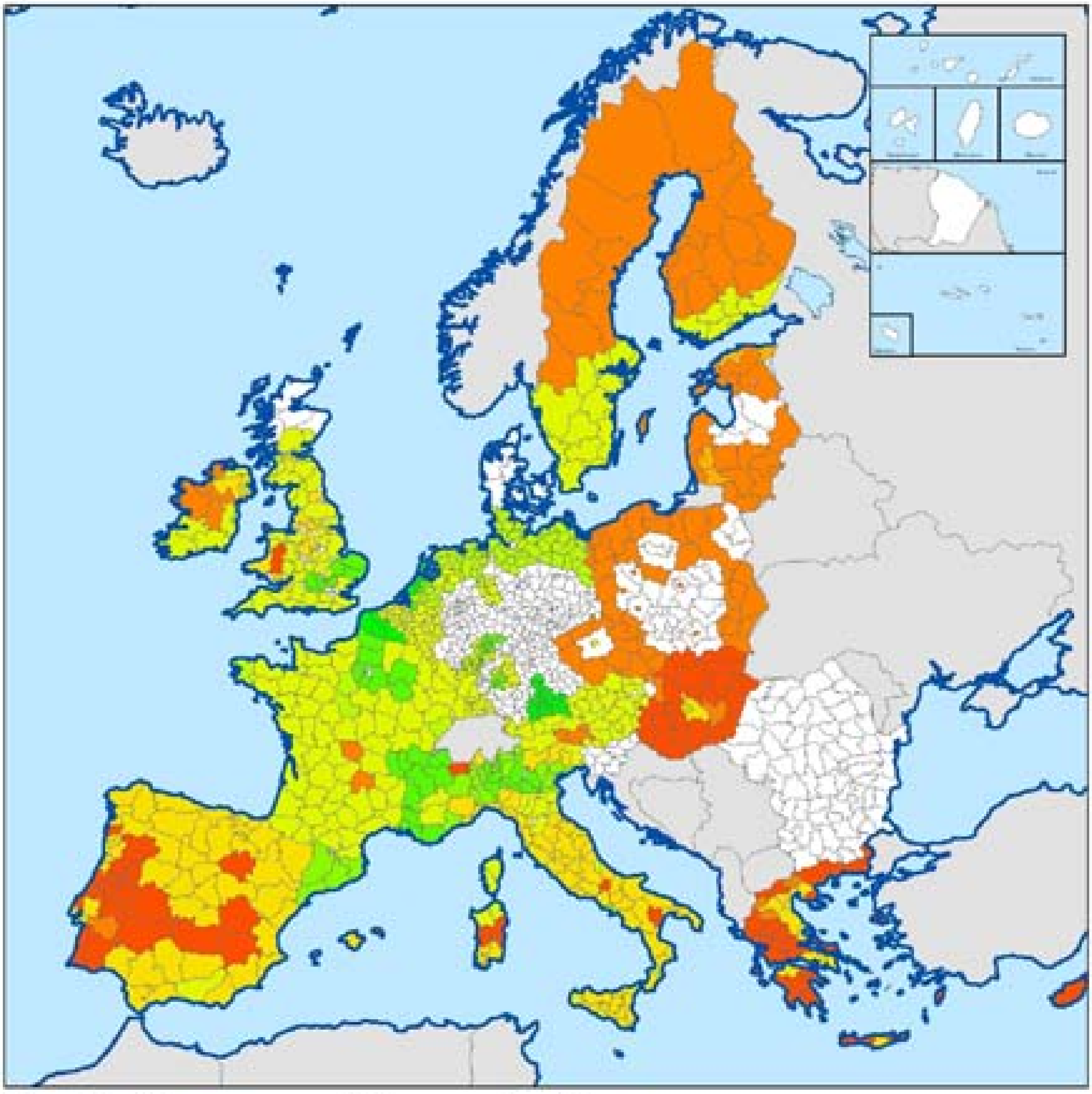
(see column "detailed typology" in Table 8 for legend description)



Group	N
no data	490
112	94
113	1
122	90
123	4
212	138
222	262
223	3
232	108
312	20
322	56
332	37

Map 7: *Simplified farm competitiveness typology*

(see column “merged/CODE” in Table 8 for legend description)



Simplified farm competitiveness typology

Economic competitiveness, primary sector human capital

- no data
- [11] low economic strength and low human capital: least competitive regions
- [12] low economic strength and average human capital
- [13] low economic strength and high human capital
- [21] average economic strength and low human capital
- [22] average economic strength and average human capital
- [23] average economic strength and high human capital
- [31] high economic strength and low human capital
- [32] high economic strength and average human capital
- [33] high economic strength and high human capital: most competitive regions

Group	N
no data	590
11	90
12	76
13	4
21	116
22	211
23	110
31	20
32	49
33	37

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Sources: Eurostat REGIO Database, ESPON public database, RIDEU07

7.2.4 LFA absorption capacity typology

ABSORPTION TYPOLOGY 4: Sustainable Agriculture (LFA)

Related RDP measures: *211, 212*

Key rural socio-economic and environmental perspectives (KRP): *(k) LFA*

Overview of rationale:

This typology is intended to capture patterns of absorption capacity for LFA/Mountain Area measures. In this case it is not necessary to use indirect proxy measures since LFA expenditure generally takes the form of headage or area payments, and is therefore closely related to the share of agricultural area which is within the LFA/Mountain Area boundary.

Outline of the methodology:

The typology takes the form of a simple classification on the basis of percentage of agricultural area within the LFA/Mountain Area boundary.

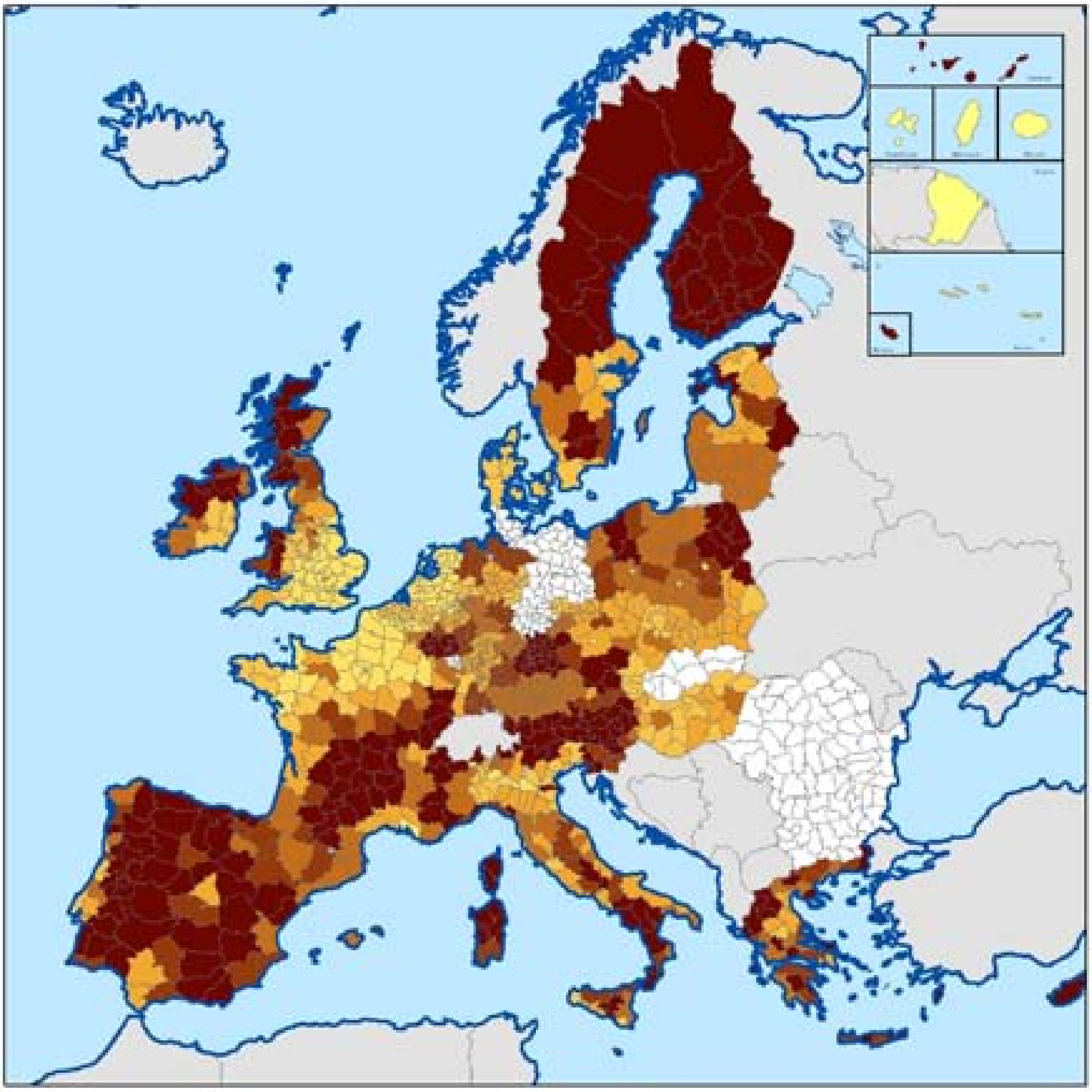
Key results:

The map of the typology closely reproduces the map of the LFA boundary.

In contrast to the other typologies discussed prior to this, the LFA absorption capacity typology does not build upon a combination of different "proxy indicators" but builds solely on available data about the LFA as a percentage of the overall UAA within a region (LFA in mountainous regions, LFA specific and LFA other).

Map 7, which depicts the LFA as a percentage of the UAA, shows that in particular Spain, northern Sweden, Scotland, Northern Ireland and the northern part of the Republic of Ireland as well as southern Italy, Sardinia, Corsica and the regions in low mountain ranges and the Alps, have the highest percentage of LFA. No LFA exists in south-east England, the Netherlands, parts of the French regions Nord Pas de Calais, Picardie, Paris de France, Normandy and Buches-du-Rhone and the adjoining regions and in the regions of Milano, Lodi, Cremona and Mantova in Italy (see Annex 4, Table A 14 for detailed typology statistics).

Map 8: *Less favoured areas typology*



Less favoured areas

Less favoured freas (in % of utilized agricultural area)

- no data
- 0 %
- <= 20 %
- > 20 % - <=40 %
- > 40 % - <=60 %
- > 60 % - <= 80 %
- > 80 %

Group	N
no data	180
0%	172
<= 20%	131
> 20 % <= 40 %	183
> 40 % <= 60 %	212
> 60 % <= 80 %	148
> 80 %	277

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Sources: Eurostat REGIO Database, ESPON public database, RDEU07

7.3 Structural typology

STRUCTURAL TYPOLOGY

Related RDP measures: *All*

Key rural socio-economic and environmental perspectives (KRP): *N/A*

Overview of rationale:

The Structural Typology is intended to reflect variations in the likely strength of indirect and induced economic impacts from rural development expenditure. Sectoral and territorial measures must be considered separately. In the case of the former, the indirect and induced impacts are seen as dependent on the relative size of the farm sector and related industries within the regional economy. In the case of territorial measures, the strength of the indirect and induced impact is considered to be determined by the degree of "self-containedness" of the rural economy, which in turn is postulated to depend upon the degree to which it is diverse or specialised.

Outline of the methodology:

The Structural Typology is based on NACE classified employment data extracted from Eurostat's Structural Business Statistics database. This database is only available at NUTS2 level. There are two elements to the typology, sectoral and territorial. The former is based simply upon the percentage of employment in agriculture and associated industries, whilst the latter uses a Shannon Index to measure overall diversity/specialisation.

Key results:

The relatively large (NUTS2) regions for which data are available, together with the rather large proportion of "missing data" means that the results so far are illustrative of the methodology, but unfortunately not yet susceptible to reliable interpretation.

The objective of the structural typology is to capture some key regional characteristics that reflect regional variations in the extent to which the indirect and induced economic impacts of rural development policy expenditure remain within the region.

For *sectoral measures*, the direct policy expenditure goes to farms, which will trade mainly with other farms as well as industries up- and downstream to agriculture (food processors, suppliers of machinery, fertilizers, etc.). This allows us to hypothesize that the proportion of indirect and induced impacts retained within the region depends partly upon the relative size of the farm sector, and partly upon the relative size of the agriculture-related industries within the region. In terms of indicators, this can be measured by the "relative size of agriculture" and the "relative size of agriculture-related industries", which can be approximated from the 2-digit NACE classification in the Structural Business Statistics.

The potential regional multiplier impacts of *territorial measures* are not affected by the size of the primary sector, but by the degree to which the regional economy is "self-contained" as opposed to reliant upon exogenous inputs and markets. Contrary to the sectoral measures, this aspect is quite difficult to express in terms of indicators. One possibility is to hypothesize that there exists a relationship with the degree of specialisation/ diversity of the regional economy, in that higher impacts can be expected in a less specialised economy (diverse economy) and lower impacts in a more specialised (less diverse) economy. In terms of indicators, the 2-digit NACE classification of the Structural Business Statistics seems to be a useful base for the determination of a region's degree of diversification.

Method of typology construction

As both components of the structural typology build (at least in part) upon the Structural Business Statistics, the regional level of the resulting typologies is NUTS2, as the official European NACE statistics do not contain data below the NUTS2 level.

In Eurostat's REGIO database employment data about agriculture and fisheries (NACE A to B) is stored within the regional employment statistics (in table "reg_e3empl95"), whereas NACE C to K activities are stored in the structural business section (in table "sbs_rnuts03"). At the time of data extraction (February 2009) both tables had a different geo reference: "reg_e3empl95" is based on NUTS 2006 regions, "sbs_rnuts03" on NUTS 2003 regions except for Sweden whose regions bear the NUTS 2006 codes. In order to be able to get a harmonised data set all "sbs_rnuts03" have been allocated to NUTS 2006 regions.

Furthermore, the NACE data sets are far from being complete, which means that for different countries as well as different NACE activities, data are not necessarily available for the same year of reference. Therefore, in order to get a core data set that has as few regions missing as possible, the most recent year data available for one region and NACE activity has been determined and taken as input for the following calculations.

Structural typology – sectoral component

The relative size of the farm sector and agriculture-related industries is approximated by the percentage share in total persons employed of persons employed in the NACE activities A to B (agriculture and fisheries) plus those in the NACE activities DA (manufacture of food products; beverages and tobacco), DC (manufacture of leather and leather products), DD (manufacture of wood and wood products), DE (manufacture of pulp, paper and paper products; publishing and printing), G512 (wholesale of agricultural raw materials, live animals) and G513 (wholesale of food, beverages and tobacco).

According to these calculations, the relative size of the farm sector and agriculture-related industries sector in the NUTS2 regions for which data are available ranges from 3% to 54% (see Table 10, p. 87 and Map 9, p. 88). For classification purposes this range was divided into 10 groups, each with a range of 5 % (see first column of Table 10).

Structural typology – territorial component

Remaining data gaps in the input NACE data per region were filled by calculated values as follows:

1. In order to be able to determine the diversification of the non-agricultural activities the original NACE activities were merged into 11 superordinate groups (TERA-SIAP groups) in order to ease the process of filling data gaps first (see Table 9).

2. If only one value of a 2-digit NACE activity (e.g. DA) out of a 1-digit NACE activity (e.g. D) was missing and the value of this 1-digit activity was known, the missing value of the 2-digit activity was calculated by subtracting

Table 9: Grouping of NACE activities

NACE activities		TERA-SIAP groups
C	Mining and quarrying	MIN
CA	Mining and quarrying of energy producing materials	
CB	Mining and quarrying except energy producing materials	
D	Manufacturing	
DA	Manufacture of food products; beverages and tobacco	FOOD
DB	Manufacture of textiles and textile products	PROC
DC	Manufacture of leather and leather products	PROC
DD	Manufacture of wood and wood products	PROC
DE	Manufacture of pulp, paper and paper products; publishing and pi	PROC
DF	Manufacture of coke, refined petroleum products and nuclear fue	ENERWAT
DG	Manufacture of chemicals, chemical products and man-made fibr	SYNTH
DH	Manufacture of rubber and plastic products	SYNTH
DI	Manufacture of other non-metallic mineral products	SYNTH
DJ	Manufacture of basic metals and fabricated metal products	SYNTH
DK	Manufacture of machinery and equipment n.e.c.	ENG
DL	Manufacture of electrical and optical equipment	ENG
DM	Manufacture of transport equipment	ENG
DN	Manufacturing n.e.c.	ENG
E	Electricity, gas and water supply	ENERWAT
F	Construction	CONST
G	Wholesale and retail trade; repair of motor vehicles, motorcycles	TRADE
H	Hotels and restaurants	HOT
I	Transport, storage and communication	TRANS
K	Real estate, renting and business activities	BUS

the values of the available 2-digit activities from the value of the corresponding 1-digit activity.

3. If the values of more than one 2-digit activity out of a 1-digit activity was missing and the value of the 1-digit activity was known, the missing values of the 2-digit activities were calculated based on the sum of the available values of the other 2-digit activities and the assumption that the ratio of the values of the missing 2-digit activities in the specific region equals the corresponding national ratio.

4. If a data set of only one NUTS2 region out of a NUTS1 region was missing and data for the NUTS1 region was available, the missing values were calculated for each activity by subtracting the sum of values of the available NUTS2 regions from the value of the NUTS1 region.

5. If a data set of 2 or more NUTS2 regions was missing and the data for the superordinate NUTS1 region was available the missing values were filled with the values of that region.

6. For Romania as well as Bulgaria, data was only available at country level, and so the country level data was allocated to all NUTS2 regions of these countries.

After these steps, the number of NACE activities considered within each region was determined. Based on this number for each region and the persons employed within the individual activities, a Shannon diversification index (Hs) and a Shannon evenness (E) index are calculated. They provide information on the degree of specialisation and diversification respectively of the regions under consideration, and are based on the following equations:

$$Hs = -\Sigma\ pi * \log(pi)$$

$$Hmax = \log(\ i\ )$$

$$E = = Hs/Hmax$$

pi: relative abundance of NACE activities

i: Number of different NACE activities within the region under consideration

For the regions under consideration, the resulting values for E are between 0.43 and 0.79 out of a possible range of the index from 0 (low diversity; prevalence of one or a few activities under consideration) to 1 (high diversity; all activities under consideration nearly uniformly distributed) (see Table 10, p. 87 and Map 10, p. 89).

Since the Shannon diversification index is quite sensitive to differences in the level of aggregation of the NACE, the results should be treated with caution.

Overall structural typology

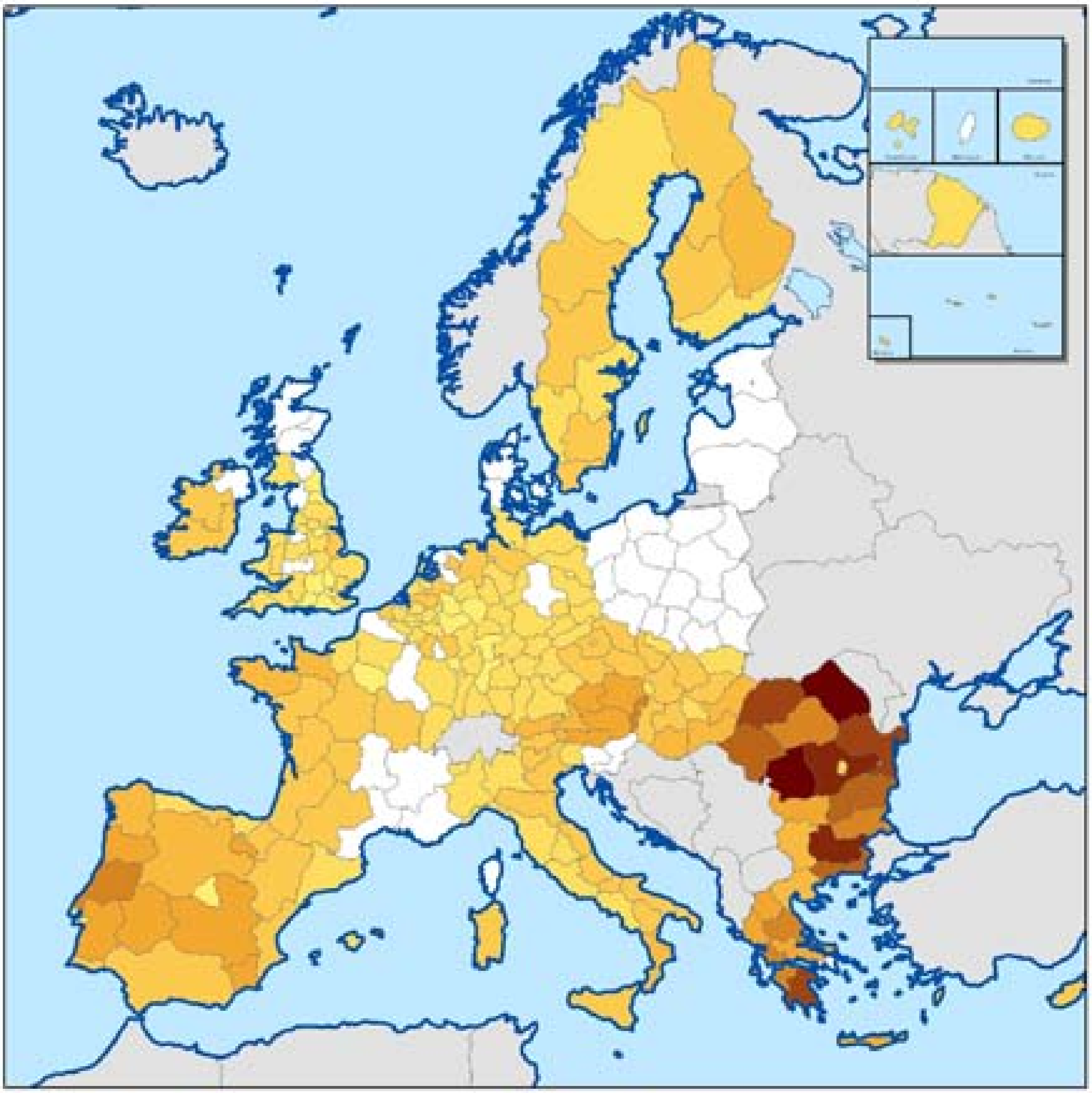
The combination of the single sectoral and territorial structural typologies leads to an overall structural typology depicting the regional "farm-sector absorption capacity" as well as the regional degree of economic specialisation (see Table 10, p. 87 and Map 11, p. 90). High values for the "relative size of agriculture" and an evenness score close to 1 indicate a high potential that the indirect and induced economic impacts of agricultural rural development policy expenditure remain within a region. Meanwhile low values for the "relative size of agriculture" and an evenness score close to 0 are an indication that it is likely that many of the impacts of agricultural rural development policy expenditure do not remain within the funded region.

EU-wide detailed structural business data is at present only available at NUTS2 level. Thus, the regions considered are quite large and therefore prone to be assessed as quite economically diverse. More pronounced regional differences could only be revealed at a smaller regional level. Furthermore, due to data protection issues no data are released for some countries and regions. This results in considerable data gaps. Therefore, the results of the structural typology should be considered an example of what could be done if data availability was better.

Table 10: Coding of the regions in the structural typology

Sectoral		Territorial		
Relative size of agriculture and agriculture related industries in % of employed persons		Relative diversity of economy expressed as Shannon Evenness (NACE C-I,K activities) 0: low diversity 1: high diversity	Key	CODE
grouping criteria	CODE			
<= 5	5	0,4	4	54
		0,5	5	55
		0,6	6	56
		0,7	7	57
		0,8	8	58
> 5 to <= 10	10	0,4	4	104
		0,5	5	105
		0,6	6	106
		0,7	7	107
		0,8	8	108
> 10 to <= 15	15	0,4	4	154
		0,5	5	155
		0,6	6	156
		0,7	7	157
		0,8	8	158
> 15 to <= 20	20	0,4	4	204
		0,5	5	205
		0,6	6	206
		0,7	7	207
		0,8	8	208
> 20 to <= 25	25	0,4	4	254
		0,5	5	255
		0,6	6	256
		0,7	7	257
		0,8	8	258
> 25 to <= 30	30	0,4	4	304
		0,5	5	305
		0,6	6	306
		0,7	7	307
		0,8	8	308
> 30 to <= 35	25	0,4	4	254
		0,5	5	255
		0,6	6	256
		0,7	7	257
		0,8	8	258
> 35 to <= 40	40	0,4	4	404
		0,5	5	405
		0,6	6	406
		0,7	7	407
		0,8	8	408
> 40 to <= 45	45	0,4	4	454
		0,5	5	455
		0,6	6	456
		0,7	7	457
		0,8	8	458
> 45 to <= 50	50	no regions fall in this category		
> 50 to <= 55	55	0,4	4	554
		0,5	5	555
		0,6	6	556
		0,7	7	557
		0,8	8	558

Map 9: Structural typology – sectoral component



Structural typology - sectoral component

relative importance of agriculture and agriculture related industries
in % of employed persons

- no data
- < 5 %
- 5 % to < 10 %
- 10 % to < 15 %
- 15 % to < 20 %
- 20 % to < 25 %
- 25 % to < 30 %
- 30 % to < 35 %
- 35 % to < 40 %
- 40 % to < 45 %
- 50 % to < 55 %

Group	N
no data	83
< 5 %	27
5 % to < 10 %	89
10 % to < 15 %	62
15 % to < 20 %	13
20 % to < 25 %	18
25 % to < 30 %	6
30 % to < 35 %	4
35 % to < 40 %	3
40 % to < 45 %	2
50 % to < 55 %	2

Calculated index is based on the most recent year data available per region (years considered 2000 to 2005)

Sources: Eurostat REGIO Database, ESPON public database, RDEU07, Bundesagentur für Arbeit

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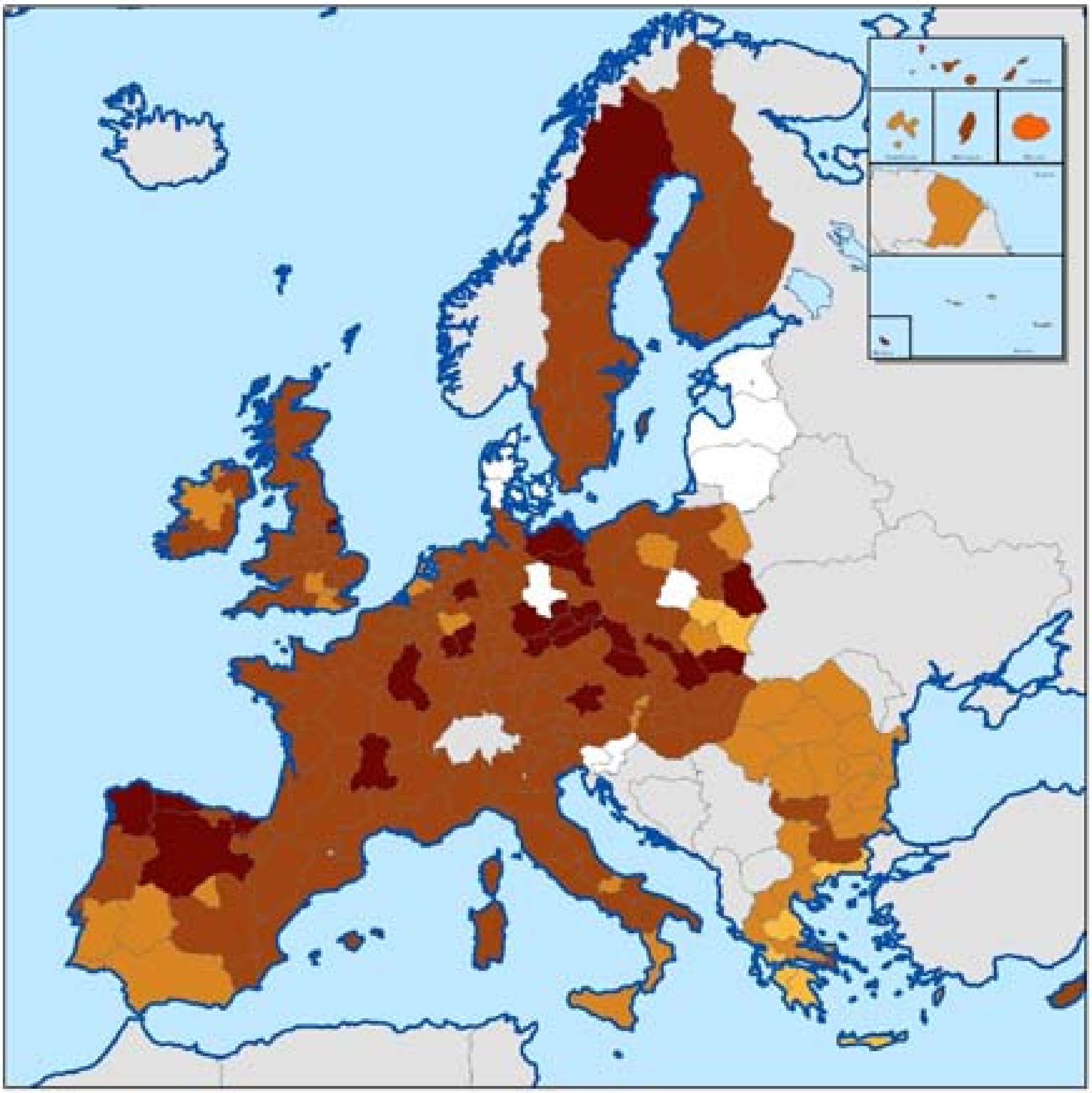
Map 10: *Structural typology – territorial component*



Structural typology - territorial component

Shannon eveness (range 1 low diversification to 0 high diversification)

- no data
- <= 0,4
- > 0,4 <= 0,5
- > 0,5 <= 0,6
- > 0,6 <= 0,7
- > 0,7

Group	N
no data	44
<= 0,4	0
> 0,4 <= 0,5	9
> 0,5 <= 0,6	45
> 0,6 <= 0,7	185
> 0,7	26

Calculated index is based on the most recent year data available per region (years considered 2000 to 2005)

Sources: Eurostat REGIO Database, ESPON public database, RDEU07, Bundesagentur für Arbeit

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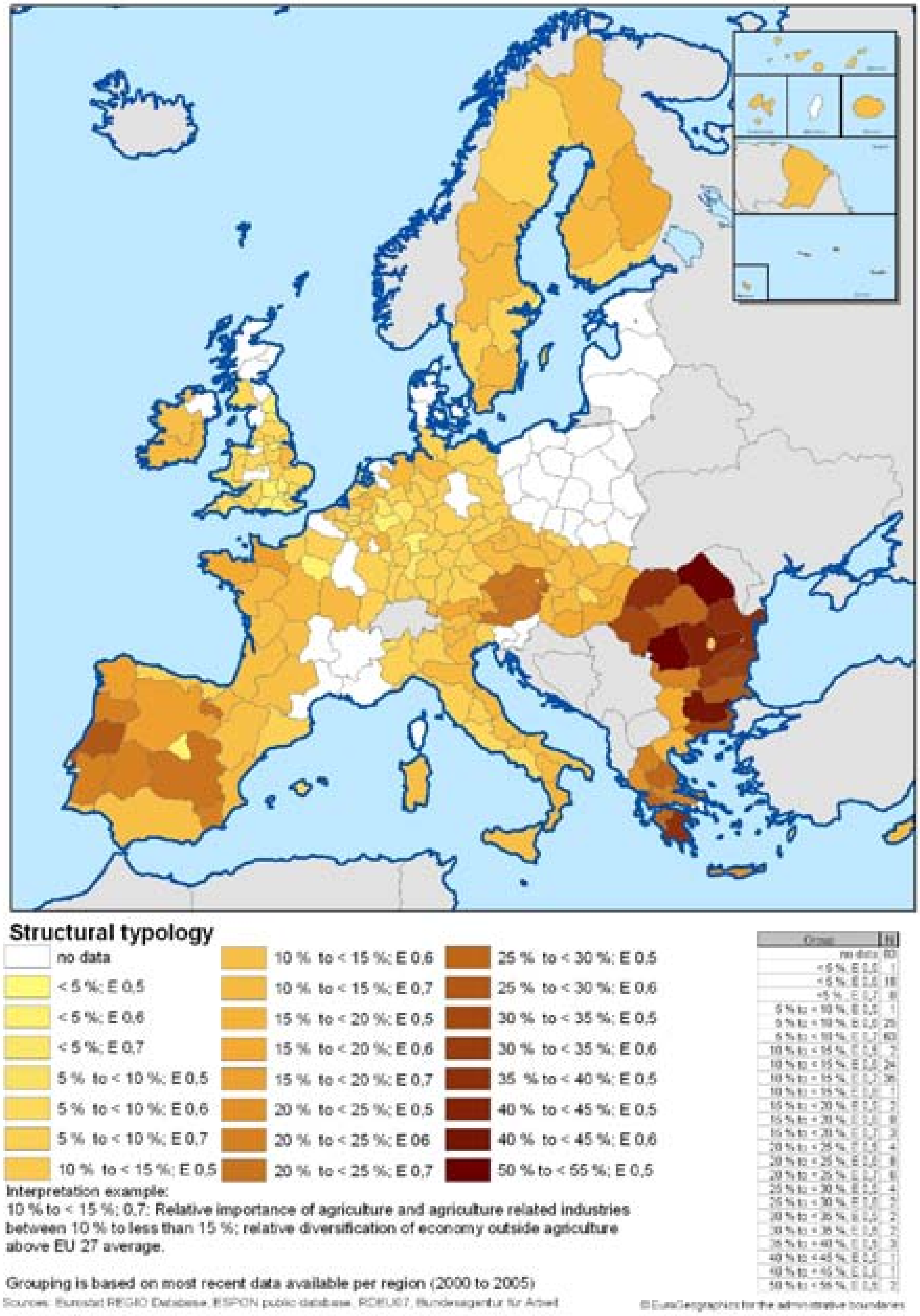
Map 11: Structural typology (sectoral and territorial components combined)



8. Spatial Impact Assessment of two axis 3 measures in 16 case regions

The aim of this section is to analytically present the application of the I-O methodology to analyse the economic impacts of Quality of Life (QoL) and Economic Diversification Axis 3 measures in 16 selected test-regions and thus to test the suitability of the TERA in providing Spatial Impact Assessment. Hence, Section 8.1 presents the process utilised for selecting the TERA-SIAP test regions. This is followed by the model construction process (procedure and data requirements in Section 8.2), and Section 8.3 provides details on the specification of Axis 3 policy shocks for each test region. Finally, Section 8.4 presents the results of the policy impact analysis.

8.1 Study area selection

8.1.1 Selection procedure

As the objective of the TERA-SIAP model test was to assess the economic impacts of QoL and Economic Diversification Axis 3 measures, the selection of the test regions was based on the diversification typology (see Section 7.2.1). As noted in this section, this typology depicts economic diversification in EU27 NUTS3 regions in terms of "actual economic diversification" and "overall diversification potential". In more detail, the typology refers to:

a) the "actual situation" of agricultural dependence in the region, measured by primary sector GVA, agricultural employment and OGA, and

b) the overall potential of the region for developing a further diversified economy measured by accessibility and the tourism potential of the region which is measured by nature and forests and beds per employees (all employees).

In total, NUTS3 regions were coded into 27 different categories; these are presented in Table 13 of Section 7.2.1, while Table 11 presents occurrences per type of regions (in the case of regions with data).

Initially, the aim of the research team was to select 12 test regions and base this selection on groups of regions by representing (in the tests) both agriculturally dependent and diversified economies (i.e. first-digit codes 1 and 3), all levels of pluriactivity (i.e. second-digit codes 1, 2 and 3) and both low and high diversification potential (i.e. third-digit codes 1 and 3). This would have led to a selection of one area per code 111, 113, 121, 123, 131, 133 (agriculturally dependent economies) and 311, 313, 321, 323, 331 and 333 (diversified economies). Although the above procedure could have led to a satisfactory representation of EU Member States in the sample, it suffered from a major drawback.

To be precise, any analysis of the impacts of Axis 3 measures through the use of I-O models, and especially (as documented by various studies in this field; see Psaltopoulos *et al.,* 2004) any comparative analysis (e.g. between regions representing codes 111 and 113) would be only marginally meaningful if the selected study areas (i.e. the structure of their economies) are influenced by different development contexts. Taking into account the limitations associated with project resources, it was judged that the selection of (only) 2 test regions per group would cause problems with the comparative analysis.

Thus, in an effort to reflect different economic development contexts, it was decided to apply another layer to the test region selection process and cluster all NUTS3 regions accordingly.

Table 11: Occurrences per type of regions

Groups: Economy, Agriculture, Potential	Occurrences	% share
111	79	7,3
112	15	1,4
113	31	2,9
121	32	3,0
122	10	0,9
123	8	0,7
131	13	1,2
132	2	0,2
133	9	0,8
211	42	3,9
212	27	2,5
213	50	4,6
221	19	1,8
222	4	0,4
223	23	2,1
231	35	3,2
232	21	1,9
233	28	2,6
311	41	3,8
312	36	3,3
313	127	11,8
321	32	3,0
322	17	1,6
323	34	3,2
331	107	9,9
332	83	7,7
333	153	14,2

Note: See Table 7 (p. 64) for the coding of the regions.

8.1.2 Clustering procedure: data and results

The aim of this clustering exercise was to produce clusters that reflect the different growth environments faced by European regions at the NUTS3 level. The two basic indicators of economic growth that are also available at the NUTS3 level and are utilised in this exercise are GDP per capita in PPP and GDP change between 2000 and 2004. The first indicator reflects the level of economic growth while the second reflects the growth potential. The original sample contains all EU27 NUTS3 areas. From this sample all observations with at least one missing value for one of the two indicators were eliminated. The final sample contained 1242 NUTS3 areas with valid observations for both indicators. The descriptive statistics of the sample are (Table 12):

Table 12: Sample descriptive statistics

	N	Minimum	Maximum	Mean	Std. Deviation
GDP per capita in PPP in 2004	1302	3628	110402	20368	9107
GDP annual change rate 2000-2004	1242	-2.9	15.8	3.5	2.5

Figure 9: Distribution of GDP p.c. in PPP (2004) and GDP annual change rate 2000-2004 among NUTS3 regions

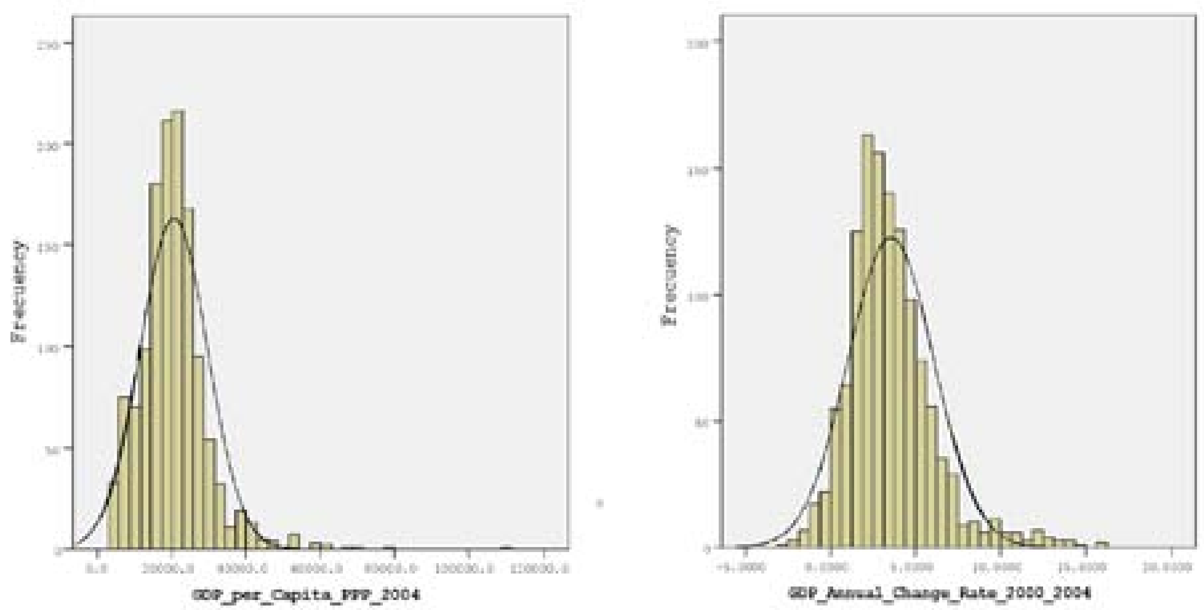


Table 13: Cluster descriptive statistics

Cluster		GDP Annual Change Rate 2000-2004	GDP per Capita in PPP in 2004
1	Mean	2.9	23928
	N	618	618
2	Mean	2.5	94773
	N	2	2
3	Mean	4.3	13751
	N	550	550
4	Mean	3.5	42788
	N	72	72
Total	**Mean**	**3.5**	**20628**

The average GDP in 2004 was Euro 20,368 and the annual GDP change 2000-2004 was 3,5%. The distribution of GDP and GDP change are shown in Figure 9. The sample contains some outliers for both GDP and GDP change. For example, one NUTS3 area has a GDP of Euro 110,402 and some of them have an annual GDP change of over 14%.

The simple clustering technique produces 4 clusters of regions as follows:

Cluster 1 contains 618 cases with relatively high GDP (average of Euro 23,928) and an annual growth rate of about 2,9%. Cluster 2 contains two outlier cases with extremely high GDP. Cluster 3 contains 550 cases which present low GDP (average of Euro 13,751) and a high annual growth rate of 4,3%. Cluster 4 again contains 72 outliers with extremely high GDP (average of Euro 42,788) and high annual growth rates (3,5%).

Figure 10 shows the distribution of GDP change and GDP per capita for areas in cluster 1. It is evident that the distribution of GDP for areas in cluster 1 is truncated below at around Euro 20,000. Thus, all areas in that cluster may be assumed to have a high level of development and to experience relatively low rates of growth.

Figure 10: Cluster 1: distribution of GDP p.c. in PPP (2004) and GDP annual change rate 2000-2004 among NUTS3 regions

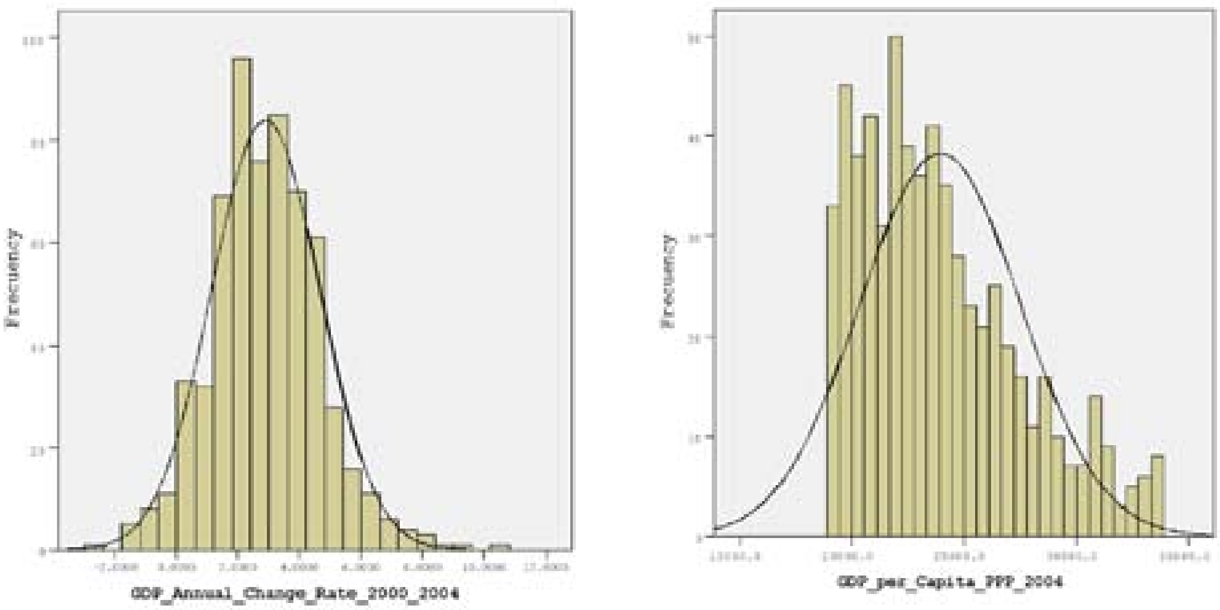
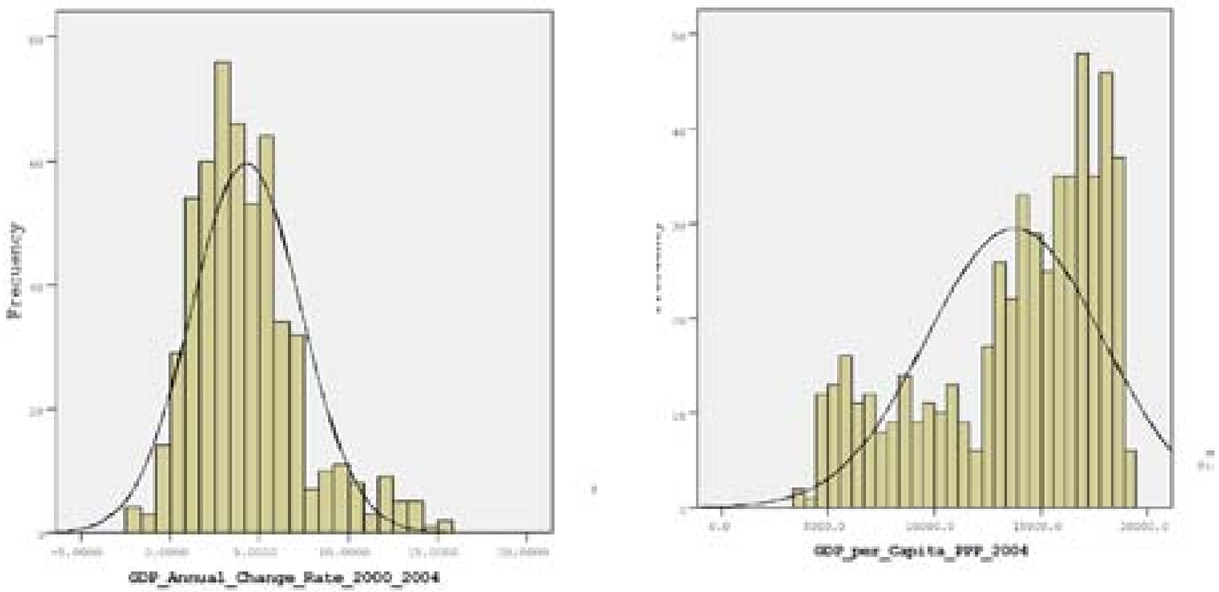


Figure 11 shows the distribution of GDP change and GDP per capita for areas in cluster 3.

Figure 11: Cluster 3: distribution of GDP p.c. in PPP (2004) and GDP annual change rate 2000-2004 among NUTS3 regions



It is evident that the distribution of GDP for areas in cluster 3 is truncated from above at around Euro 20,000. Thus, all areas in that cluster may be assumed to have a low level of development but, at the same time, to experience relatively high rates of growth.

Thus, we argue that clusters 1 and 3 capture two distinct development situations:

– Cluster 1: Higher than the EU average development in terms of GDP per capita and

Table 14: Selected TERA-SIAP test regions

Typology Detailed	Economic Devel. Cluster**	GEO (NUTS 2006)	NUTS_0_NAME	NUTS_1_NAME	NUTS_2_NAME	NUTS_3_NAME
111	1	AT124	_ STERREICH	OST_ STERREICH	Nieder_sterreich	Waldviertel
111	1	GR253	ELLADA	KENTRIKI ELLADA	Peloponnisos	Korinthia
111	3	LV005	LATVIJA	LATVIJA	Latvija	Latgale
111	3	FI133	SUOMI / FINLAND	MANNER-SUOMI	It_-Suomi	Pohjois-Karjala
313	1	ITC32	ITALIA	NORD-OVEST	Liguria	Savona
313	1	FR825	FRANCE	M_DITERRAN_E	Provence-Alpes-C_te d'Azur	Var
313	3	ITE11	ITALIA	CENTRO (I)	Toscana	Massa-Carrara
313	3	DE936	DEUTSCHLAND	NIEDERSACHSEN	L_neburg	Osterholz
331	1	UKK23	UNITED KINGDOM	SOUTH WEST (ENGLAND)	Dorset and Somerset	Somerset
331	1	SE125	SVERIGE	_ stra Sverige	_ stra Mellansverige	V_stmanlands l_n
331	3	CZ072	CESKA REPUBLIKA	CESKA REPUBLIKA	Stredni Morava	Zlinsky kraj
331	3	UKM22	UNITED KINGDOM	SCOTLAND	Eastern Scotland	Clackmannanshire & Fife
333	1	SE224	SVERIGE	S_dra Sverige	Sydsverige	Sk_ne l_n
333	1	DE21F	DEUTSCHLAND	BAYERN	Oberbayern	Miesbach
333	3	SI024	SLOVENIJA	SLOVENIJA	Zahodna Slovenija	Obalno-kraska
333	3	DEG0I	DEUTSCHLAND	TH_RINGEN	Th_ringen	Saalfeld-Rudolstadt
** Cluster 1: High Development - growth below average						
Cluster 3: Low Development - growth above average						

Note: See Table 7 (p. 12) for the coding of the regions.

lower than the EU average growth in terms of GDP change

– Cluster 3: Lower than the EU average development in terms of GDP per capita and higher than the EU average growth in terms of GDP change

The two clusters together comprise 1,168 areas (618+550) of the 1,242 with usable data, or 94% of the regions in the NUTS3 population.

8.1.3 Final selection

Taking the above logic into account and in order to facilitate the comparative analysis of results, it was decided to reduce the number of the types of regions to be considered and at the same time to increase the number of case regions per type. Specifically, it was decided to select two regions per clusters 1 and 3 (each cluster representing a different economic development context, as specified in the cluster analysis) for each 111 type (agriculturally dependent economies with low pluriactivity and low potential for diversification), 313 type (diversified economies with low pluriactivity and high potential for diversification), 331 type (diversified economies with high pluriactivity and low potential for diversification) and 333 type (diversified economies with high pluriactivity and high potential for diversification). This specification of these types was determined by:

– The high interest (to the project) of specific types (e.g. type 111)

– The share of type-specific occurrences (see Table 17)

In total, 16 test regions were selected (instead of the originally planned 12). The associated groups represented more that 43 per cent of total occurrences. In each group the specification of areas selected were determined by country-specific shares of region appearance (e.g. if 60% of regions appearing in group 111 - economic development cluster 1, were in Germany, then a German region was selected), as well as the availability of detailed (region-specific and national) sectoral employment data needed for the application of the GRIT technique. Finally, the selection of regions from Bulgaria, Malta, Cyprus and Luxembourg was avoided due to the non-availability (in the case of these countries) of industry-by-industry national I-O tables.

Table 14 presents the 16 selected test regions. In total, 11 EU Member States (both old and new; and south, central and north) were represented in the selection.

8.2 Model construction

This section aims to summarize the main elements of the construction of the 16 regional I-O models which were then used for carrying out the TERA-SIAP policy impact tests.

As a starting point, GRIT requires a national I-O table. Thus, national I-O tables were obtained from the Eurostat database for all countries corresponding to the 16 test regions, with the exception of the UK table (which was provided by the OECD) and the Scottish table (provided by the Scottish Office). Table 15 summarises the base year of each national I-O table, which corresponds to the base years of the country-specific constructed regional I-O tables. As seen from the table, all but two of the national I-O tables corresponded to either 2005 or 2004. Also, half of the I-O tables were recorded in Euros. Finally, as one of the selected regions was located in Scotland, the research team benefited from the availability of a Scottish I-O table.

The next data requirement was sectoral employment data at the national and regional levels. The data which should have been available to perform these estimations is NACE 2-digit sectoral employment at the national and regional level, respectively. Obtaining this data for 16 areas was a difficult and time-consuming task,

Table 15: *National I-O tables utilised for the TERA-SIAP tests*

Country	Base-Year	Currency
Austria	2005	Ml. Euro
Czech Republic	2005	Ml. CZK
Finland	2005	Ml. Euro
France	2005	Ml. Euro
Germany	2005	Ml. Euro
Greece	2004	Ml. Euro
Italy	2000	Ml. Euro
Latvia	1998	Ths. Lats
Scotland	2004	Ml. GBP
Slovenia	2005	Ml. Tolars
Sweden	2005	Ml. SEK
UK	2004	Ml. GBP

as this data (at least at the NUTS3 level) is not publicly available. Hence, the research team had to carry out extensive searches on the internet, contact national statistical offices and utilize research contacts around Europe.[12]

Finally, as noted in a TERA-SIAP working paper (Psaltopoulos *et al.*, 2009), and as in the case of several relevant research efforts (e.g. Doyle *et al.*, 1997; Mattas, 2001), time and financial constraints prohibited business surveys from being carried out and thus the insertion of superior data to the constructed regional I-O tables.

8.3 Specification of policy shocks

According to the analytical approach adopted here, two kind of impacts analysis of the two Axis 3 measures were distinguished:

– *investment effects:* effects strictly related to the expenditure of policy funds; and

– *capacity-adjustment effects:* effects related to the economic activity generated through the utilisation of productive resources stimulated by the policy-related investment.

In order to estimate investment effects, policy expenditures were classified by sector and treated as "injections" of expenditure into the local economies, from both public (EU and national government) and private sources. Then, I-O multipliers and coefficients are applied to these injections, in order to produce economy-wide "impacts" (change in output, income, employment, etc.).

In order to estimate capacity-adjustment effects, the "mixed exogenous/endogenous variable version of the Leontief model" method, devised by Miller and Blair (1985) for I/O analysis, and utilised by Psaltopoulos and Thomson (2005), was followed. As already noted, development policy expenditures may have the effect of raising a constraint on the level of certain activities in study area economies, by increasing the capacity of a resource such as a transport facility or visitor centre. Such expenditures have economy-wide effects not only through the immediate effects (direct, indirect and induced) of the investment activity thus stimulated, but also by loosening a binding capacity constraint so that other activities which utilise that capacity can expand to meet

12 Here, it must be emphasised that the collection of this data and hence, the construction of the regional I-O tables, would not have been possible without the hard efforts of Andrew Copus, Stefan Neumeier and Tomas Ratinger, and other colleagues around Europe.

demand which was hitherto not satisfied. Usually, such expenditure will be applied through the construction of additional roads, enterprises, etc., or staff training, so that more tourists can be handled, could be another form of capacity adjustment for example.

As already noted, policy shocks to be modelled are associated with two Axis 3 measures, namely Diversification of the Rural Economy (311, 312) projects and Renovation and Development of Villages projects (322). The modelling of these shocks was carried out in an ex-ante manner.

The introduction of Diversification of the Rural Economy (311, 312) projects would ideally involve the specification of three types of effects or more precisely economic inducements. These are:

a) short-run (investment) effects - construction stage which is dealt through increasing demand for investment goods utilised to construct, e.g. a new agrotourism unit.

b) an increase in business turnover (capacity-adjustment effects). In a modelling context this involves a capacity-adjustment re-run of the base I-O model; these effects are measured through a supply-side approach, i.e. through the assumption that all extra productive capacity is utilised.

c) a change in the local purchasing pattern reflecting the behaviour of firms prompted by the completion of the supported project. It can be regarded as the long-run/secondary effects of the “diversification” simulation. Under this shock, there could be an assumption that new firms purchase a higher proportion of their inputs (intermediate and labour) from the local economy, compared to the baseline observations. However, due to the lack of data, this was actually not implemented here.

To sum up, in order to apply the relevant methodology to the assessment of the economic impact of investment (construction stage) the following steps were necessary:

- Data-requests included the total project costs;

- As a next step, the sector(s) for the product of which this particular investment represents demand were specified. To acquire this information, data available in a ‘project expenditure per annum’ format were utilised. Usually, for the majority of investment action, the related activity represents demand for the output of the construction sector;

- Using national or regional GDP deflators the above cost (“shock”) values (expenditure on investment) were converted to real terms (base year of the I-O model);

- The relevant (deflated) “shock” data was fed to the exogenous section of the I-O, and associated impacts on local output, income and employment were estimated, following the traditional Leontief procedure.

To estimate capacity-adjustment effects, information was additionally needed on the increase of sectoral turnover (strictly attributed to this type of project). In particular, an estimate was needed of the extra business turnover generated due to the utilisation of one or more specific projects. Then the base model was re-run with the new activity level. In this way, the new equilibrium can facilitate comparative analysis and the estimation of the relevant economic effects (of changes in supply) on output, income and employment.

The introduction of the Renovation and Development of Villages (322, RENOV) measure could also involve the specification of three types of effects. These are:

a) short-run (investment) effects associated with the construction stage are implemented in a similar way to the case of rural economy diversification projects. In this run the effects of, e.g., the renovation of a village square can be simulated.

b) the effects of new business activity (increased tourism demand) result from an increase in tourist demand, i.e. a +x% change in tourism demand (depending on the extent and nature of the project) modelled as an increase in the value of transfers from the Rest of the World to the representative tourist account or to exports. In this way, there is an assessment of the economic impacts that such a set of village renovation projects could have in terms of generating an increase in tourism demand and thus business turnover for hotels and restaurants, etc.

c) secondary effects based on migration of urban households to live in now more attractive rural areas while keeping urban jobs and thus commuting to the neighbouring urban area. However, due to lack of data this effect has had to be omitted in this simulation run.

In order to generate a baseline of the internal (i.e. sector-specific and capacity-adjustment-specific) distribution of these shocks, data were obtained from the files of two projects actually implemented in 2005, in the context of the 2000-2006 Crete RDP.

In the case of the first shock associated with the Diversification of the Rural Economy measure, the project selected was an agrotourism unit establishment project (RDIVERS), which possessed the following details:

– Its capacity was 12 rooms – 24 beds

– Works included surrounding area infrastructure, building, and machinery and equipment

– On average, the total cost per unit (in 2005 prices) was 519.200 Euro (55% Public Expenditure – 45% Private)

– The distribution of this total cost in terms of sectoral demand was:
    - Energy (sector 40-41): 0,4%
    - Wholesale trade (50-51): 1,3%
    - Retail trade (52): 0,5%
    - Other manufacturing (29): 6,8%
    - Private services (70-74): 4,4%
    - Furniture (36): 3,8%
    - Construction (45): 82,8%

The expected new Business turnover (sector 55) amounted to 119,000 Euro per annum (in 2005 prices).

The project selected for the Renovation and Development of Villages (322, RENOV) measure possessed the following details:

– The total cost (in 2005 prices) amounted to 228,858 Euro (100% public expenditure)

– The distribution of this total cost in terms of sectoral demand was:
    - Energy (40-41): 18,5%
    - Private services (70-74): 18,9%
    - Construction (45): 62,6%

In terms of secondary effects, there was a projection of a +5% per annum increase in tourism expenditure.

The size of the shocks and the size of each regional economy greatly influence the size of the impacts to be estimated. In other words, though specifying a shock size of three projects per category seemed reasonable at first, this type of shock size could not produce meaningful impacts (i.e. for comparative analysis) in the case of comparatively small (e.g. Osterholz, Savonna) and large (e.g. Var) test regions. Thus, the following procedure was decided and implemented in order to "normalize" the shock data:

Table 16: Investment and capacity-adjustment shocks in the study areas (base year values)

Econ. Dev. Cluster	Region	RDIVERS Investment	RDIVERS Capacity Adjustment	RENOV Investment	RENOV Capacity Adjustment
111: Agriculturally dependent economies, low pluriactivity, low potential for diversification					
1	Waldviertel (AU) – ml Euro 2005 prices	3.120	0.714	1.380	16.860
1	Korinthia (GR) – ml Euro 2004 prices	1.040	0.238	0.460	5.620
3	Latgale (LV) – ths Lats, 1998 prices	0.247	0.057	0.109	1.331
3	Pohjois–Karjala (FI) – ml Euro 2005 prices	1.560	0.357	0.690	8.430
313: Diversified economies, low pluriactivity, high potential for diversification					
1	Savona (IT) – ml Euro 2000 prices	0.885	0.203	0.392	4.785
1	Var (FR) – ml Euro 2005 prices	10.400	2.380	4.600	56.200
3	Massa-Carrara (IT) – ml Euro 2000 prices	1.328	0.304	0.587	7.177
3	Osterholz (DE) – ml Euro 2005 prices	0.520	0.119	0.230	2.810
331: Diversified economies, high pluriactivity, low potential for diversification					
1	Somerset (UK) – ml GBP 2004 prices	1.777	0.407	0.786	9.604
1	Västmanlands län (SE) – ml Sek, 2005 prices	24.134	5.523	10.675	130.415
3	Zlinsky kraj (CZ) – ml CZK,2005 prices	139.380	31.897	61.649	753.187
3	Clackmannanshire and Fife (UK) – ml GBP 2004 prices	0.955	0.219	0.422	5.162
333: Diversified economies, high pluriactivity and high potential for diversification					
1	Skane lan (SE) – ml Sek 2005 prices	33.787	7.732	14.944	182.581
1	Miesbach (DE) – ml Euro 2005 prices	0.520	0.119	0.230	2.810
3	Obalno-kraska (SI) – ml Tollars, 2005 prices	124.613	28.517	55.111	67.388
3	Saalfeld-Rudolstadt (DE) – ml Euro 2005 prices	1.040	0.238	0.460	5.620

Source: Authors' calculations.

- First, a mean of total employment of the 16 test regions was calculated in an effort to portray the size of each local economy;
- Then, a ratio of Axis 3 (RDIVERS and RENOV) investment to total regional investment (three projects per category, in base year values) was calculated for the area whose employment was closest to the mean (i.e. Clackmannanshire and Fife, in Scotland, UK);
- This ratio was then replicated in the case of all study areas, so that Axis 3 shocks to total investment ratios for all areas were in the same +-10% range;
- Lastly, the need to apply "integer" shocks (e.g. 3 or 5 agrotourism units and not 2.8 or

Table 17: *Uniform investment and capacity-adjustment shocks in the study areas (base year values)*

Econ. Dev. Cluster	Region	RDIVERS Investment	RDIVERS Capacity Adjustment	RENOV Investment	RENOV Capacity Adjustment
111: Agriculturally dependent economies, low pluriactivity, low potential for diversification					
1	Waldviertel (AU) – ml Euro 2005 prices	3.00	0.600	3.00	0.600
1	Korinthia (GR) – ml Euro 2004 prices	1.00	0.200	1.00	0.200
3	Latgale (LV) – ths Lats, 1998 prices	0.237	0.171	0.237	0.171
3	Pohjois–Karjala (FI) – ml Euro 2005 prices	1.500	0.300	1.500	0.300
313: Diversified economies, low pluriactivity, high potential for diversification					
1	Savona (IT) – ml Euro 2000 prices	0.851	0.170	0.851	0.170
1	Var (FR) – ml Euro 2005 prices	10.000	2.000	10.000	2.000
3	Massa-Carrara (IT) – ml Euro 2000 prices	1.277	0.255	1.277	0.255
3	Osterholz (DE) – ml Euro 2005 prices	0.500	0.100	0.500	0.100
331: Diversified economies, high pluriactivity, low potential for diversification					
1	Somerset (UK) – ml GBP 2004 prices	0.610	0.342	0.610	0.342
1	Västmanlands län (SE) – ml Sek, 2005 prices	23.206	4.641	23.206	4.641
3	Zlinsky kraj (CZ) – ml CZK,2005 prices	134.019	26.804	134.019	26.804
3	Clackmannanshire and Fife (UK) – ml GBP 2004 prices	0.918	0.184	0.918	0.184
333: Diversified economies, high pluriactivity and high potential for diversification					
1	Skane lan (SE) – ml Sek 2005 prices	32.488	22.741	32.488	22.741
1	Miesbach (DE) – ml Euro 2005 prices	0.500	0.100	0.500	0.100
3	Obalno-kraska (SI) – ml Tollars, 2005 prices	119.820	23.964	119.820	23.964
3	Saalfeld-Rudolstadt (DE) – ml Euro 2005 prices	1.000	0.200	1.000	0.200

Source: Authors' calculations.

5.3 agrotourism units) which could then be associated with capacity-adjustment impacts led to the rounding of investment flows.

Study-area-specific investment and capacity-adjustment shocks produced through the above procedure are presented in Table 16. Estimated policy impacts were whole-project (i.e. not average annual) values in the case of investment effects, and annual effects in the case of capacity-adjustment ones.

Additionally, and in order to accommodate the comparative analysis of the impacts of shocks of a similar size associated with the two Axis 3 measures, it was decided to test the regions with the same (in terms of value) shock for both investment and capacity-adjustment analysis. In terms of the size of the shocks, it was decided to use the same method (as above) and apply the RDIVERS shock values as a baseline (assuming that investment per project amounts to 500,000 Euro in 2005 prices and that the annual business turnover of each unit is 100,000 Euro). Table 17 indicates "uniform" study-area-specific investment and capacity-adjustment shocks specified as described above.

The GAMS software environment was utilised for both producing the regional I-O tables and running the policy impact shocks.

8.4 Regional effects

In terms of Axis 3 policy effects estimated for agriculturally dependent economies with low pluriactivity and low potential for diversification, Table 18 presents the economy-wide impacts of the agrotourism (RDIVERS) and village renovation (RENOV) shocks on the economy of Waldviertel, Austria. In terms of output effects, the largest impacts are associated with the capacity-adjustment effects of village renovation projects (+1.19%), followed by the investment effects of the agrotourism projects (+0.31%). Investment effects associated with agrotourism are higher than those linked to renovation investment, while the opposite holds in the case of capacity-adjustment effects. The same pattern of effects is observed in the case of income and employment generation. However, percentage changes in output are considerably higher than those in income, while changes in employment are the lowest amongst the three categories.

In the case of Korinthia, Greece (Table 19), again output effects associated with the capacity-adjustment effects of village renovation projects are the highest (+0.94%), followed by investment effects of the agrotourism projects (+0.22%). Investment effects associated with agrotourism are more than twice as high as those linked to renovation investment, while renovation capacity-adjustment effects are almost twenty times higher than agrotourism ones. The same pattern of effects is observed in the case of the other categories of estimated impacts. Percentage changes in output are the highest, but changes in employment are considerably higher than those in income.

In Latgale, Latvia (Table 20), total output effects associated with the capacity-adjustment effects of village renovation projects are the highest ones (+0.82%), followed by investment effects of the agrotourism projects (+0.21%). Investment effects associated with agrotourism are twice as high as those linked to renovation investment, while renovation capacity-adjustment effects are almost ten times higher than agrotourism ones. The same pattern of effects is observed in the case of the other categories

Table 18: Impacts of Axis 3 RDP measures, Waldviertel, Austria (million Euro, jobs, at 2005 values)

	Output Effects	% change from 2005	Income Effects	% change from 2005	Employment Effects	% change from 2005
RDIVERS project (311, 312) – Investment Effects	7.666	0,31	2.845	0,13	118	0,10
RDIVERS project (311, 312) – Capacity Adjustment Effects	1.748	0,07	1.511	0,07	31	0,03
RENOV project (322) – Investment Effects	3.288	0,13	1.204	0,06	48	0,04
RENOV project (322) – Capacity Adjustment Effects	29.510	1,19	16.569	0,77	671	0,57

Source: Authors' calculations.

Table 19: *Impacts of Axis 3 RDP measures, Korinthia, Greece (million Euro, jobs, at 2004 values)*

	Output Effects	% change from 2004	Income Effects	% change from 2004	Employment Effects	% change from 2004
RDIVERS project (311, 312) – Investment Effects	2.067	0.22	0.386	0.02	32	0.06
RDIVERS project (311, 312) – Capacity Adjustment Effects	0.453	0.05	0.336	0.02	8	0.01
RENOV project (322) – Investment Effects	0.885	0.09	0.169	0.01	13	0.02
RENOV project (322) – Capacity Adjustment Effects	8.872	0.94	1.556	0.09	177	0.31

Source: Authors' calculations.

Table 20: *Impacts of Axis 3 RDP measures, Latgale, Latvia (thousand Lats, jobs, at 1998 values)*

	Output Effects	% change from 1998	Income Effects	% change from 1998	Employment Effects	% change from 1998
RDIVERS project (311, 312) – Investment Effects	0.641	0.21	0.206	0.08	74	0.08
RDIVERS project (311, 312) – Capacity Adjustment Effects	0.250	0.08	0.191	0.07	30	0.03
RENOV project (322) – Investment Effects	0.286	0.10	0.094	0.03	33	0.03
RENOV project (322) – Capacity Adjustment Effects	2.440	0.82	0.606	0.22	349	0.36

Source: Authors' calculations.

Table 21: *Impacts of Axis 3 RDP measures, North Karelia, Finland (million Euro, jobs, at 2005 values)*

	Output Effects	% change from 2005	Income Effects	% change from 2005	Employment Effects	% change from 2005
RDIVERS project (311, 312) – Investment Effects	4.855	0.21	2.566	0.24	67	0.10
RDIVERS project (311, 312) – Capacity Adjustment Effects	1.173	0.05	0.997	0.09	131	0.20
RENOV project (322) – Investment Effects	2.022	0.09	1.069	0.10	27	0.04
RENOV project (322) – Capacity Adjustment Effects	18.008	0.78	7.088	0.65	254	0.39

Source: Authors' calculations.

(income, employment) of estimated impacts, with the exception of the very low impacts associated with village renovation investment. Percentage changes in output are the highest ones, followed by changes in employment which are higher than those in income.

Estimated effects for North Karelia (Pohjois-Karjala), Finland (Table 21) follow a rather different pattern. Total output effects associated with the capacity-adjustment effects of village renovation projects are highest (+0.78%), followed by investment effects of the agrotourism projects (+0.21%). Investment effects associated with agrotourism are more than twice as high as those linked to renovation investment, while renovation capacity-adjustment effects are almost fifteen times higher than agrotourism ones. This pattern of effects is not observed in the case of the employment impacts, where RENOV capacity-adjustment effects lead (+0.39%), followed by RDIVERS capacity-adjustment effects and by much lower impacts associated with investment. More importantly, percentage increases in output are the highest only in the case of RENOV capacity-adjustment, while income effects prevail in the case of RDIVERS and RENOV investment, and employment effects are the highest in the case of agrotourism capacity-adjustment.

In terms of Axis 3 policy effects estimated for diversified economies with low pluriactivity but high potential for economic diversification, Table 22 presents the economy-wide impacts of the two shocks on the economy of Savona, Italy. The largest impacts on total output are (once again) associated with the capacity-adjustment effects of village renovation projects (+0.71%), followed by investment effects of the agrotourism projects (+0.19%). Investment effects of agrotourism are more than twice those linked to renovation investment, while the opposite applies in the case of capacity-adjustment effects, with renovation generating considerably higher impacts than agrotourism. The same pattern of effects is observed in the case of income and employment generation. Finally, with the exception of RENOV capacity-adjustment effects where employment impacts are higher than income ones, percentage changes in employment are the lowest amongst the three categories.

In Var, France (Table 23), total output effects associated with the capacity-adjustment effects of village renovation projects are the highest ones (+1.23%), followed (again) by investment effects of agrotourism projects (+0.34%). Agrotourism investment effects are twice as high as those linked to renovation investment, while renovation capacity-adjustment effects are more than fifteen times higher than agrotourism ones. The same ranking of effects is observed in the case of employment changes, but income effects associated with agrotourism capacity-adjustment are higher than those linked to renovation investment activity. Finally, percentage changes in output are the highest ones, while, in contrast to agrotourism, renovation employment effects exceed income ones.

The pattern of effects estimated for the region of Massa Carrara, Italy (Table 24) is rather similar to that associated with Savona, Italy, with the exception of the differences in estimated percentage changes between the different categories of impacts (i.e. the differences between figures estimated for Massa Carrara are much lower).

Table 22: Impacts of Axis 3 RDP measures, Savona, Italy (million Euro, jobs, at 2000 values)

	Output Effects	% change from 2000	Income Effects	% change from 2000	Employment Effects	% change from 2000
RDIVERS project (311, 312) – Investment Effects	2.337	0.19	1.210	0.09	31	0.07
RDIVERS project (311, 312) – Capacity Adjustment Effects	0.591	0.05	0.566	0.04	8	0.02
RENOV project (322) – Investment Effects	1.013	0.08	0.523	0.04	12	0.03
RENOV project (322) – Capacity Adjustment Effects	8.831	0.71	3.858	0.28	160	0.36

Source: Authors' calculations.

Table 23: *Impacts of Axis 3 RDP measures, Var, France (million Euro, jobs, at 2005 values)*

	Output Effects	% change from 2005	Income Effects	% change from 2005	Employment Effects	% change from 2005
RDIVERS project (311, 312) – Investment Effects	31.020	0.34	16.875	0.17	374	0.11
RDIVERS project (311, 312) – Capacity Adjustment Effects	7.737	0.08	7.785	0.08	98	0.03
RENOV project (322) – Investment Effects	13.673	0.15	156	0.05	7.358	0.08
RENOV project (322) – Capacity Adjustment Effects	113.625	1.23	54.311	0.56	1890	0.56

Source: Authors' calculations.

Table 24: *Impacts of Axis 3 RDP measures, Massa Carrara, Italy (million Euro, jobs, at 2000 values)*

	Output Effects	% change from 2000	Income Effects	% change from 2000	Employment Effects	% change from 2000
RDIVERS project (311, 312) – Investment Effects	5.376	0.34	4.016	0.24	105	0.20
RDIVERS project (311, 312) – Capacity Adjustment Effects	1.062	0.07	1.034	0.06	21	0.04
RENOV project (322) – Investment Effects	2.249	0.14	1.651	0.10	42	0.08
RENOV project (322) – Capacity Adjustment Effects	15.184	0.97	8.435	0.51	385	0.72

Source: Authors' calculations.

In the rather small economy of Osterholz, Germany (Table 25), total output impacts associated with the capacity-adjustment effects of village renovation projects are again (and by far) the highest (+1.22%), followed by investment effects of the agrotourism projects (+0.29%). Investment effects associated with agrotourism are more than double those linked to renovation investment, while agrotourism capacity-adjustment effects are minimal compared to

Table 25: *Impacts of Axis 3 RDP measures, Osterholz, Germany (million Euro, jobs, at 2005)*

	Output Effects	% change from 2005	Income Effects	% change from 2005	Employment Effects	% change from 2005
RDIVERS project (311, 312) – Investment Effects	1.378	0.29	0.760	0.08	16	0.08
RDIVERS project (311, 312) – Capacity Adjustment Effects	0.354	0.08	0.399	0.04	4	0.02
RENOV project (322) – Investment Effects	0.592	0.13	0.322	0.04	7	0.03
RENOV project (322) – Capacity Adjustment Effects	5.700	1.22	3.376	0.38	97	0.46

Source: Authors' calculations.

Table 26: Impacts of Axis 3 RDP measures, Somerset, UK (million GBP, jobs, at 2000 values)

	Output Effects	% change from 2000	Income Effects	% change from 2000	Employment Effects	% change from 2000
RDIVERS project (311, 312) – Investment Effects	4.807	0.16	2.019	0.05	108	0.05
RDIVERS project (311, 312) – Capacity Adjustment Effects	2.598	0.08	2.265	0.05	76	0.04
RENOV project (322) – Investment Effects	2.029	0.07	0.834	0.02	45	0.02
RENOV project (322) – Capacity Adjustment Effects	18.474	0.60	7.430	0.17	690	0.33

Source: Authors' calculations.

Table 27: Impacts of Axis 3 RDP measures, Västmanlands län, Sweden (million Sek, jobs, at 2005 values)

	Output Effects	% change from 2005	Income Effects	% change from 2005	Employment Effects	% change from 2005
RDIVERS project (311, 312) – Investment Effects	81.149	0.20	40.804	0.61	83	0.07
RDIVERS project (311, 312) – Capacity Adjustment Effects	19.137	0.05	17.443	0.26	21	0.02
RENOV project (322) – Investment Effects	32.914	0.08	16.007	0.24	32	0.03
RENOV project (322) – Capacity Adjustment Effects	283.718	0.68	136.252	2.05	383	0.33

Source: Authors' calculations.

renovation ones. The same ranking of effects is observed in the case of the other categories (income, employment) of estimated impacts. Percentage changes in output are the highest, followed by changes in income and changes in employment associated with the most important renovation capacity-adjustment effects.

In the case of Axis 3 policy effects estimated for diversified economies with high pluriactivity and low potential for economic diversification, Table 26 presents the economy-wide impacts of the two shocks on the economy of Somerset, UK. As in the case of other test regions, the largest impacts on total output are associated with the capacity-adjustment effects of village renovation projects (+0.60%), followed by investment effects of the agrotourism projects (+0.16%). Investment effects of agrotourism are more than double than those linked to renovation investment, while the opposite holds in the case of capacity-adjustment effects, with renovation impacts being four times higher than those of agrotourism. The major difference in the pattern of impacts estimated for Somerset is that (in contrast to most other areas) agrotourism capacity-adjustment effects are (in terms of percentage changes) higher than renovation investment effects. The same pattern of effects is observed in the case of income and employment generation. Finally, with the exception of RENOV capacity-adjustment effects (once more) where employment impacts are higher than income ones, percentage changes in employment are the lowest amongst the three categories.

Estimated effects for Västmanlands län, Sweden (Table 27) follow a different pattern. While the comparative sizes of output, income and employment effects follow the patterns already observed (i.e. RENOV capacity adjustment-effects are higher than RDIVERS investment effects), income effects are considerably higher than output effects, while employment effects are rather marginal. In other words, Axis 3 measures implemented in this region seem to possess a comparatively high potency of local income generation.

Estimated effects for the region of Zlinsky Kraj, Czech Republic (Table 28) follow the "usual" pattern. Total output effects associated with village renovation capacity-adjustment are the highest ones (+1.10%) followed by investment effects of the agrotourism projects (+0.23%). Agrotourism investment impacts are more than twice as high as those linked to renovation investment, while renovation capacity-adjustment effects are more than twenty times higher than agrotourism ones. Output changes are higher than changes in income and employment, with the exception of RDIVERS capacity-adjustment, where income effects are largest.

The same (as in Zlinsky Kraj, Czech Republic) pattern of effects applies in the case of Clackmannanshire and Fife (UK) (Table 29), with the exception that output effects are the highest in all categories of shocks, followed by those on income and employment. Finally, differences in percentage changes estimated for different categories of impacts are rather low.

Table 28: Impacts of Axis 3 RDP measures, Zlinsky Kraj, Czech Republic (million CZK, jobs, at 2005 values)

	Output Effects	% change from 2005	Income Effects	% change from 2005	Employment Effects	% change from 2005
RDIVERS project (311, 312) – Investment Effects	233.471	0.23	61.301	0.09	145	0.06
RDIVERS project (311, 312) – Capacity Adjustment Effects	53.919	0.05	43.821	0.06	35	0.01
RENOV project (322) – Investment Effects	102.935	0.10	26.779	0.04	62	0.02
RENOV project (322) – Capacity Adjustment Effects	1112.537	1.10	242.702	0.35	895	0.34

Source: Authors' calculations.

Table 29: Impacts of Axis 3 RDP measures, Clackmannanshire and Fife, Scotland (million GBP, jobs, at 2004 values)

	Output Effects	% change from 2004	Income Effects	% change from 2004	Employment Effects	% change from 2004
RDIVERS project (311, 312) – Investment Effects	2.707	0.23	1.526	0.09	73	0.05
RDIVERS project (311, 312) – Capacity Adjustment Effects	0.774	0.07	0.844	0.05	29	0.02
RENOV project (322) – Investment Effects	1.212	0.10	0.689	0.04	34	0.02
RENOV project (322) – Capacity Adjustment Effects	7.330	0.63	4.601	0.28	384	0.27

Source:Authors' calculations.

Finally, in the case of Axis 3 policy effects estimated for diversified economies with high pluriactivity and high potential for economic diversification, Table 30 presents the economy-wide impacts of the two shocks on the economy of Skane lan, Sweden. Again, capacity-adjustment of village renovation projects generates the largest impacts on total output (+1.12%), followed by investment effects of the agrotourism projects (+0.27%). With the exception of income effects, RENOV investment generates higher impacts than agrotourism capacity-adjustment. In contrast to most test regions, investment (in both types of project) is associated with comparatively higher income effects, which are followed by effects on output.

The pattern of effects in the next test region, Miesbach in Germany, is presented in Table 31. The usual pattern of ranking of effects between policy measures is repeated (i.e. RENOV capacity adjustment impacts are the highest, followed by RDIVERS investment ones). On the other hand, for the most important impact-generating shocks (RENOV capacity-adjustment and RDIVERS investment), employment effects are higher than income ones.

Table 32 presents policy impacts in the Slovenian region of Obalno. The pattern of estimated impacts is very different from that of other study areas. Firstly, the most significant impacts (with the exception of income) are generated by agrotourism investment, followed by village renovation capacity-adjustment. On the other hand, output effects are (again) the highest, followed (unlike in most other cases) by income effects. Finally, due to the very low rate of general

Table 30: Impacts of Axis 3 RDP measures, Skane lan, Sweden (million Sek, jobs, at 2005 values)

	Output Effects	% change from 2005	Income Effects	% change from 2005	Employment Effects	% change from 2005
RDIVERS project (311, 312) – Investment Effects	86.611	0.27	28.284	0.25	79	0.07
RDIVERS project (311, 312) – Capacity Adjustment Effects	21.517	0.07	16.323	0.14	21	0.02
RENOV project (322) – Investment Effects	36.444	0.11	11.543	0.10	31	0.03
RENOV project (322) – Capacity Adjustment Effects	361.532	1.12	135.750	1.20	413	0.37

Source: Authors' calculations.

Table 31: Impacts of Axis 3 RDP measures, Miesbach, Germany (million Euro, jobs, at 2005 values)

	Output Effects	% change from 2005	Income Effects	% change from 2005	Employment Effects	% change from 2005
RDIVERS project (311, 312) – Investment Effects	2.018	0.29	1.385	0.13	35	0.14
RDIVERS project (311, 312) – Capacity Adjustment Effects	0.315	0.05	0.344	0.03	5	0.02
RENOV project (322) – Investment Effects	0.855	0.12	0.582	0.06	15	0.06
RENOV project (322) – Capacity Adjustment Effects	5.184	0.75	2.752	0.26	121	0.48

Source: Authors' calculations.

Table 32: *Impacts of Axis 3 RDP measures, Obalno, Slovenia (million Tolars, jobs, at 2005 values)*

	Output Effects	% change from 2005	Income Effects	% change from 2005	Employment Effects	% change from 2005
RDIVERS project (311, 312) – Investment Effects	189.675	30.64	9.208	1.29	3234	7.96
RDIVERS project (311, 312) – Capacity Adjustment Effects	35.165	5.68	28.912	4.04	763	1.88
RENOV project (322) – Investment Effects	81.032	13.09	3.264	0.51	1285	3.16
RENOV project (322) – Capacity Adjustment Effects	84.098	13.59	0.833	0.12	1789	4.40

Source: Authors' calculations.

Table 33: *Impacts of Axis 3 RDP measures, Saalfeld-Rudolstadt, Germany (million Euro, jobs, at 2005 values)*

	Output Effects	% change from 2005	Income Effects	% change from 2005	Employment Effects	% change from 2005
RDIVERS project (311, 312) – Investment Effects	2.862	0.26	1.218	0.11	31	0.09
RDIVERS project (311, 312) – Capacity Adjustment Effects	0.694	0.06	0.620	0.06	8	0.02
RENOV project (322) – Investment Effects	1.170	0.10	0.481	0.04	12	0.04
RENOV project (322) – Capacity Adjustment Effects	11.201	1.00	5.071	0.47	176	0.52

Source: Authors' calculations.

investment which took place in the area in the base year (and the procedure adopted for specifying the shocks), estimated percentage effects are much higher than those in other test regions.

Finally, Table 33 presents estimated policy impacts for the test region of Saafeld-Rudolstadt, Germany. Estimated effects mostly follow the usual pattern, with RENOV capacity-adjustment generating the highest percentage changes, followed by RDIVERS investment. With the exception of RENOV capacity-adjustment (where employment changes are higher than income ones), impacts on regional income exceed those on employment.

With regards to the uniform shock analysis, Table 34 presents the economy-wide impacts of the agrotourism (RDIVERS) and village renovation (RENOV) shocks on the economy of Waldviertel, Austria. Comparing the two investment shocks, it seems that agrotourism projects generate considerably higher output, income and employment effects in comparison to village renovation. These effects are almost threefold in the case of all impact categories. In terms of capacity-adjustment, agrotourism impacts again prevail, being higher than those of village renovation in terms of output, and significantly larger in terms of income. However, employment effects associated with the renovation projects are exceptionally larger than those associated with rural diversification. Regarding the ranking of impacts, output effects are the highest ones, followed by income and employment effects. This pattern is not observed in village renovation capacity-adjustment analysis, where employment impacts are the highest ones.

In the case of Korinthia, Greece (Table 35), again rural diversification projects generate higher investment effects than renovation ones. However, these effects are only marginally higher. In terms of capacity-adjustment, the same (as in investment) pattern applies, with the exception of income effects which are much higher for agrotourism projects. Regarding the ranking of impacts, the pattern of Table 19 is observed.

Table 34: Impacts of Axis 3 RDP measures, Waldviertel, Austria (million Euro, jobs, at 2005 values)

	Output Effects	% change from 2005	Income Effects	% change from 2005	Employment Effects	% change from 2005
RDIVERS project (311, 312) – Investment Effects	7.371	0.30	2.735	0.13	114	0.10
RDIVERS project (311, 312) – Capacity Adjustment Effects	1.470	0.06	1.271	0.06	27	0.02
RENOV project (322) – Investment Effects	2.869	0.12	1.001	0.05	38	0.03
RENOV project (322) – Capacity Adjustment Effects	1.102	0.04	0.274	0.01	158	0.14

Source: Authors' calculations.

Table 35: Impacts of Axis 3 RDP measures, Korinthia, Greece (million Euro, jobs, at 2004 values)

	Output Effects	% change from 2004	Income Effects	% change from 2004	Employment Effects	% change from 2004
RDIVERS project (311, 312) – Investment Effects	1.987	0.21	0.371	0.02	31	0.05
RDIVERS project (311, 312) – Capacity Adjustment Effects	0.379	0.04	0.281	0.02	7	0.01
RENOV project (322) – Investment Effects	1.924	0.20	0.368	0.02	28	0.05
RENOV project (322) – Capacity Adjustment Effects	0.326	0.03	0.055	0.01	6	0.01

Source: Authors' calculations.

Table 36: Impacts of Axis 3 RDP measures, Latgale, Latvia (thousand Lats, jobs, at 1998 values)

	Output Effects	% change from 1998	Income Effects	% change from 1998	Employment Effects	% change from 1998
RDIVERS project (311, 312) – Investment Effects	0.617	0.21	0.198	0.07	71	0.07
RDIVERS project (311, 312) – Capacity Adjustment Effects	0.179	0.06	0.138	0.05	21	0.02
RENOV project (322) – Investment Effects	0.623	0.21	0.205	0.07	72	0.07
RENOV project (322) – Capacity Adjustment Effects	0.132	0.04	0.033	0.01	19	0.02

Source: Authors' calculations.

In Latgale, Latvia (Table 36), investment impact analysis shows, in contrast to both Waldviertel and Korinthia, village renovation projects generate marginally higher effects than diversification investment. On the other hand, rural diversification capacity-adjustment effects are higher, especially in the case of income. Regarding the ranking of impacts, the pattern of Table 20 holds.

Estimated effects for North Karelia, Finland (Table 37) follow the Waldviertel and Korinthia pattern. In more detail, agrotourism investment effects on output, income and employment are higher compared to effects associated with village renovation. Also, the capacity-adjustment effects of agrotourism projects are much higher than village renovation impacts, especially in the case of income and employment. Regarding the ranking of impacts, the pattern of Table 21 is repeated.

The pattern of estimated impacts observed in the uniform Axis 3 shock analysis in agriculturally dependent economies is also repeated in the case of diversified economies with low pluriactivity but high potential for economic diversification. To be precise, Table 38 presents the economy-wide impacts of the two shocks on the economy of Savona, Italy. In terms of investment, rural diversification projects generate marginally higher effects than village renovation ones. In the case of capacity-adjustment analysis, again rural diversification projects generate higher effects, especially in the case of income. Regarding the ranking of impacts, the pattern observed in Table 22 is repeated.

Table 37: Impacts of Axis 3 RDP measures, North Karelia, Finland (million Euro, jobs, at 2005 values)

	Output Effects	% change from 2005	Income Effects	% change from 2005	Employment Effects	% change from 2005
RDIVERS project (311, 312) – Investment Effects	4.669	0.20	2.467	0.23	65	0.10
RDIVERS project (311, 312) – Capacity Adjustment Effects	0.982	0.04	0.835	0.08	110	0.17
RENOV project (322) – Investment Effects	4.395	0.19	2.324	0.21	59	0.09
RENOV project (322) – Capacity Adjustment Effects	0.639	0.03	0.251	0.02	9	0.01

Source: Authors' calculations.

Table 38: Impacts of Axis 3 RDP measures, Savona, Italy (million Euro, jobs, at 2000 values)

	Output Effects	% change from 2000	Income Effects	% change from 2000	Employment Effects	% change from 2000
RDIVERS project (311, 312) – Investment Effects	2.247	0.18	1.163	0.08	29	0.06
RDIVERS project (311, 312) – Capacity Adjustment Effects	0.431	0.03	0.412	0.03	6	0.01
RENOV project (322) – Investment Effects	2.203	0.18	1.137	0.08	27	0.06
RENOV project (322) – Capacity Adjustment Effects	0.314	0.03	0.137	0.01	6	0.01

Source: Authors' calculations.

Table 39: Impacts of Axis 3 RDP measures, Var, France (million Euro, jobs, at 2005 values)

	Output Effects	% change from 2005	Income Effects	% change from 2005	Employment Effects	% change from 2005
RDIVERS project (311, 312) – Investment Effects	29.827	0.32	16.225	0.17	360	0.11
RDIVERS project (311, 312) – Capacity Adjustment Effects	6.504	0.07	6.543	0.07	83	0.02
RENOV project (322) – Investment Effects	29.672	0.32	15.966	0.16	320	0.10
RENOV project (322) – Capacity Adjustment Effects	4.045	0.04	1.934	0.02	67	0.02

Source: Authors' calculations.

Table 40: Impacts of Axis 3 RDP measures, Massa Carrara, Italy (million Euro, jobs, at 2000 values)

	Output Effects	% change from 2000	Income Effects	% change from 2000	Employment Effects	% change from 2000
RDIVERS project (311, 312) – Investment Effects	5.169	0.33	3.861	0.23	101	0.19
RDIVERS project (311, 312) – Capacity Adjustment Effects	0.754	0.05	0.735	0.04	15	0.03
RENOV project (322) – Investment Effects	4.866	0.31	3.585	0.22	91	0.17
RENOV project (322) – Capacity Adjustment Effects	0.541	0.03	0.301	0.02	14	0.03

Source: Authors' calculations.

Table 41: Impacts of Axis 3 RDP measures, Osterholz, Germany (million Euro, jobs, at 2005 values)

	Output Effects	% change from 2005	Income Effects	% change from 2005	Employment Effects	% change from 2005
RDIVERS project (311, 312) – Investment Effects	1.325	0.28	0.731	0.08	15	0.07
RDIVERS project (311, 312) – Capacity Adjustment Effects	0.296	0.06	0.332	0.04	4	0.02
RENOV project (322) – Investment Effects	1.286	0.27	0.699	0.08	14	0.07
RENOV project (322) – Capacity Adjustment Effects	0.201	0.04	0.119	0.01	3	0.01

Source: Authors' calculations.

In Var, France (Table 39) again rural diversification investment impacts are higher (though only marginally) than village renovation ones, while capacity-adjustment effects of agrotourism projects are considerably higher than those of village renovation projects. This particular pattern of impacts is emphatically repeated in the case of both Massa Carrara, Italy (Table 40) and Osterholz in Germany (Table 41). Regarding the ranking of impacts, in all these three study regions

Table 42: *Impacts of Axis 3 RDP measures, Somerset, UK (million GBP, jobs, at 2000 values)*

	Output Effects	% change from 2000	Income Effects	% change from 2000	Employment Effects	% change from 2000
RDIVERS project (311, 312) – Investment Effects	1.649	0.05	0.693	0.02	37	0.02
RDIVERS project (311, 312) – Capacity Adjustment Effects	0.990	0.03	0.863	0.02	29	0.01
RENOV project (322) – Investment Effects	1.574	0.05	0.646	0.01	34	0.02
RENOV project (322) – Capacity Adjustment Effects	0.658	0.02	0.265	0.01	25	0.01

Source: Authors' calculations.

Table 43: *Impacts of Axis 3 RDP measures, Västmanlands län, Sweden (million Sek, jobs, at 2005 values)*

	Output Effects	% change from 2005	Income Effects	% change from 2005	Employment Effects	% change from 2005
RDIVERS project (311, 312) – Investment Effects	78.028	0.19	39.234	0.59	80	0.07
RDIVERS project (311, 312) – Capacity Adjustment Effects	16.082	0.04	14.659	0.22	17	0.01
RENOV project (322) – Investment Effects	71.511	0.17	34.798	0.52	69	0.06
RENOV project (322) – Capacity Adjustment Effects	10.095	0.02	4.848	0.07	14	0.01

Source: Authors' calculations.

Table 44: *Impacts of Axis 3 RDP measures, Zlinsky Kraj, Czech Republic (million CZK, jobs, at 2005 values)*

	Output Effects	% change from 2005	Income Effects	% change from 2005	Employment Effects	% change from 2005
RDIVERS project (311, 312) – Investment Effects	224.492	0.22	58.943	0.08	140	0.05
RDIVERS project (311, 312) – Capacity Adjustment Effects	45.306	0.04	36.823	0.05	30	0.01
RENOV project (322) – Investment Effects	223.771	0.22	58.216	0.08	134	0.05
RENOV project (322) – Capacity Adjustment Effects	39.593	0.04	8.638	0.01	32	0.01

Source: Authors' calculations.

the pattern of Table 23, Table 24 and Table 25 is repeated.

In the case of Axis 3 policy effects estimated for diversified economies with high pluriactivity and low potential for economic diversification, Table 42 presents the economy-wide impacts of the two shocks on the economy of Somerset, UK. As in the case of other test regions, the largest (though marginally) investment impacts are

Table 45: Impacts of Axis 3 RDP measures, Clackmannanshire and Fife, Scotland (million GBP, jobs, at 2004 values)

	Output Effects	% change from 2004	Income Effects	% change from 2004	Employment Effects	% change from 2004
RDIVERS project (311, 312) – Investment Effects	2.611	0.22	1.471	0.09	70	0.05
RDIVERS project (311, 312) – Capacity Adjustment Effects	0.534	0.05	0.583	0.04	20	0.01
RENOV project (322) – Investment Effects	1.212	0.10	0.689	0.04	34	0.02
RENOV project (322) – Capacity Adjustment Effects	0.261	0.02	0.164	0.01	14	0.01

Source: Authors' calculations.

Table 46: Impacts of Axis 3 RDP measures, Skane lan, Sweden (million Sek, jobs, at 2005 values)

	Output Effects	% change from 2005	Income Effects	% change from 2005	Employment Effects	% change from 2005
RDIVERS project (311, 312) – Investment Effects	83.280	0.26	27.196	0.24	76	0.07
RDIVERS project (311, 312) – Capacity Adjustment Effects	63.442	0.20	47.987	0.43	63	0.06
RENOV project (322) – Investment Effects	79.224	0.25	25.093	0.22	67	0.06
RENOV project (322) – Capacity Adjustment Effects	45.029	0.14	16.908	0.15	51	0.05

Source: Authors' calculations.

associated with rural diversification projects. The same type of projects generate marginally higher capacity-adjustment impacts on output and employment, and much higher ones (compared to village renovation ones) on total income. Regarding the ranking of impacts, the pattern of Table 26 is generally repeated.

Estimated effects for Västmanlands län, Sweden (Table 43), follow a similar (to Somerset) pattern, with the exception of a very significant difference between capacity-adjustment output and income effects, which are much higher for rural diversification projects. Regarding the ranking of impacts, income effects are the highest ones, followed by output and employment effects for all categories of shocks.

The pattern of impacts estimated for Somerset is repeated in the case of Zlinsky Kraj (Table 44), while rural diversification investment and capacity-adjustment effects are much higher in Clackmannanshire and Fife than village renovation ones, for all categories of estimated impacts (Table 45). In both study areas, the ranking of effects observed in Tables 28 and 29 is repeated.

Finally, in the case of Axis 3 policy effects estimated for diversified economies with high pluriactivity and high potential for economic diversification, Table 46 presents the economy-wide impacts of the two shocks on the economy of Skane lan, Sweden. Again, rural diversification projects generate rather marginally-higher investment effects, while the capacity-adjustment impacts of the same type of projects are considerably higher compared to those associated with village renovation projects (especially in the case of output and income generation). This

Table 47: *Impacts of Axis 3 RDP measures, Miesbach, Germany (million Euro, jobs, at 2005 values)*

	Output Effects	% change from 2005	Income Effects	% change from 2005	Employment Effects	% change from 2005
RDIVERS project (311, 312) – Investment Effects	1.941	0.28	1.332	0.13	34	0.13
RDIVERS project (311, 312) – Capacity Adjustment Effects	0.262	0.04	0.286	0.03	4	0.02
RENOV project (322) – Investment Effects	1.858	0.27	1.264	0.12	32	0.13
RENOV project (322) – Capacity Adjustment Effects	0.182	0.03	0.097	0.01	4	0.02

Source: Authors' calculations.

Table 48: *Impacts of Axis 3 RDP measures, Obalno, Slovenia (million Tolars, jobs, at 2005 values)*

	Output Effects	% change from 2005	Income Effects	% change from 2005	Employment Effects	% change from 2005
RDIVERS project (311, 312) – Investment Effects	182.399	29.47	8.853	1.24	3110	7.65
RDIVERS project (311, 312) – Capacity Adjustment Effects	29.548	4.77	24.496	3.39	641	1.58
RENOV project (322) – Investment Effects	176.156	28.46	7.879	1.10	2792	6.87
RENOV project (322) – Capacity djustment Effects	29.625	4.79	1.293	0.18	631	1.55

Source: Authors' calculations.

Table 49: *Impacts of Axis 3 RDP measures, Saalfeld-Rudolstadt, Germany (million Euro, jobs, at 2005 values)*

	Output Effects	% change from 2005	Income Effects	% change from 2005	Employment Effects	% change from 2005
RDIVERS project (311, 312) – Investment Effects	2.752	0.25	1.171	0.11	30	0.09
RDIVERS project (311, 312) – Capacity Adjustment Effects	0.592	0.05	0.528	0.05	7	0.02
RENOV project (322) – Investment Effects	2.544	0.23	1.046	0.10	26	0.08
RENOV project (322) – Capacity Adjustment Effects	0.399	0.04	0.181	0.02	6	0.02

Source: Authors' calculations.

pattern of effects is more or less repeated in the regions of Miesbach and Saalfeld-Rudolstadt in Germany (Table 47 and Table 49). On the other hand, though agrotourism investment effects in Obalno (Table 48) are higher than village renovation ones capacity-adjustment effects of renovation projects on output are marginally larger. Meanwhile, rural diversification income effects are very high, with the equivalent effects of renovation projects being marginal.

In all four areas, the ranking of impacts observed in Table 30, Table 31, Table 32 and Table 33 is repeated.

9. Modelling results and typologies: differences in the analysed policy impacts among different types of regions

The aim of this section is to illustrate differences in the impacts of the specified policy shocks amongst the different types of study areas in order to facilitate a generalisation of Axis 3 impact analysis findings (by establishing links between model results and the typology used for the selection of the test regions). Therefore, in this section, the modelling results are discussed with regard to different types of areas specified by the diversification typology.

Table 50 presents percentage changes in total output, income and employment associated with investment in agrotourism.

In the case of agriculturally dependent economies with low pluriactivity and low potential for diversification (code 111), the main observations are:

– the comparison between the two “high GDP/capita – low growth” areas shows that effects in Waldviertel are considerably higher than those in Korinthia. This shows that sectors undertaking this type of investment activity in the Austrian area (an area with a higher development context) have closer links with the rest of the economy compared to their equivalents in the Greek area;

– the comparison between the two “low GDP/capita – high growth” areas shows rather similar sised effects, with the exception of the income ones which are much higher in North Karelia. This shows that this type of investment activity in North Karelia can generate significant income benefits for the local population;

– when comparing the two different “economic development clusters”, the findings show that increases in total economic activity are higher in the “lower-income” areas (which, however, have comparatively high growth rates). This is especially true in the case of income and employment generation.

When comparing diversified economies with low pluriactivity and high potential for diversification (code 313), the main observations are:

– the two “high GDP/capita – low growth” areas show that effects in Var (France) are much higher than those in Savona (Italy). Again, this finding can be attributed to the rather higher development level associated with the French area;

– the two “low GDP/capita – high growth” areas show considerably higher impacts in Massa-Carrara (Italy), especially in the case of income and employment generation;

– the two different “economic development” clusters findings show higher increases in total economic activity in the “lower-income” areas (which, however, have comparatively high growth rates), especially in the case of income and employment generation.

The pattern of comparative findings in the case of diversified economies with a high pluriactivity and a low potential for diversification (code 331) is rather different from those observed above. In more detail:

– the two “high GDP/capita – low growth” areas show much higher effects in Västmandlands län (Sweden) than those estimated for Somerset (UK), especially in the case of income generation;

Table 50: Investment effects of rural diversification project (% changes from base year)

Econ. Dev. Cluster	Region	Output (% change)	Income (% change)	Employment (% change)
111: Agriculturally-dependent economies, low pluriactivity; low potential for diversification				
1	Waldviertel (AU)	0.31	0.13	0.10
1	Korinthia (GR)	0.22	0.02	0.06
3	Latgale (LV)	0.21	0.08	0.08
3	Pohjois–Karjala (FI)	0.21	0.24	0.10
313: Diversified economies, low pluriactivity, high potential for diversification				
1	Savona (IT)	0.19	0.09	0.07
1	Var (FR)	0.34	0.17	0.11
3	Massa-Carrara (IT)	0.34	0.24	0.20
3	Osterholz (DE)	0.29	0.08	0.08
331: Diversified economies, high pluriactivity, low potential for diversification				
1	Somerset (UK)	0.16	0.05	0.05
1	Västmanlands län (SE)	0.20	0.61	0.07
3	Zlinsky kraj (CZ)	0.23	0.09	0.06
3	Clackmannanshire and Fife (UK)	0.23	0.09	0.05
333: Diversified economies, high pluriactivity, high potential for diversification				
1	Skane lan (SE)	0.27	0.25	0.07
1	Miesbach (DE)	0.29	0.13	0.14
3	Obalno-kraska (SI)	30.64	1.29	7.96
3	Saalfeld-Rudolstadt (DE)	0.26	0.11	0.09

Source: Authors' calculations.

Table 51: Capacity-adjustment effects of rural diversification project (% changes from base year)

Econ. Dev. Cluster	Region	Output (% change)	Income (% change)	Employment (% change)
111: Agriculturally-dependent economies, low pluriactivity; low potential for diversification				
1	Waldviertel (AU)	0.07	0.07	0.03
1	Korinthia (GR)	0.05	0.02	0.01
3	Latgale (LV)	0.08	0.07	0.03
3	Pohjois–Karjala (FI)	0.05	0.09	0.20
313: Diversified economies, low pluriactivity, high potential for diversification				
1	Savona (IT)	0.05	0.04	0.02
1	Var (FR)	0.08	0.08	0.03
3	Massa-Carrara (IT)	0.07	0.06	0.04
3	Osterholz (DE)	0.08	0.04	0.02
331: Diversified economies, high pluriactivity, low potential for diversification				
1	Somerset (UK)	0.08	0.05	0.04
1	Västmanlands län (SE)	0.05	0.26	0.02
3	Zlinsky kraj (CZ)	0.05	0.06	0.01
3	Clackmannanshire and Fife (UK)	0.07	0.05	0.02
333: Diversified economies, high pluriactivity, high potential for diversification				
1	Skane lan (SE)	0.07	0.14	0.02
1	Miesbach (DE)	0.05	0.03	0.02
3	Obalno-kraska (SI)	5.65	4.04	1.88
3	Saalfeld-Rudolstadt (DE)	0.06	0.06	0.02

Source: Authors' calculations.

Table 52: *Investment effects of village renovation project (% changes from base year)*

Econ. Dev. Cluster	Region	Output (% change)	Income (% change)	Employment (% change)
111: Agriculturally-dependent economies, low pluriactivity; low potential for diversification				
1	Waldviertel (AU)	0.13	0.04	0.06
1	Korinthia (GR)	0.09	0.01	0.02
3	Latgale (LV)	0.10	0.03	0.03
3	Pohjois–Karjala (FI)	0.09	0.10	0.04
313: Diversified economies, low pluriactivity, high potential for diversification				
1	Savona (IT)	0.08	0.04	0.03
1	Var (FR)	0.15	0.08	0.05
3	Massa-Carrara (IT)	0.14	0.10	0.08
3	Osterholz (DE)	0.13	0.04	0.03
331: Diversified economies, high pluriactivity, low potential for diversification				
1	Somerset (UK)	0.10	0.04	0.02
1	Västmanlands län (SE)	0.08	0.24	0.03
3	Zlinsky kraj (CZ)	0.10	0.04	0.02
3	Clackmannanshire and Fife (UK)	0.10	0.04	0.02
333: Diversified economies, high pluriactivity, high potential for diversification				
1	Skane lan (SE)	0.11	0.10	0.03
1	Miesbach (DE)	0.12	0.06	0.06
3	Obalno-kraska (SI)	13.09	0.51	3.16
3	Saalfeld-Rudolstadt (DE)	0.10	0.04	0.04

Source: Authors' calculations.

– the two "low GDP/capita – high growth" areas show a rather similar size of effects;

– the two different "economic development" clusters show that (in contrast to areas associated with codes 111 and 313) increases in total economic activity are much higher in the "higher-income" areas.

When comparing diversified economies with high pluriactivity and high potential for diversification (code 333), the main observations are:

– the two "high GDP/capita – low growth" areas show marginally higher effects in Skane Ian (Sweden) than those in Miesbach (Germany). Again, this finding can be attributed to the rather higher development level associated with the Swedish area;

– the two "low GDP/capita – high growth" areas are not very comparable, due to the rather special investment characteristics of Obalno (Slovenia);

– the two different "economic development" clusters[13] show that increases in total economic activity are higher in the "higher-income" areas (i.e. Skane Ian, Sweden, and Miesbach, Germany), especially in the case of income generation.

Very interestingly, the comparative analysis of results associated with capacity-adjustment effects of both type of measures and investment effects of village renovation (Table 51, Table 52, Table 53) reveal very similar patterns. However, there are a few exceptions to this rule:

– in the case of capacity-adjustment analysis of RDIVERS projects, employment effects (and not income effects) are much higher

13 Assuming that impacts estimated for Saafeld-Rudolstadt (Germany) are representative for this type of region.

Table 53: *Capacity-adjustment effects of village renovation project (% changes from base year)*

Econ. Dev. Cluster	Region	Output (% change)	Income (% change)	Employment (% change)
111: Agriculturally-dependent economies, low pluriactivity; low potential for diversification				
1	Waldviertel (AU)	1.19	0.77	0.57
1	Korinthia (GR)	0.94	0.09	0.31
3	Latgale (LV)	0.82	0.22	0.36
3	Pohjois–Karjala (FI)	0.78	0.65	0.39
313: Diversified economies, low pluriactivity, high potential for diversification				
1	Savona (IT)	0.71	0.28	0.36
1	Var (FR)	1.23	0.56	0.56
3	Massa-Carrara (IT)	0.97	0.51	0.72
3	Osterholz (DE)	1.22	0.38	0.46
331: Diversified economies, high pluriactivity, low potential for diversification				
1	Somerset (UK)	0.60	0.17	0.33
1	Västmanlands län (SE)	0.68	2.05	0.33
3	Zlinsky kraj (CZ)	1.10	0.35	0.34
3	Clackmannanshire and Fife (UK)	0.63	0.28	0.27
333: Diversified economies, high pluriactivity, high potential for diversification				
1	Skane lan (SE)	1.12	1.20	0.37
1	Miesbach (DE)	0.75	0.26	0.48
3	Obalno-kraska (SI)	13.59	0.12	4.40
3	Saalfeld-Rudolstadt (DE)	1.00	0.47	0.52

Source: Authors' calculations.

in North Karelia (Finland) than in Latgale (Latvia) (code 111);

– in the case of capacity-adjustment analysis of RENOV projects (for 111 test regions), economic effects are, on average, higher in "higher-income" areas (Waldviertel, Austria, and Korinthia, Greece);

– finally, in the case of capacity-adjustment analysis of RENOV projects for low GDP/capita – high growth areas with code 331, estimated impacts for the Czech region are much higher than those estimated for Clackmannanshire and Fife (UK).

The above pattern of findings is repeated in the case of the uniform shock analysis (Table 54, Table 55, Table 56, Table 57).

When comparing impact analysis results between areas which belong to a different typology, several interesting findings arise:

– In the case of investment for both RDIVERS (Table 50) and RENOV (Table 52) projects, the highest average percentage changes in economic activity appear in diversified economies with low pluriactivity and high potential for diversification (code 313). These are followed (in terms of the size of impacts) by diversified economies, with high pluriactivity and high potential for diversification (code 333). Effects estimated for code 331 areas are characterised by a diversified economy, high pluriactivity and low potential for diversification rank third (on average), while the (comparatively) lower average impacts are generated for agriculturally-dependent areas with low pluriactivity and low potential for diversification (code 111). The above findings show that investment activity associated with these two Axis 3 measures generates higher impacts in diversified economies with a high potential for diversification. In the case of the uniform shock analysis (Table 54 and Table

Table 54: *Investment effects of rural diversification project (% changes from base year)*

Econ. Dev. Cluster	Region	Output (% change)	Income (% change)	Employment (% change)
111: Agriculturally dependent economies, low pluriactivity, low potential for diversification				
1	Waldviertel (AU)	0.30	0.13	0.10
1	Korinthia (GR)	0.21	0.02	0.05
3	Latgale (LV)	0.21	0.07	0.07
3	Pohjois–Karjala (FI)	0.20	0.23	0.10
313: Diversified economies, low pluriactivity, high potential for diversification				
1	Savona (IT)	0.18	0.08	0.06
1	Var (FR)	0.32	0.17	0.11
3	Massa-Carrara (IT)	0.33	0.23	0.19
3	Osterholz (DE)	0.28	0.08	0.07
331: Diversified economies, high pluriactivity, low potential for diversification				
1	Somerset (UK)	0.05	0.02	0.02
1	Västmanlands län (SE)	0.19	0.59	0.07
3	Zlinsky kraj (CZ)	0.22	0.08	0.05
3	Clackmannanshire and Fife (UK)	0.22	0.09	0.05
333: Diversified economies, high pluriactivity and potential for diversification				
1	Skane lan (SE)	0.26	0.24	0.07
1	Miesbach (DE)	0.28	0.13	0.13
3	Obalno-kraska (SI)	29.47	1.24	7.65
3	Saalfeld-Rudolstadt (DE)	0.25	0.11	0.09

Source: Authors' calculations.

Table 55: *Investment effects of village renovation project (% changes from base year)*

Econ. Dev. Cluster	Region	Output (% change)	Income (% change)	Employment (% change)
111: Agriculturally dependent economies, low pluriactivity, low potential for diversification				
1	Waldviertel (AU)	0.12	0.05	0.03
1	Korinthia (GR)	0.20	0.02	0.05
3	Latgale (LV)	0.21	0.07	0.07
3	Pohjois–Karjala (FI)	0.19	0.21	0.09
313: Diversified economies, low pluriactivity, high potential for diversification				
1	Savona (IT)	0.18	0.08	0.06
1	Var (FR)	0.32	0.16	0.10
3	Massa-Carrara (IT)	0.31	0.22	0.17
3	Osterholz (DE)	0.27	0.08	0.07
331: Diversified economies, high pluriactivity, low potential for diversification				
1	Somerset (UK)	0.05	0.01	0.02
1	Västmanlands län (SE)	0.17	0.52	0.06
3	Zlinsky kraj (CZ)	0.22	0.08	0.05
3	Clackmannanshire and Fife (UK)	0.10	0.04	0.02
333: Diversified economies, high pluriactivity and potential for diversification				
1	Skane lan (SE)	0.25	0.22	0.06
1	Miesbach (DE)	0.27	0.12	0.13
3	Obalno-kraska (SI)	28.46	1.10	6.87
3	Saalfeld-Rudolstadt (DE)	0.23	0.10	0.08

Source: Authors' calculations.

Table 56: Capacity-adjustment effects of rural diversification project (% changes from base year)

Econ. Dev. Cluster	Region	Output (% change)	Income (% change)	Employment (% change)
111: Agriculturally dependent economies, low pluriactivity, low potential for diversification				
1	Waldviertel (AU)	0.06	0.06	0.02
1	Korinthia (GR)	0.04	0.02	0.01
3	Latgale (LV)	0.06	0.05	0.02
3	Pohjois–Karjala (FI)	0.04	0.08	0.17
313: Diversified economies, low pluriactivity, high potential for diversification				
1	Savona (IT)	0.03	0.03	0.01
1	Var (FR)	0.07	0.07	0.02
3	Massa-Carrara (IT)	0.05	0.04	0.03
3	Osterholz (DE)	0.06	0.04	0.02
331: Diversified economies, high pluriactivity, low potential for diversification				
1	Somerset (UK)	0.03	0.02	0.01
1	Västmanlands län (SE)	0.04	0.22	0.01
3	Zlinsky kraj (CZ)	0.04	0.05	0.01
3	Clackmannanshire and Fife (UK)	0.05	0.04	0.01
333: Diversified economies, high pluriactivity and potential for diversification				
1	Skane lan (SE)	0.20	0.43	0.06
1	Miesbach (DE)	0.04	0.03	0.02
3	Obalno-kraska (SI)	4.77	3.39	1.58
3	Saalfeld-Rudolstadt (DE)	0.05	0.05	0.02

Source: Authors' calculations.

55) this pattern of results is repeated, with the exception of agriculturally dependent areas (code 111) which are associated with marginally higher impacts than diversified economies with high pluriactivity and low potential for diversification (code 331).

– In the case of capacity-adjustment effects associated with RDIVERS projects (Table 51), agriculturally dependent regions (code 111) show the highest impacts, followed by diversified economies with high pluriactivity and low potential for diversification (code 331), then by diversified economies with low pluriactivity and high potential for diversification (code 313) and finally diversified economies with high pluriactivity and high potential for diversification (code 333). Here it seems that comparatively high linkages of the hotel and restaurant sector (i.e. its rather limited integration with the rest of the world) play a major part. In the uniform shock analysis (Table 56), results show that the largest impacts are generated in diversified economies with high pluriactivity and high potential for diversification (code 333), followed by agriculturally dependent regions (code 111), diversified economies with high pluriactivity and low potential for diversification (code 331), and diversified economies with low pluriactivity and high potential for diversification (code 313).

– In the case of capacity-adjustment effects of RENOV projects (modelled here through an increase in tourism demand), the highest (on average) impacts are observed in diversified economies with high pluriactivity and high potential for diversification (code 333), followed by diversified economies with low pluriactivity and high potential for diversification (code 313), and diversified economies with high pluriactivity and low potential for diversification (code 331) and agriculturally dependent regions (code 111). Here it seems that "highly diversified"

Table 57: *Capacity-adjustment effects of village renovation project (% changes from base year)*

Econ. Dev. Cluster	Region	Output (% change)	Income (% change)	Employment (% change)
111: Agriculturally dependent economies, low pluriactivity, low potential for diversification				
1	Waldviertel (AU)	0.04	0.01	0.14
1	Korinthia (GR)	0.03	0.01	0.01
3	Latgale (LV)	0.04	0.01	0.02
3	Pohjois–Karjala (FI)	0.03	0.02	0.01
313: Diversified economies, low pluriactivity, high potential for diversification				
1	Savona (IT)	0.03	0.01	0.01
1	Var (FR)	0.04	0.02	0.02
3	Massa-Carrara (IT)	0.03	0.02	0.03
3	Osterholz (DE)	0.04	0.01	0.01
331: Diversified economies, high pluriactivity, low potential for diversification				
1	Somerset (UK)	0.02	0.01	0.01
1	Västmanlands län (SE)	0.02	0.07	0.01
3	Zlinsky kraj (CZ)	0.04	0.01	0.01
3	Clackmannanshire and Fife (UK)	0.02	0.01	0.01
333: Diversified economies, high pluriactivity and potential for diversification				
1	Skane lan (SE)	0.14	0.15	0.05
1	Miesbach (DE)	0.03	0.01	0.02
3	Obalno-kraska (SI)	4.79	0.18	1.55
3	Saalfeld-Rudolstadt (DE)	0.04	0.02	0.02

Source: Authors' calculations.

economies are (sectorally) more integrated, and thus tourism demand corresponds to local economic activity characterised by low leakages to the rest of the world. In the uniform shock analysis, results differ in terms of comparatively higher effects for agriculturally dependent regions (i.e. they rank second) and comparatively lower effects for areas 313 and 331.

Finally, when comparing the performance of different types of areas in terms of generation of different effects, the following patterns are observed:

– The highest output effects are generally observed in diversified economies with low pluriactivity and high potential for diversification (code 313), while the lowest ones appear in diversified economies with high pluriactivity and low potential for diversification (code 331). Again, it seems that diversification potential makes the difference.

– The highest income effects are generally observed in diversified economies with high pluriactivity and low potential for diversification (code 331), while the lowest appear in agriculturally dependent economies.

– The highest employment effects are observed in diversified economies with low pluriactivity and high potential for diversification (code 313), while the lowest appear in diversified economies with high pluriactivity and low potential for diversification (code 331).

10. Summary and conclusions

10.1 Introduction

Before attempting to summarise the findings of the TERA-SIAP project, it is perhaps worthwhile recalling the three objectives set for the research team by the Technical Specifications, i.e.:

- to build a Typology of European Rural Areas (TERA) which will provide a suitable basis for Spatial Impact Assessment of a range of current and possible policies for rural areas;
- to provide guidelines for its potential use, particularly in conjunction with a set of models;
- to test the suitability of the TERA for providing Spatial Impact Assessment of at least two different policy measures of the Axis 3 of the Rural Development Regulation.

As a means of underlining the policy rationale for this kind of analysis, it may also be helpful to reflect upon the increasing interest (in the context of the formulation of post-2013 Rural Development Programmes subject to significant resource constraints) in various forms of targeting. The following quotations, both from speeches at the 2008 Cyprus Conference on Rural Development illustrate this:

"Within rural development policy, to what extent will we want to 'target' available funding?" (Commissioner Fischer Boel) (Fischer Boel, 2008, p. 5)

"Of course, this makes it all the more essential to target support, to look into measures critically, to develop indicators, to ask again and again the question: how can we get the most value for money? How can we improve targeting? How can we ensure that the needs we have identified are addressed, while ensuring the highest possible controllability?" (Deputy Commissioner Dormal) (Dormal Marino, 2008, p. 8)

10.2 Developing "purposive" typologies with a policy-based Rationale

The real challenge of the first of the TERA-SIAP objectives has been to move the "art" of regional typology construction away from the descriptive and inductive approaches, common in the literature of Geography and Regional Planning, towards a deductive-analytical framework which is both strongly rooted in the "intervention logic" of policy (in this case Pillar 2 of the CAP) and explicitly linked forward to quantitative Spatial Impact Analysis.

An important first step was to consider the different ways in which regional policy impact may be determined; in terms of "absorption effects" and the "containment" of indirect and indirect effects. This distinction has proved fundamental to the underlying architecture of the TERA-SIAP typologies.

The second step was to clarify the structure of Pillar 2 interventions, in the form of Generic Policy Issues (GPIs), derived from a careful review of the evolution of the thinking behind the 40+ measures included in Regulation 1698/2005.

The unbroken chain between policy rationale and typology construction was carefully maintained through the choice of "families of indicators" (KRPs), which would, in various combinations, form the building blocks of Single issue typologies (SITs) corresponding to each of the GPI.

A final design stage was the elaboration of a simple, pragmatic (and therefore transparent) multi-criteria methodology, supported by frequent use of cartographic reviewing of results to ensure that the outcome would be "reasonable" and of practical use in a policy context.

10.3 TERA-SIAP database

Implementing the SITs requires setting up a database with data on the KRPs[14] at a regional level, which is adequate both in terms of policy relevance and its usefulness for model-based spatial impact analyses. The TERA-SIAP database builds on data already publicly available for the entire EU, following the NUTS nomenclature. The main data sources are the Eurostat New Cronos REGIO Database, the statistical annexes of the CMEF associated with the 2007-13 Rural Development Regulation, the ESPON Database Public Files, and the regional tables of the DG Agriculture's Rural Development in the European Union - Statistical and Economic Information - Report 2007.

The smallest regional unit of the TERA-SIAP database is NUTS3. As far as possible, data gaps at NUTS3 level were filled following clear procedures which are reported in a meta-database. The revision of the NUTS nomenclature which came into force in 2008 reduced data availability. However, this problem could be overcome for all NUTS3 regions, which are affected by border changes, except for 41 regions.

Technically, the database is available both as a MS-Access database and a MS-Excel data file. Due to dynamic links, updates of the data are easily possible. A Simple Data Mapping Tool (SDMT) can be used to visualise the spatial distribution of individual indicators of the database.

10.4 Typologies developed

In order to provide a suitable basis for Spatial Impact Assessment of a range of current and possible policies for rural areas, two types of typologies were developed. The structure and rationale of these typologies derive from the distinction between a) measure/GPI-specific "absorption capacity" effects with associated direct economic impacts on the one hand and b) indirect and induced (income and employment) impacts of RDP on the other.

In the case of a), the objective is to classify regions on the basis of characteristics which it is reasonable to assume affect the way in which the initial policy expenditure moves through (or out of) the regional economy. The typologies reflecting these characteristics we termed the "Structural typologies".

In the case of b), regions are grouped on the basis of the way in which their socio-economic characteristics are likely to affect the size of the demand (or uptake) for policy expenditure under different GPIs. The typologies reflecting these characteristics we termed the "Absorption typologies".

In more detail, the following 7 typologies were developed:

a) Absorption typologies:
- Economic diversification typology
- Territorial human capital typology
- Sectoral human capital typology
- Farm competitiveness typology
- Less favoured areas typology

b) Structural typologies:
- Structural typology – sectoral measures
- Structural typology – territorial measures

14 In total, the database contains 60 indicators for the 10 KRPs (accessibility; demography and migration; labour market; education and training; access to services; sectoral structure of employment; pluriactivity; farm structure; sustainable agriculture/LFA; landscape and nature resources).

All of the absorption typologies can be characterised as "performance" typologies, in that they produce a set of types for which there is a fairly obvious order from "good" to "bad".

Against the background of the practical policy environment of the TERA-SIAP typologies, a "transparent" and "commonly understandable" approach that easily allows the typology building and region grouping steps to be retraced, seems more appropriate than more sophisticated, complex multivariate approaches, such as cluster analyses. Therefore the TERA-SIAP typologies are the outcome of simple cross-tabulation procedures, and/or calculation of z-transformed means.

The implementation of the conceptual framework for the development of "purposive" EU-wide typologies with a policy-based rationale encountered difficulties with regard to data availability. Only some of them could be overcome. This has to be taken into account for the interpretation of the typologies. Due to the relatively large size of the regions for which much of the data are only available (NUTS2), and the rather large proportion of missing data the structural typologies so far serve to illustrate the methodology applied and to indicate what could be achieved if better data were available.

In this report the geographical arrangements of regions in space (i.e. contiguity effects) could not be considered other than (to an extent) via the accessibility indicator. This is an opportunity for further research.

10.5 Models for Spatial Impact Assessment

There is a wide range of models for Spatial Impact Assessments. Socio-economic models which could deal with rural development policies related to the Quality of Life GPI include (a) Econometric Residential Choice Models, (b) Economic Base Models and (c) Regional Input-Output Models. Socio-economic models which could deal with the assessment of the impacts of measures associated with the Rural Economic Diversification GPI include (a) Regional Input-Output Models, (b) Regional Social Accounting Matrices (SAM), (c) Regional Computable General Equilibrium (CGE) Models, (d) Gravity Models, (e) Shift-Share Analysis, (f) Econometric Residential Choice Models, (g) Economic Base Models, and (h) Keynesian Multiplier Analysis. Each model has its specific strengths and weaknesses for Spatial Impact Assessment, depending among other things on the specific policy measure to be analysed.

Taking into account the characteristics of these different models and their capacity to assess the impacts of Axis 3 measures, Regional Input-Output (I-O) models were chosen as the appropriate quantitative instruments to test the suitability of one of the typologies developed. For constructing regional I-O tables, the hybrid Generation of Regional I/O Tables (GRIT) were chosen.

10.6 Implementing Spatial Impact Assessment

The impact assessment modelling exercise implemented in this project reveals significantly different paths of "regional reaction" to two selected Axis 3 policy shocks. In turn these differences in impacts can be rather well associated with different types of rural areas, as specified by the TERA-SIAP Economic Diversification Typology.

In more detail, a first attempt to draw conclusions from the relevant analysis showed that, in the vast majority of the 16 test regions, output effects are the most substantial ones, while in most regions income effects are higher than employment ones. In 15 out of 16 regions, the highest impacts are generated by the extra tourism demand associated with village renovation projects, and the next highest by investment in agrotourism, while the capacity-adjustment effects of rural diversification (agrotourism in this example) projects are comparatively low. On the other hand, when comparing the impacts of shocks of a similar size (uniform shock analysis), findings clearly showed that in the vast majority of areas, investment in rural diversification generates considerably greater effects than investment in village renovation. When capacity-adjustment effects are compared, results show that in 15 out of 16 areas agrotourism creates greater economy-wide effects than village renovation projects.

In areas characterised by a lower level of development (i.e. agriculturally dependent regions and diversified regions with low levels of pluriactivity), much higher policy impacts are associated with less prosperous regions with high growth rates. This can be attributed to the comparatively closed nature of these economies.

In more developed regions (i.e. diversified economies with high pluriactivity and diversified economies with high pluriactivity and potential for diversification), higher policy impacts are associated with more prosperous regions, even though these seem to be growing rather slowly. This can be attributed to the fact that these economies have moved to another stage of development, characterised not only by their economic integration with the rest of the world, but also by the creation of rather strong internal linkages (i.e. a widening of their economic base).

If the focus is on the effects of investment action, the analysis has generally shown that diversified economies with a high potential for diversification are associated with high policy impacts. In the case of agrotourism capacity-adjustment effects, then policy impacts are higher in "less open" regional economies with rather low potential for diversification. However, this ranking is reversed in the uniform shock analysis, where, again, diversified economies with high pluriactivity and high potential for diversification are associated with the largest impacts. Finally, in the case of the important capacity-adjustment effects of increased tourism demand, significant policy impacts mostly occur in highly-diversified economies (in terms of both status quo and potential).

In conclusion, the findings of this analysis indicate (as in several other relevant studies) that different types of rural economies are clearly associated with different patterns of policy impacts. However, it seems that this type of policy intervention is rather "doomed" to generate comparatively low effects in areas which are in need of high policy impacts, and much higher effects in areas characterised by a high level of economic development. On the other hand, the significant contribution of policy measures analysed here towards creating the necessary conditions for rural development must not be underrated.

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Annex

Annex 1: Generic issues in the 2005 Rural Development Regulation

As mentioned in Section 3.3, there are at least three ways to identify the GPIs which lie behind the 2005 RDR:

(a) By considering the historical accretion of measures and the policy debates which surrounded each stage in the accumulation.

(b) By considering the classifications suggested in the academic literature.

(c) By studying the policy documents issued by DG Agriculture to accompany the RDR.

In Section 3.3, the first two are only mentioned, and the third is only briefly described. In this annex, all three ways are described in more detail.

A1.1 Historical accretion of measures and the policy debates which surrounded each stage in the accumulation

According to Elena Saraceno (2004 p33):

> *"The existing measures… represent the historical accumulation of direct interventions since the CAP was launched and reflect different rationales of policy intervention in successive programming periods rather than a coherent overall design."*

She summarises the development of EU rural development policy in terms of three "waves":

– **Mid-1960s to mid-1980s:** The first generation of measures were predominantly "sectoral". They used a compensatory approach "to transform a structure of peasant farms into one of professional family farms, of medium size, well-equipped and connected to markets …". Small-scale semi-subsistence farming was intended to disappear, though regions with particular natural handicaps were supported with compensatory payments.

– **Mid-1980s to late 1990s:** The second period saw the addition of territorial measures (concerned with farm households and to a limited extent with other rural activities, rather than with farm businesses alone), but also a significant expansion of sectoral ones. Early initiatives were the integrated rural development programmes (for the Mediterranean and Western Isles). The publication of "The Future of Rural Society" and the Cork Conference were significant events in the background policy debate. The LEADER initiative and the MacSharry reforms (including the "accompanying measures") date from this period. The latter introduced an agri-environmental dimension. Thus the main components of the current EU perspective on rural development were now in place. The concepts of multi-functionality and the "European Model of agriculture" began to gain popularity as policy rationales.

– **Late 1990s to 2005:** The third wave was characterised by the gathering together of (mostly pre-existing) measures and "repackaging" them as the Second Pillar of the CAP. There were some minor additions concerned with food safety, animal welfare, and the need for farmers to adapt to new regulatory frameworks. CAP Pillar 2 had a complex relationship with Structural Fund policy, it being difficult to reconcile payment, monitoring and evaluation

Table A 1: Classification of (1257/99) measures according to Saraceno (2004)

Function	Category	Number of Measures
Sectoral	Investment in Farms	6
	Services and Infrastructures for Farmers	4
	Human Resources in Farming	3
	Income Support for Less Favoured Areas (LFA), etc.	1
	Environment and Forestry	4
Territorial	Promoting the Adaptation and Development of Rural Areas	4

Source: Saraceno (2004).

arrangements. During this period the idea of grouping measures according to the issue they address, which would later crystallize into the three Axes of Regulation 1698/2005, first appeared in Commission documentation.

To Saraceno's three waves we may perhaps add a fourth, initiated by 1698/2005, in which the three axes emerge clearly, in a first attempt to guide Member States with respect to a proportionate balance between them. A small number of new measures were added, but perhaps more significant is the separation of Pillar 2 from Structural Fund policy, and the introduction of a single rural development fund (EAFRD).

Saraceno's analysis led her to propose the classification of then current measures (1257/99) shown in Table A 1. Although the categories are described in terms of the objectives of the measures, Saraceno (op cit p38) stresses the fact that the structure is primarily the consequence of "successive additions of measures with different rationales". Indeed, she remarks on the several conflicts between the objectives of different categories.

A1.2 Classifications suggested in the academic literature

Storti, Henke and Macri (2004), after a similar historical account of the development of Pillar 2, suggest a 5-fold classification of the 22 measures in 1257/99 (Table A 2). Whilst there are clear similarities with Saraceno's classification, the sectoral-territorial distinction is not sustained. This particularly affects the third type, where "Promoting Rural Development" includes (farm) diversification (p), marketing of quality agricultural products (m), alongside territorial measures such as the ones supporting basic services (n), and village renovation (o).

The inclusion, by Storti *et al.,* of some measures in their "Promoting Rural Development" category is perhaps debatable. For example financial engineering (v) would seem more suited to the "other" category, whilst the measure relating to restoring land after natural disasters (u) might seem more at home in the "Protection and Improvement of the Environment" category. The claim that the rows in Table A 3 represent "5 homogeneous

Table A 2: Classification of measures according to Storti, Henke and Macri (2004)

Type of Measure	Number of Measures
Modernisation of Productive Structures	7
Training	1
Promoting Rural Development:	
(a) Diversification	3
(b) Infrastructure and Services	6
Protection and Improvement of the Environment	5
Other Measures (incl. evaluation)	N/A

Source: Storti et al. (2004).

Table A 3: *Anticipated post-reform priorities for rural development - Terluin and Venema 2004*

Priority	Number of Measures*
1. Strengthening sustainable production of agricultural and forest products.	7 (11)
2. Stimulating the production of landscape and nature and sound environmental management by farmers	3 (4)
3. Encouraging agrotourism and other non-agricultural activities on farm.	1 (3)
4. Enhancing the production of landscape and nature and sound environmental management by nature conservation organisations.	3 (5)
5. Consolidating economic activities of the industrial and services sectors in rural areas	8 (7)

*Note: * 1257/99 (anticipated measures after reform for 2007-2013).*

Source: Terluin and Venema (2004).

categories on the basis of the main goals they pursue" is at least open to question.

Terluin and Venema (2004) anticipate the structure of 1698/2005 by suggesting 5 "priorities" (groups of measures). These five groups of measures are derived from an analysis of the relationships between suppliers, products and consumers in the rural economy. Although this rationale has the advantage of being explicit, it produces results which are not very intuitive.

Thus the environmental measures are divided into two groups (2 and 4) on the basis of whether the beneficiaries are farmers or conservation organisations. As in the previous classification, LFA policy (which also has income support objectives) is classed with the (farm-based) environmental measures in Priority 2. However, perhaps a little confusingly, the last priority (Consolidating economic activities of the industrial and services sectors…) contains farm-based measures (processing and marketing (g), farm relief and farm management services (l)) together with a range of measures aimed at rural communities in general.

A1.3 Policy documents issued by DG Agriculture to accompany the RDR

The key Commission documents, from which GPIs may be deduced are:

(i) The Impact Assessment Report, and its Update.

(ii) The Rural Development Regulation (1698/2005).

(iii) The Community Strategic Guidelines.

(iv) The Common Monitoring and Evaluation Framework, and the Commission factsheet "EU Rural Development Policy 2007-2013".

In the first three, there are discussions about objectives, which provide clues to the thinking of the Commission, and the evolution of the main themes within the current Pillar 2 policy envelope. The last two present the three axes and the sub-sections within them. It is helpful to review the various lists of objectives, and try to understand the conceptual structures behind them. It is also instructive to note the evolution of a "matrix" of policy "objects" and "subjects". In this context, the term "object" refers to the aspect of the rural socio-economic environment which the policy seeks to change, whilst the "subject" is the social group or economic sector to which it is directed. We will suggest that the "objects" identified in the various policy documents form the starting point for definition of GPIs.

ad (i): Impact Assessment Report [SEC(2004)931), Update [COM(2005)304 final]

The Impact Assessment Report of 2004 (updated in 2005) served as a review of the current situation and a perspective on the future, as a background to Council discussions on CAP reform. It was, in a sense, a stage in working towards the RDR which followed in 2005,

Table A 4: Thematic structure of the (updated) impact assessment report

"Functions" of Rural Development Policy	Object/Mode of Intervention	Subject of Intervention	THEME?
3.1 A more attractive place to live and work – **INFRASTRUCTURE AND DIVERSIFICATION**	Small-scale infrastructure, local strategies for diversification and development of agriculture and food sector	Local infrastructure, broader rural economy (Territory?)	Broadening
3.2 Promoting knowledge and innovation for growth – **KNOWLEDGE TRANSFER AND INNOVATION**	Promoting research and innovation (quality and added value) in relation to forestry and agri-food sectors – incl. I.T. investmenti in human and physical capital.	Farmers and food supply chain.	Deepening/ Regrounding
3.3 Creating more and better jobs – **HUMAN CAPITAL INVESTMENT**	Education and training (life-long learning) to support diversification into tourism crafts and rural amenities.	Farm workforce (+ other rural residents?)	Broadening
3.4 Sustainable use of natural resources – **ENVIRONMENTAL PROTECTION/ ENHANCEMENT**	Protect and enhance biodiversity, HNV farming/forestry, water quality, response to climate change, organic farming, biomass.	Agriculture and forestry	
3.5 Improving governance			
3.6 Ensuring synergy with cohesion policy			
3.7 Setting Objectives			

and the Strategic Guidelines which interpreted the Regulation for the Member States as they drafted their national programmes. As such, it is interesting to note the thematic structure which (it may be assumed) reflected the thinking of the Commission at the time.

Section 3 of the Impact Assessment Report reviews the role of rural development in "The Realisation of Community Priorities", i.e. the Lisbon (employment and competitiveness) and Gothenburg (environmental) agendas. Table A 4 is an attempt to summarise what this section says about the "functions" of rural development in this context.

If we set aside the last three subsections, which relate to implementation and coordination with other Community policies, four main functions emerge:

(a) Infrastructure and other supports for economic diversification

(b) Knowledge transfer and innovation to support a shift towards a focus on quality, and value added in the agri-food sector

(c) Human capital investment to support diversification into tourism, crafts and rural amenities.

(d) Environmental protection and enhancement by farming and forestry.

The last of these is clearly distinguished in that it relates primarily to the environment (Gothenburg), rather than to socio-economic issues (i.e. Lisbon). The rationale or principles by which the first three (socio-economic) functions are defined is rather less clear-cut. However, we may perhaps borrow/extend the terminology of Van der Ploeg and Roep (2003), and summarise the first and third as "Broadening", the second as a combination of both "Deepening" and "Regrounding". The first and third are distinguished in that the first relates to infrastructure investment, and the third to human capital.

All of the first three categories in Table A 4 are directed both at the primary sector and at the rest of the rural economy, and so a sectoral/territorial distinction cannot be maintained here.

The fourth (environmental) function relates only to farming and forestry.

ad (ii): The Rural Development Regulation (1698/2005)

Article 4 of the Regulation sets out the three objectives which later become the first three Axes of the Regulation:

(a) "improving the competitiveness of agriculture and forestry by supporting restructuring, development and innovation;

(b) improving the environment and the countryside by supporting land management;

(c) improving the quality of life in rural areas and encouraging diversification of economic activity."

These three objectives/axes equate (roughly) with the first four "functions" of the Impact Assessment Report. However they are reformulated, so direct comparisons are difficult. In broad terms the first objective/axis equates to the second Impact Assessment Report function in Table A 4, the second objective to the fourth Impact Assessment Report function, and the third objective to the first and third Impact Assessment Report functions. This simplification removes the earlier distinction between physical investments (in the first Impact Assessment Report function) and human capital investment (Impact Assessment Report function 3). It also seems to increase the sectoral/territorial polarisation, between the first two objectives/axes, and the third. In terms of the Van der Ploeg classification, Objective/Axis 1 combines deepening and regrounding, while the third equates to broadening.

ad (iii): The Community Strategic Guidelines (2006/144/EC)

The Community Strategic Guidelines were subsequently derived from the 1698/2005 regulation, to assist Member States (and regions) in the process of designing the national (regional) development programmes. The three objectives/axes become the first three of six "guidelines". The remaining three relate to implementation and compatibility with other EU policies and are not relevant on this occasion.

The Community Strategic Guidelines provide a more detailed example of the way in which the overall scope of EU Rural Development Policy action may be subdivided and classified. This is because the first three guidelines are illustrated by 22 "key actions". A careful review of the descriptions of these actions (Table A 5) may help us to better understand the thinking behind the classification.

The key actions described as illustrating Axis 1 are almost all designed to enhance competitiveness, mainly through increased efficiency, but also by developing new markets. They are exclusively sectoral – being directed at the agricultural, food and forestry sectors. In terms of Van der Ploeg's classification, they are designed to "deepen" and "reground" the activities of these sectors.

As might be expected, the majority of actions cited under Axis 2 are designed to protect or enhance the rural environment, though competitiveness is associated with (v), and cohesion is the main objective of (vi) (which seems to sit rather uncomfortably in this Axis). With the exception of key action (vi), all the actions cited under Axis 2 are sectoral rather than territorial.

Axis 3 has a rather heterogeneous collection of key actions. Competitiveness and environmental protection are almost absent as primary objectives. More important are objectives such as Quality of Life, Diversification (of the rural economy), Human Capital investment, and Cohesion. With two partial exceptions, the actions are territorial rather than sectoral. They are predominantly of a "broadening" nature, though with some potential for deepening too.

Table A 5: Axes and key actions of the Community Strategic Guidelines

Axes and Key Actions	Object	Subject	Ploeg Classification
Axis 1 Improving the competitiveness of the agriculture and forestry sector			
(i) Restructuring and modernisation of the agricultural sector	Comp.	Agri.	D/R
(ii) Improving integration of the agrifood chain	Comp.	Agri-food	D/R
(iii) Facilitating innovation and access to research and development	Comp.	Agri-food-forest	D/R
(iv) Encouraging take-up and diffusion of ICT	Comp.	Agri-food	D/R
(v) Fostering dynamic entrepreneurship	Comp.	Agri.	D/R
(vi) Developing new outlets for agriculture and forestry products	Mark.	Agri-forestf	D/R
(vii) Improving environmental performance of farms and forestry	Env./Comp.	Agri-forest	R?
Axis 2: Improving the Environment and the Countryside			
(i) Promoting environmental practices and animal-friendly farming practices	Env.	Agri.	
(ii) Preserving farmed landscape and forest	Env.	Agri-forest	
(iii) Combating climate change	Env.	Agri-forest	
(iv) Consolidating the contribution of organic farming	Env.	Agri.	
(v) Encouraging environmental/economic win-win intiatives	Env./Comp	Agri.	
(vi) Promoting territorial balance	Cohes.	Territ.	
Axis 3: Improving the quality of life in rural areas and encouraging diversification of the rural economy			
(i) Raising economic activity and employment rates in the wider economy	QoL/Cohes.	Territ.	
(ii) Encouraging entry of women into the labour market	Cohes.	Territ.	
(iii) Putting the heart back into villages	QoL	Territ.	B?
(iv) Developing micro-businesses and crafts	Divers.	Territ.	B
(v) Training young people	Hum.Cap.	Territ.	
(vi) Encouraging take-up and diffusion of ICT	Divers.	Territ.	B/D?
(vii)Developing the provision and innovative use of renewable energy sources	Divers./Env.	Agri./Territ.	B
(viii) Encouraging the development of tourism	Divers.	Territ.	B
(ix) Upgrading local infrastructure	QoL/Divers/ Comp.	Agri./territ.	B/D

Key:

Object:
Comp. – Competitiveness
Mark. – Support for marketing of agric. Produce.
Env.– Protecting or enhancing the environment
Divers. – Diversification
QoL – Quality of Life
Hum. Cap. – Enhancing Human Capital
Cohes. – Strengthening Cohesion

Subject:
Agri. – Directed mainly to farmers
Food – Available to food sector companies
Forest – Available to the forestry sector
Territ. – Available to all sectors, or non-sectoral bodies

Ploeg Classification:
D = Deepening,
B = Broadening,
R = Regrounding

Source: RDR 1698/2005, own classification.

ad (iv): Handbook on Common Monitoring and Evaluation Framework, (CMEF) Guidance document and Commission Factsheet "The EU Rural Development Policy 2007-2013"

The CMEF Guidance Document, published in September 2006, is of interest here, since it provides a classification of objectives and measures, not only by Axis, but according to 9 themes within the axes. These themes also feature in the Commission Factsheet "The EU Rural

Development Policy 2007-2013". In this version the measures of Axis 2 are grouped in a slightly different way to that shown in the CMEF.

The CMEF handbook explains the purpose of the hierarchy of objectives:

"A hierarchy of objectives is a tool that helps to analyse and communicate programme objectives and shows how local interventions should contribute to global objectives. It organizes these objectives into different levels (objectives, sub-objectives) in the form of a hierarchy or tree, thus showing the logical links between the objectives and their sub-objectives. It presents in a synthetic manner the various intervention logics derived from the regulation, that link individual actions and measures to the overall goals of the intervention." (CMEF Note d p6)

The "intervention logic" provides a very important insight into the Commission's view

Table A 6: Axes, themes and measures – Commission Factsheet: EU Rural Development Policy 2007-2013

Code	Theme and /Measure Names	Object	Subject
	Axis 1		
11	Human resources:		
111	Vocational training and information actions	Hum.Cap..	Agri. Food. For.
112	Young farmers	Hum.Cap.	Agri.
113	Early retirement	Hum.Cap.	Agri.
114	Use of farm advisory services	Comp./Hum.Cap.	Agri.
115	Setting up of farm management, relief and advisory and forestry advisory services	Comp./Hum.Cap.	Agri. For.
12	Physical capital:		
121	Farm/forestry investments	Comp.	Agri. For.
122	Improvement of economic value of forests	Comp.	For.
123	Processing and marketing	Qual./Comp.	Agri. For. Food
124	Co-operation for innovation	Comp.	Agri. Food
125	Agricultural/forestry infrastructure	Comp.	Agri. For.
126	Restoring agricultural production potential	Comp/Env.	Agri.
13	Quality of agricultural production and products:		
131	Meeting standards temporary support	Comp/Hum.Cap.	Agri.
132	Food quality incentive scheme	Qual/Comp	Agri.
133	Food quality promotion	Qual/Comp.	Agri.
14	Transitional measures:		
141	Semi-subsistence (only for new MS)	Comp.	Agri.
142	Setting-up producer groups (only for new MS)	Comp./Hum.Cap.	Agri.
	Axis 2		
21	Sustainable use of agricultural land:		
211	Mountain LFA	Env./Sust. Ag..	Agri.
212	Other areas with handicaps	Env./Sust.Ag..	Agri.
213	Natura 2000 agricultural areas	Env.	Agri.
214	Agri-environment	Env.	Agri.
215	Animal welfare (compulsory)	Env.	Agri.
216	Support for non-productive investments	Env.	Agri.
22	Sustainable use of forest land:		Agri.

Code	Theme and /Measure Names	Object	Subject
221	Afforestation of agricultural land	Env./Divers.	For.
222	Agroforestry establishment	Env./Divers.	For./Agri.
223	Afforestation of non-agricultural land	Env./Divers.	For.
224	Natura 2000 forest areas	Env.	For.
225	Forest environment	Env.	For.
226	Restoring forestry prodution potential	Env.	For.
227	Support for non-productive investments	Env.	Agri./For.
	Axis 3		
31	Economic diversification:		
311	Diversification to non-agricultural activities	Divers.	Agri.
312	Support for micro-enterprises	Diverse/Comp.	Territ.
313	Encouragement of tourism activities	Divers.	Territ.
32	Quality of life:		
321	Basic services for the rural economy and population (setting up and infrastructure)	QoL	Territ.
322	Renovation and development of villages	QoL	Territ.
323	Protection and conservation of the rural heritage	QoL	Territ.
33-34	Training, skills acquisition and animation:		
331	Training and information	Hum.Cap.	Territ.
341	Skills acquisition, animation and implementation	Hum.Cap.	Territ.
	Axis 4		
41	Local Development Strategies		Territ
421	Cooperation Projects	Mixed	Territ.
431	Skills and animation of LAGs		Territ.

Key:

Object:
Comp. – Competitiveness
Qual. – Support for quality products.
Env. – Protecting or enhancing the environment
Divers. – Diversification
QoL – Quality of Life
Hum. Cap. – Enhancing Human Capital
Sust. Ag. – Sustainable Agriculture

Subject:
Agri. – Directed mainly to farmers
Food – Available to food sector companies
Forest – Available to the forestry sector
Territ. – Available to all sectors, or non-sectoral bodies

Source: http://ec.europa.eu/agriculture/publi/fact/rurdev2007/en_2007.pdf.

of the Generic Policy Issues which are our concern here. Table A 6 shows the list of themes and measures (Factsheet version), with the additional classification (as above) by "object" and "subject". The categories are the same as in the Community Strategic Guidelines with two exceptions; marketing is replaced by support for quality products (Qual.), whilst cohesion is replaced by Sustainable Agriculture (Sust. Ag.). There are two fewer "object" classifications (7) than there are "themes" in the Commission Factsheet classification (9).[15]

15 Note: The three measures within the fourth (LEADER) axis are primarily concerned with implementation, and supporting local capacity. However certain MS (such as IE and ES) present their entire rural development programmes under the legal framework of the fourth axis. However the detail of the structure and specific objectives of these programmes remains (in the words of the Commission Factsheet p16) "within the scope of the 3 thematic axes". Whilst the technical/administrative role of the fourth axis in such programmes is fully recognised, the specific policy objectives of the interventions, (the focus here), link back to the Axis 1-3 measures for which, in these cases, Axis 4 provides an alternative, more integrated, vehicle for delivery.

Annex 2: New 2008 NUTS regions where no data are available in Eurostat's New Cronos Database (April 2008)

In order to reduce the current data losses caused by the NUTS 2008 revision, the 2008 NUTS regions that came into effect by splitting 2003 NUTS regions have been assigned to the corresponding individual 2003 NUTS region. Furthermore, the 2008 NUTS regions that came into effect as a result of minor border changes (visually recognised by comparing old and new regions within a GIS) within NUTS 2003 regions have been assigned to the NUTS 2003 region whose area corresponds for the most part to the new NUTS 2008 area (see the TERA-SIAP database for NUTS 2003 to NUTS 2008 reference table). As result, only the regions depicted in Table A 7 could not be assigned properly to any NUTS 2003 region.

Table A 7: New 2008 NUTS regions where no data are available in Eurostat's NEW Cronos Database (April 2008)

NUTS 0	NUTS Level	New 2008 NUTS regions
BG	Extra_Regio	BGZZ
		BGZZZ
	NUTS 1	BG3
		BG4
		BGZ
DE	NUTS 2	DEE0
	NUTS 3	DEE01
		DEE05
		DEE06
		DEE07
		DEE08
		DEE09
		DEE0A
		DEE0B
		DEE0C
		DEE0E
DK	NUTS 3	DK011
		DK012
		DK013
		DK021
		DK022
		DK032
		DK041
		DK042
		DK050

NUTS 0	NUTS Level	New 2008 NUTS regions
PL	NUTS 3	PL114
		PL115
		PL116
		PL117
		PL128
		PL129
		PL12A
		PL214
		PL215
		PL216
		PL217
		PL343
		PL344
		PL345
		PL416
		PL417
		PL418
		PL516
		PL518
		PL613
		PL614
		PL615
RO	Extra_Regio	ROZZ
		ROZZZ
	NUTS 1	ROZ

Annex 3: Selected CMEF indicators

Table A 8: CMEF objective-related baseline indicators

AXIS			Indicator	Measurement	Available in	NUTS level
Horizontal	*	1	Economic development	GDP/capita (EU-25 = 100)	Eurostat	NUTS 3
	*	2	Employment rate	Employed persons as a share of total population of the same age class	Eurostat	NUTS 2
	*	3	Unemployment	Rate of unemployment (% active population)	Eurostat	NUTS 3
AXIS 1, Improving the competitiveness of the agricultural and forestry sector	*	4	Training and education in agriculture	% farmers with basic and full education attained	Eurostat	NUTS 2/3
		5	Age structure in agriculture	Ratio : % farmers < 35 / >= 55 years old	Eurostat	NUTS 2/3
	*	6	Labour productivity in agriculture	GVA / AWU - total and by sector.	Eurostat / DG AGRI-FADN	NUTS 2 / NUTS 0
		7	Gross fixed capital formation in agriculture	GFCF in agriculture	Eurostat	NUTS 0 / 2
		8	Employment development of primary sector	Employment in primary sector	Eurostat	NUTS 2
		9	Economic development of primary sector	GVA in primary sector	Eurostat	NUTS 2
	*	10	Labour productivity in food industry	GVA /employee in food industry	Eurostat	NUTS 0
		11	Gross fixed capital formation in food industry	GFCF in food industry	Eurostat	NUTS 0
		12	Employment development in food industry	Employment in food industry	Eurostat	NUTS 0
		13	Economic development of food industry	GVA in food industry	Eurostat	NUTS 0
	*	14	Labour productivity in forestry	GVA /employee in forestry	Eurostat	NUTS 0
		15	Gross fixed capital formation in forestry	GFCF in forestry	Eurostat	NUTS 0
		16	Importance of semi-subsistence farming in NMS	Number of farms < 1 ESU	Eurostat	NUTS 2/3
AXIS 2, Improving the environment and the countryside through land management	*	17	Biodiversity: Population of farmland birds	Trends of index of population of farmland birds	Eurostat	NUTS 0
	*	18	Biodiversity: High Nature Value farmland areas	UAA of High Nature Value Farmland areas	EEA	NUTS 0
		19	Biodiversity: Tree species composition	Distribution of species group by area of FOWL (% coniferous/% broadleaved/%mixed)	MCPFE 2003	NUTS 0
	*	20	Water quality: Gross Nutrient Balances	Surplus of nitrogen in kg/ha	OECD	NUTS 0
				Surplu of phosphorus in kg/ha	OECD	NUTS0
		21	Water quality: Pollution by nitrates and pesticides	Annual trends in the concentrations of nitrate in ground and surface waters	EEA	NUTS 0
				Annual trends in the concentrations of pesticides in ground and surface waters	EEA	NUTS 0
		22	Soil: Areas at risk of soil erosion	Areas at risk of soil erosion (classes of T/ha/year)	JRC	NUTS 3
		23	Soil: Organic farming	UAA under organic farming	Organic Center Wales / Eurostat / DG AGRI	NUTS 0 / NUTS 1/2
	*	24	Climate change: Production of renewable energy from agriculture and forestry	Production of renewable energy from agriculture (ktoe)	EurObserER/DG AGRI	NUTS 0
				Production of renewable energy from forestry (ktoe)	Eurostat	NUTS 0
		25	Climate change: UAA devoted to renewable energy	UAA devoted to energy and biomass crops	DG AGRI	NUTS 0
		26	Climate change: GHG emissions from agriculture	Agricultural emissions of GHG (ktoe)	Eurostat	NUTS 0
AXIS 3, Improving the quality of life in rural areas and encouraging the diversification of economic activity	*	27	Farmers with other gainful activity	% holders with other gainful activity	Eurostat	NUTS 2/3
	*	28	Employment development of non-agricultural sector	Employment in secondary and tertiary sectors	Eurostat	NUTS 3
	*	29	Economic development of non-agricultural sector	GVA in secondary and tertiary sectors	Eurostat	NUTS 3
	*	30	Self-employment development	Self-employed persons	Eurostat	NUTS 2
		31	Tourism infrastructure in rural area	Number of bedplaces (in hotels, campings, holiday dwellings, etc)	Eurostat	NUTS 3
	*	32	Internet take-up in rural areas	% population having subscribed to DSL internet	DG INFSO	NUTS 0
	*	33	Development of services sector	% GVA in services	Eurostat	NUTS 3
		34	Net migration	Net migration rate	Eurostat	NUTS 2
	*	35	Life-long learning in rural areas	% of population of adults participating in education and training	Eurostat	NUTS 2
AXIS 4, LEADER	*	36	Development of Local Action Groups	Share of population covered by Local Action Groups	DG AGRI	NUTS 0

Source: DG AGRI.L2.

Table A 9: CMEF context-related baseline indicators

AXIS		Indicator	Measurement	Available in	NUTS level
Horizontal	1	Designation of rural areas	Designation of rural areas with OECD methodology	Eurostat/DG AGRI	NUTS 3
	2	Importance of rural areas	% territory in rural areas	Eurostat	NUTS 2
			% population in rural areas	Eurostat	NUTS 2
			% GVA in rural areas	Eurostat	NUTS 2
			% employment in rural areas	Eurostat	NUTS 2
AXIS 1, Improving the competitiveness of the agricultural and forestry sector	3	Agricultural land use	% arable area / permanent grass / permanent crops	Eurostat	NUTS 2/3
	4	Farm structure	Number of farms	Eurostat	NUTS 2/3
			Utilized agricultural area	Eurostat	NUTS 2/3
			Average area farm size and distribution	Eurostat	NUTS 2/3
			Average economic farm size and distribution	Eurostat	NUTS 2/3
			Labour Force	Eurostat	NUTS 2/3
	5	Forestry structure	Area of forest available for wood supply (FAWS)	Eurostat	NUTS 0
			Ownership (% area of FAWS under "eligible" ownership)	Eurostat	NUTS 0
			Average size of private holding (FOWL)	MCPFE 2003	NUTS 0
	6	Forest productivity	Average net annual volume increment (FAWS)	Eurostat	NUTS 0
AXIS 2, Improving the environment and the countryside through land management	7	Land cover	% area in agricultural / forest / natural / artificial	CLC 2000	NUTS 3
	8	LFA	% UAA in non LFA / LFA mountain / other LFA / LFA with specific handicaps	Eurostat/DG AGRI	NUTS 3
	9	Areas of extensive agriculture	% UAA for extensive arable crops	Eurostat	NUTS 1/2
			% UAA for extensive grazing	Eurostat	NUTS 1/2
	10	Natura 2000 area	% territory under Natura 2000	DG ENV	NUTS 0
			% UAA under Natura 2000	EEA	NUTS 2
			% forest area under Natura 2000	EEA	NUTS 0
	11	Biodiversity: Protected forest	% FOWL protected to conserve biodiversity, landscapes and specific natural elements (MCPFE 4.9, classes 1.1, 1.2, 1.3 & 2)	MCPFE 2003	NUTS 0
	12	Development of forest area	Average annual increase of forest and other wooded land areas	FRA 2005	NUTS 0
	13	Forest ecosystem health	% trees / conifers / broadleaved in defoliation classes 2-4	ICP Forest	NUTS 0
	14	Water quality	% territory designated as Nitrate Vulnerable Zone	DG ENV	NUTS 0
	15	Water use	% irrigated UAA	Eurostat	NUTS 2/3
	16	Protective forests concerning primarily soil and water	FOWL area managed primarily for soil & water protection (MCPFE 5.1 class 3.1)	MCPFE 2003	NUTS 0
AXIS 3, Improving the quality of life in rural areas and encouraging the diversification of economic activity	17	Population density	Population density	Eurostat	NUTS 3
	18	Age structure	% people aged (0-14) y.o. / (15-64) y.o. / >=65 y.o. in total population	Eurostat	NUTS 3
	19	Structure of the Economy	% GVA by branch (Primary / Secondary / Tertiary sector)	Eurostat	NUTS 3
	20	Structure of Employment	% employment by branch (Primary / Secondary / Tertiary sector)	Eurostat	NUTS 3
	21	Long-term unemployment	% Long-term unemployment (as a share of active population)	Eurostat	NUTS 2
	22	Educational attainment	% adults (25_64) with Medium & High educational attainment	Eurostat	NUTS 2
	23	Internet infrastructure	DSL coverage	DG INFSO	NUTS 0

Source: DG AGRI.L2.

Annex 4: Description of the Simple Data Mapping Tool (SDMT)

Graphical Database Interface – SDMT

The Simple Data Mapping Tool was developed within the vTI Institute for Rural Studies using the programming language PERL. The interface is capable of visualizing space-oriented SQL queries. With this interface, the spatial distribution of single attributes/indicators contained in a MS Access database can easily be classified and visualised on screen. The tool is intended to be able to produce an easily understandable 'on the fly' overview of data distribution, and not to perform sophisticated spatial analyses or to produce publication quality maps.

1. SDMT copyright notice

The program SDMT Version 1.0 is free software; it can be redistributed and/or modified, provided that all of the original copyright notices and associated disclaimers are duplicated, but no new copyright restrictions or commercial licences may be imposed on the program or its modifications. The program itself remains the sole property of the vTI. The vTI and the author of the program, Dr. S. Neumeier, explicitly advise that the program SDMT Version 1.0 is distributed in the hope that it will be useful, but ABSOLUTELY WITHOUT ANY WARRANTY; without even the implied warranty of MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. The vTI and author of the program are under no circumstances responsible for any damages caused by installing and/or using the program (this also includes data loss and other secondary damages).

2. SDMT – functionality

Figure A 1 depicts the workflow for using the SDMT. Figure A 2 and Figure A 3 introduce the graphical user interface. Within the program, the help menu may be consulted in order to get a detailed description of what a menu item or button is meant for.

2.1 File menu

Load reference regions

The menu "load reference regions" enables the loading of regions to the map window for which data shall be visualised. In order to be able to load regions, a csv-file containing information about the region-polygons is needed. The file must have following format:

ID#region name#x1,y1,x2,y2,…,xn,yn

(region ID#region name#coordinates of the vertices of region polygons).

The start vertex must not be stated at the end of the coordinate string again. Island polygons may cause problems if one of its vertices is connected to the outer polygon.

If one wants or is required to insert a copyright notice for the reference regions to be displayed on screen and in printouts, this can easily be achieved by inserting a plain text file into the folder containing the reference regions called "copyright.txt" with a one line copyright notice.

For example:

© EuroGeographics for the administrative boundaries

Load csv – text file

It is possible to load a csv text file containing attribute information that have been saved on file. The text file must have following format in order to be readable:

Regio ID#Value 1, Value 2, …., Value n; Header = column name

Figure A 1: Workflow for using SDMT

Figure A 2 Graphical user interface SDMT – database mode – version 0.1

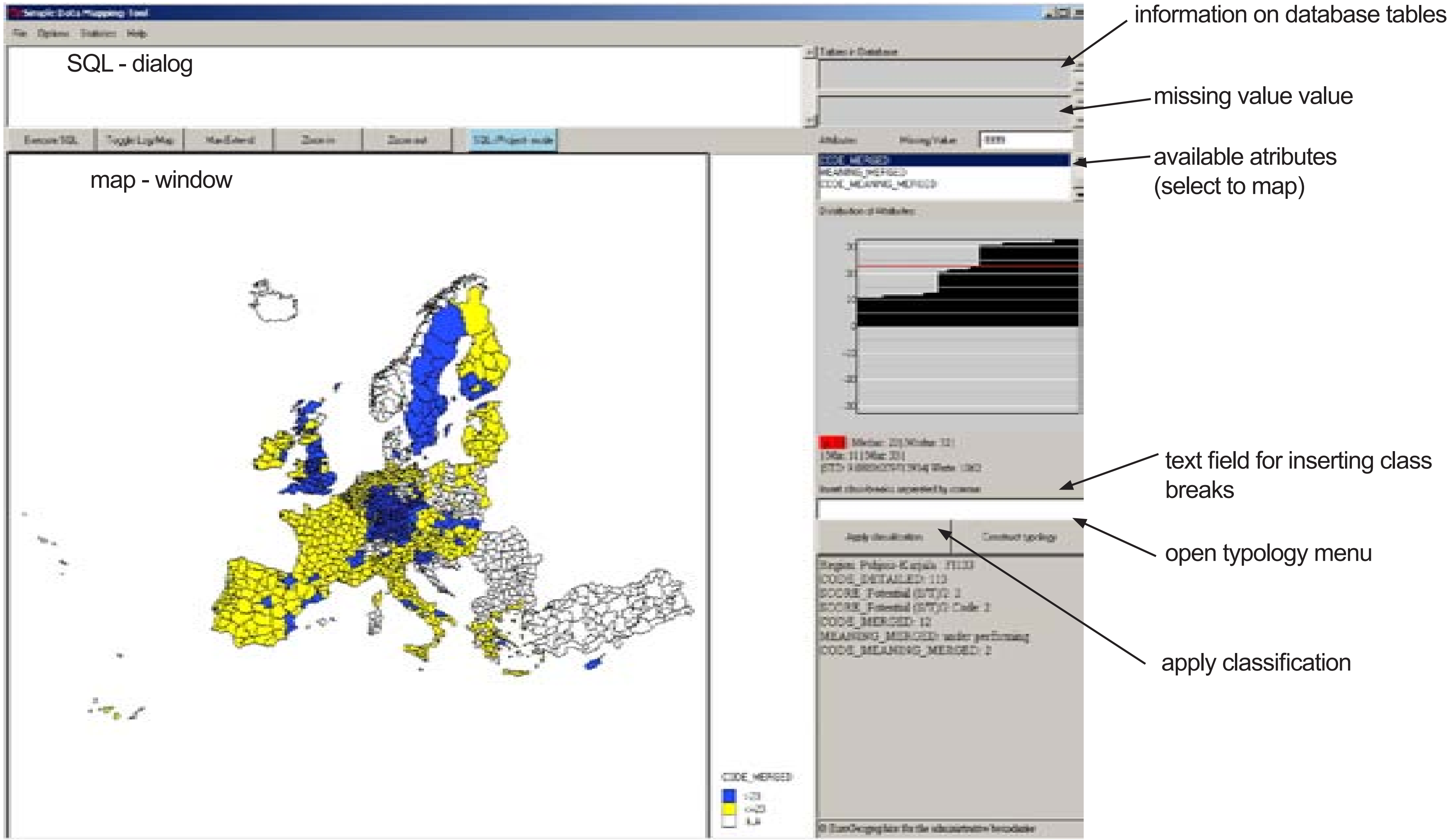
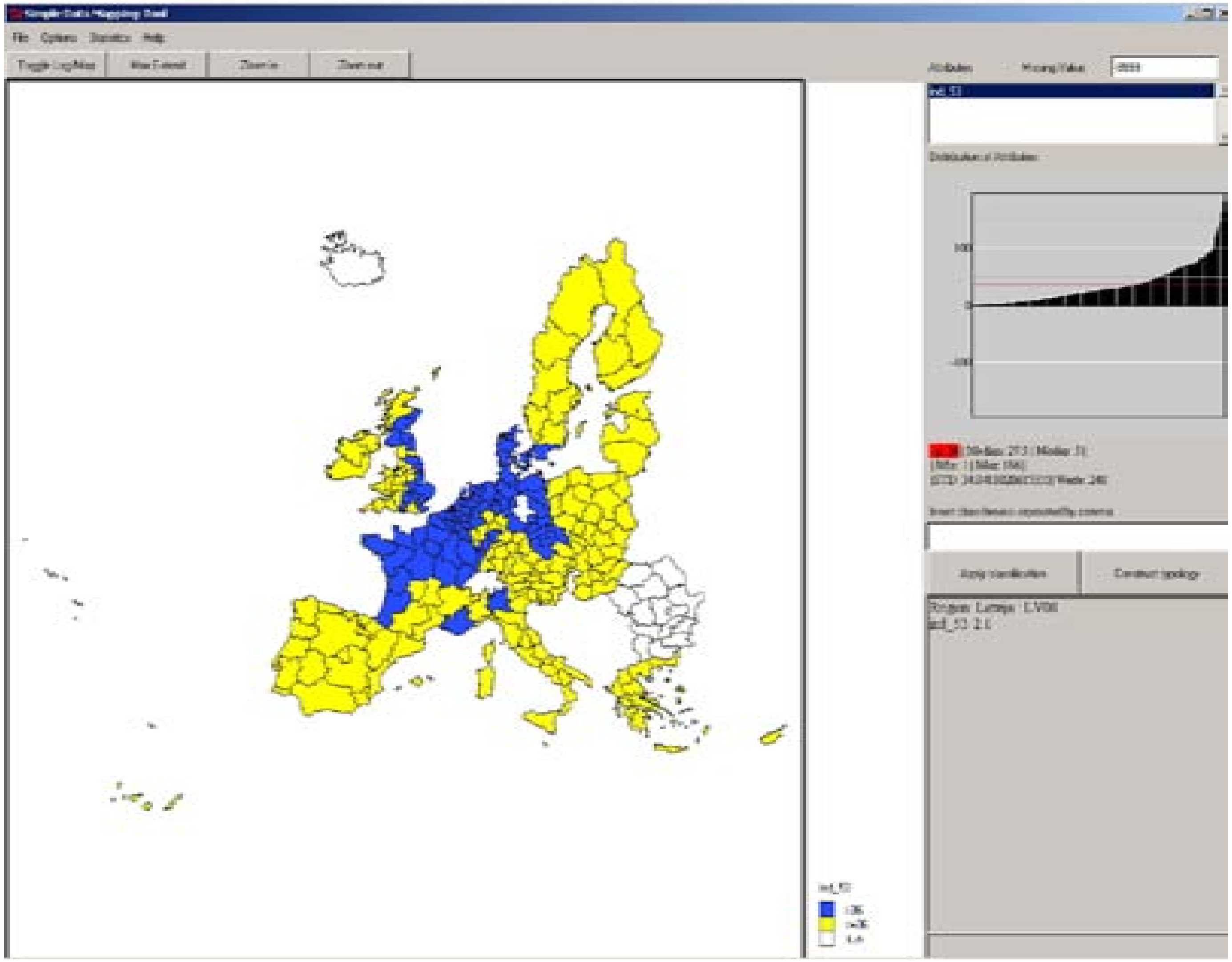


Figure A 3: Graphical user interface SDMT – CSV-file-mode – version 0.1



For example:

GEO, Income, Population	(Header; must exist)
DE12, 35000, 300	(first data set)
DE13,25000, 350	(second data set)

Save attributes as csv

Via the item "save attributes to csv" attribute data acquired by an SQL query can be saved to a text file so that they can easily be imported into a spreadsheet application or reloaded (load csv – text file) within a future program session. The resulting file will have following format:

Regio ID#Value 1, Value 2, …., Value n; Header = column name

Save SQL-log

The program automatically saves all executed SQL queries internally. In order to be able to document the executed queries it is possible to save the internal SQL-history to a plain text file via the menu item "save SQL-log".

Load SQL-log

A SQL history saved during a prior program session can be loaded for use in the current program session.

Print map as postscript

The current visible map can be printed as a postscript. With the help of programs like Adobe Acrobat or ghostscript, it is possible to convert the resulting *.ps file to a pdf file printable on every Windows printer. By printing the map – window output, the map legend, as well as a copyright notice (if applicable), will be printed to the resulting *.ps file too.

Close

The "close" menu item quits the program. There is no dialog asking if you want to save any queries or sql-histories or if you really want to quit.

2.2 Option menu

Show administrative boundaries

With the item "Show administrative boundaries", it is possible to load additional polygon layers containing, for example, superordinate region boundaries. The boundary file to be loaded must have the same format as the initial region file.

By choosing to load an additional polygon file, the user will be prompted to choose a display colour by a colour dialog. If no colour is chosen, the polygon layer will be displayed in black. (At present it is not able to manually determine the line width).

Hide administrative boundaries

With the item "Hide administrative boundaries", it is possible to unload a loaded additional polygon layer.

Connect to access database

This menu item allows the program to connect to a MS Access database. Before one is able to choose the database to connect to, a dialog asking about user id and password is shown. As the handling of password-protected MS Access databases is not yet implemented, the dialog can be ignored by simply pressing the connect button.

Attention: It is important that the database to be chosen is correctly registered as a Windows System database. Otherwise, the program will not be able to connect to the database. In order to register a MS Access database as a Windows

SystemWS database, you have to follow the below description with administrator privileges:

Start->System->Administration->Datasources (ODBC)-> System DSN-> Add-> Microsoft Access Driver-> Insert datasource name (e.g. name of database) + choose database via "Select" -> OK->OK->OK

If you are not able to connect the SDMT to the database, please repeat the described steps (sometimes it may help to add a USER DSN, too) or ask your system administrator to help you.

If one is running several instances of the SDMT, trying to connect to a database sometimes results in a termination of the SDMT program.

Once successfully connected to a database, a special database menu appears that is hidden when working with csv-files only. The button "Build SQL query" allows you to build a simple select query. After the query has been built, it can be executed via the "Execute SQL" button.

Instead of using the simple SQL-query-building dialog, you can also insert more complex SQL-statements in the SQL-text-field. Be careful that the first selected item is always the geocode linking attributes to map geometries. To execute manually inserted SQL-code, press the button "Execute SQL".

Attention:

The two grey listboxes besides the SQL-text-field are only meant to show you the tables as well as fields within a selected table of the database you are connected to. They do not have any additional functionality and are not meant for selecting items.

Define own class colours

This menu opens a window where custom colours for predefined classes can be entered. The colours can be entered manually by inserting the colour name or by choosing the desired colour from a colour dialog that will open when a right mouse click is performed in the text entry area.

2.3 Toggle SQL-history / map

This button toggles between map-view and SQL-history/console error message view. The SQL-history allows to copy a saved SQL-code and paste it to the SQL-dialog (see Figure A 4).

Attention:

You can enter your own text in the SQL-history-text-field. But the text is not saved, and is eradicated by the next execution of a SQL-statement or switching back and forth between map-view and SQL-history-view unless you explicitly save the content of the SQL-history to a file.

2.4 Toggle SQL-mode / project–mode (only if connected to database)

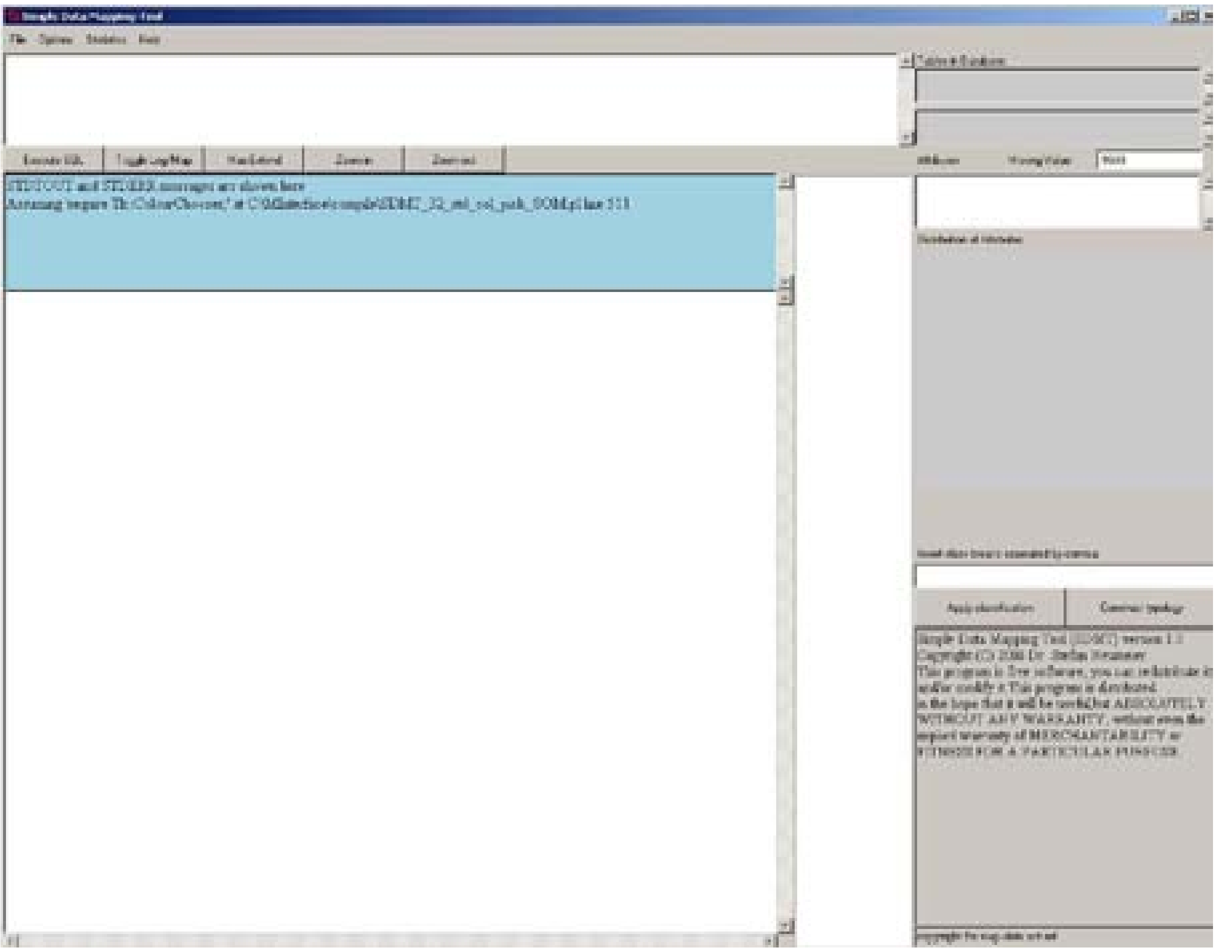
This button appears if a project file exists within the folder containing the reference regions and a database connection is established. Pressing the button will switch on the project mode (see Figure A 5) which allows the user to directly select one indicator to be displayed when clicking on the indicator entry. The project file is a file that references single indicators contained in the database so that single indicators or themes can easily be loaded without retrieving them by an SQL-query. Only one project file per folder is allowed. The file must be named "project.txt" and must have the following structure:

Name of field with geocode

Name of column in database# Name of Table# Description of indicator/ theme

Name of column in database# Name of Table# Description of indicator/ theme

Figure A 4: SDMT showing SQL-history and console error messages instead of map



Name of column in database# Name of Table# Description of indicator/ theme

…

For example:

GEO_2006

IND_1#Testtable#Net migration rate 2000-2005 per 1000 inhabitants (based on population 1st January)

IND_2#Testtable#Percentage share of population 0-14 to total population 2005 (UK: 2003; FR, IT: 2004)

IND_3#Testtable#Percentage share of population 15-24 to total population 2005 (UK: 2003; FR, IT: 2004)

By double clicking on an indicator name within the project listbox, the indicator is loaded and can be displayed.

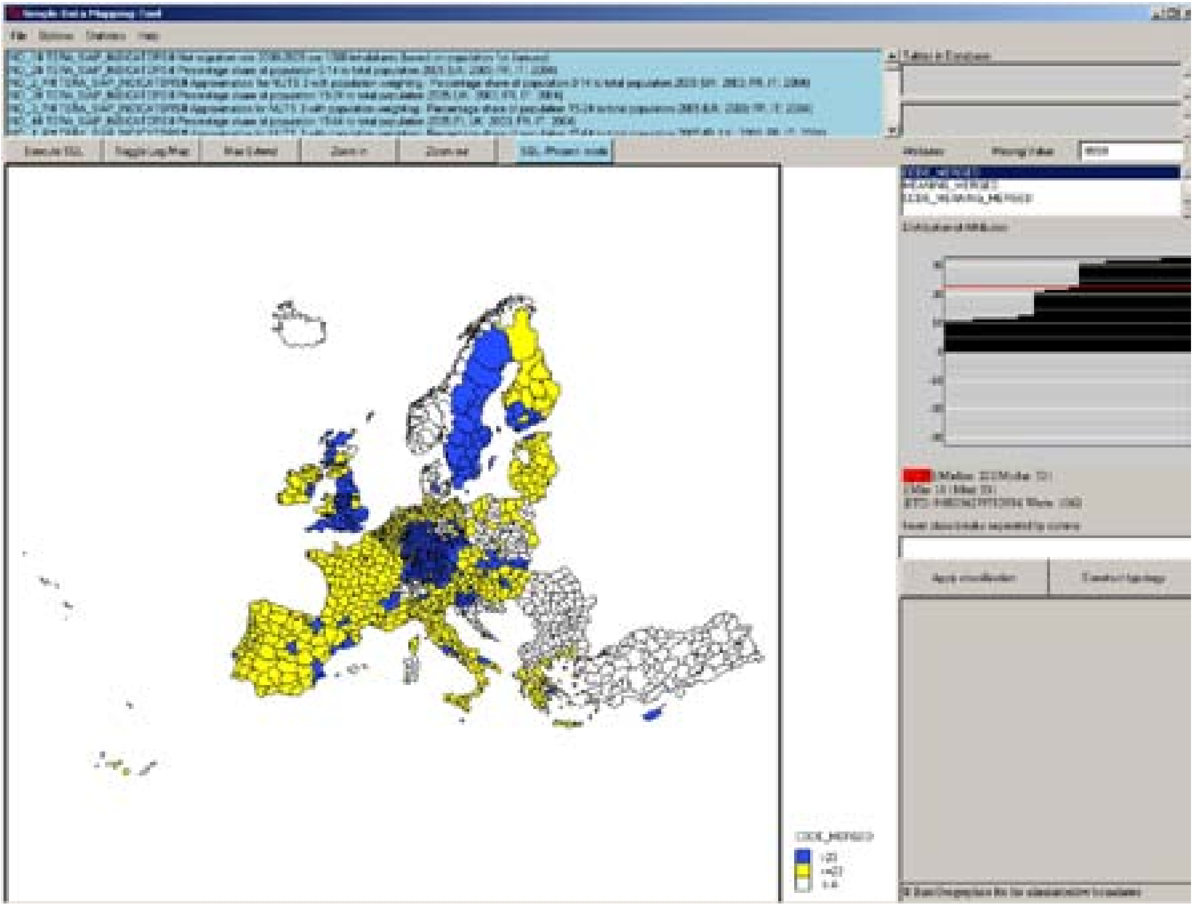
Attention:

You can only load values for the regions displayed. (Only one indicator can be loaded via the project dialog). If no values are mapped, you are likely trying to load for example NUTS3 data in NUTS2 regions.

Attention:

The function only works if a connection to the database containing the indicators listed in the project file has been established and the structure of the project file is in accordance with the above stated rules.

Figure A 5: SDMT showing project-mode instead of SQL-mode



2.5 Data classification

Initially, the chosen data is displayed as “no data”, “average”, “below average” and “above average”. By inserting class breaks separated by commas, it is possible to classify the data displayed in the map manually. The diagram showing the value distribution as well as the statistic indicators stated below the diagram may be helpful for choosing appropriate class breaks. In order to function correctly, missing value values have to be specified correctly (i.e. if they are shown as for example -9999.0 in the database you also have to insert -9999.0). Otherwise, the diagram, statistics and initial map display are not shown correctly as no data values are also included in the statistical computations. With the option menu item “define own class colours”, you can alter the colour of the displayed classes manually after performing the classification.

2.6 Info dialog

If data are loaded and the mouse is moved in the map window, information about the region below the cursor is displayed in the info-dialog (region name, values of all attributes shown in the attribute listbox). If you click in the info dialog with the mouse (right click), you are able to scroll through the text in the dialog via the arrow keys.

2.7 Cluster analysis

The menu “Cluster Analysis” is still experimental and allows one to perform a simple k-means, as well as SOM cluster analysis, on the data contained in the attribute listbox. Please note that in order to function correctly missing value values have to be specified correctly. The output is written to a txt-file (your filename_OUT.

txt). Before the cluster analysis is performed, the data of each theme to be incorporated will be subjected to a z-transformation ([single value mean of all valid values]/standard deviation). The resulting new values will be saved to a .txt file (your filename_IN.txt).

For more information about the clustering functions and its input values please see:

http://bonsai.ims.u-tokyo.ac.jp/~mdehoon/software/cluster/cluster.pdf

2.8 Correlation matrix

All variables listed in the attribute listbox will be included in the computation of the correlation. Please load one more variable than needed, as at present the last loaded variable will –depending on the performed interactions with the program– not be included in the cluster analysis.

Before starting the calculation, a pairwise deletion of missing values will be performed. The following three correlation calculation methods can be chosen: Spearman, Kendall, Csim. The resulting correlation matrix will be saved on file and displayed in the log window.

2.9 Typology construction

With the button "Typology construction", it is possible to build a simple typology with the indicators contained in the "attributes listbox". There are three options for constructing typologies:

Typology 1: Typologies are constructed by dividing the indicators into three groups (above mean plus one standard deviation, between mean plus one standard deviation and mean minus one standard deviation, mean minus one standard deviation) and by building classes out of the possible "classified" indicator combinations. Indicators to be included have to be chosen by a SQL-Query. The Output will be saved as a csv-file (where the typology column has the header "Typology") and loaded in the "attribute listbox". By clicking on the "Typology" entry, the built typology will be visualised.

Typology 2: Values are converted to z-scores. Afterwards, means for each region are calculated based on these z-scores. This signifies that the means of the z-scores of all variables describing a region are calculated. The result is afterwards rounded so that the classes do not contain floating point numbers. The Output will be saved as a csv-file (where the typology column has the header "Typology") and loaded in the "attribute listbox". By clicking on the "Typology" entry the built typology will be visualised. Attention: the single variables that constitute the typology are shown in the listbox but cannot be selected as they do not contain valid numeric values. (They are necessary so that, on placing the mouse over events in the map window, the z-scores as well as original variable values can be shown in the "info -dialog" window.

Typology 3: The typology is constructed by calculating the Shannon diversity index based on the input variables of a region. The index is calculated as follows:

$$H' = -\sum p_i \ln(p_i)$$

H' = The Shannon - Diversity Index;

pi = the variable values (relative abundance of a phenomenon in a region);

The index is expressed as eH';

Attention:

The calculation of the diversity index can be quite time-consuming.

Annex 5: Typology statistics

Table A 10: Economic diversification typology statistics

Type of regions (code)	Accessibility (peripherality with respect to population by car, index)					GVA per AWU (1000 Euro/AWU)					Agricultural Employment (% of total employment)					Total population (in 1000)	No. of regions	No. Of regions in urban - rural classification types according to Poelman				
	MIN	MAX	AVG	‰	coeff of variation	MIN	MAX	AVG	‰	coeff of variation	MIN	MAX	AVG	‰	coeff of variation			PU	IR	IRR	PR	PRR
111	13,6	113,4	51,7	25,4	0,5	3,8	22,5	9,5	3,9	0,4	6,5	48,8	20,1	11,5	0,6	21644,3	79	1	16	2	28	32
112	30,5	117,5	75,1	29,6	0,4	3,1	12,7	6,7	2,5	0,4	5,1	50,4	20,8	12,9	0,6	4409,7	15	1	4	0	2	8
113	9,9	230,2	109,4	60,8	0,6	2,1	19,6	7,6	4,0	0,5	7,1	35,3	15,5	8,1	0,5	5049,6	31	5	6	2	7	11
121	19,0	131,5	54,1	23,2	0,4	2,3	14,5	7,7	3,4	0,4	6,8	37,6	16,8	9,6	0,6	12032,9	32	1	6	1	19	5
122	35,0	129,5	69,7	31,1	0,4	4,0	11,8	7,9	2,7	0,3	10,3	20,3	15,1	4,0	0,3	2563,3	10	0	1	1	4	4
123	61,2	169,9	99,6	35,2	0,4	3,9	13,8	7,2	3,0	0,4	8,0	29,5	15,6	7,3	0,5	1709,4	7	0	2	1	2	2
131	37,2	94,4	56,7	15,1	0,3	4,1	8,6	6,4	1,4	0,2	6,4	23,4	12,7	4,3	0,3	3733,3	13	0	4	0	6	3
132	77,2	104,8	91,0	19,5	0,2	5,4	12,0	8,7	4,7	0,5	13,0	20,6	16,8	5,3	0,3	211,5	2	0	0	0	1	1
133	23,4	123,4	82,3	32,6	0,4	1,3	8,2	4,6	2,2	0,5	5,9	28,5	19,8	7,3	0,4	1066,6	9	1	0	1	4	3
211	31,4	145,4	75,3	29,4	0,4	2,1	6,7	4,3	1,0	0,2	2,2	13,7	7,1	2,3	0,3	18965,8	42	0	26	1	12	3
212	52,6	182,5	103,9	34,1	0,3	2,0	6,7	4,2	1,2	0,3	4,8	15,5	7,5	2,4	0,3	8966,5	27	2	16	0	7	2
213	4,1	241,3	137,8	50,4	0,4	2,4	5,6	3,9	0,8	0,2	4,7	11,4	6,2	1,3	0,2	13456,0	50	7	27	0	12	4
221	29,0	92,5	49,1	16,8	0,3	2,4	6,3	4,2	1,0	0,2	3,7	10,5	6,7	2,0	0,3	11292,0	19	3	7	0	5	4
222	11,2	150,7	79,7	58,8	0,7	2,8	5,7	4,0	1,2	0,3	5,4	10,2	7,3	2,3	0,3	652,9	4	0	1	0	2	1
223	69,0	164,8	128,3	27,9	0,2	1,9	5,8	4,3	1,0	0,2	4,3	14,3	7,0	2,2	0,3	4013,2	23	3	6	0	12	2
231	12,2	122,9	58,8	25,9	0,4	1,6	6,0	4,0	1,1	0,3	3,3	12,9	7,0	2,5	0,4	13066,8	35	1	16	0	13	5
232	18,7	129,5	103,8	26,2	0,3	1,7	6,2	3,2	1,0	0,3	4,8	8,6	6,5	1,0	0,2	3211,1	21	0	8	0	10	3
233	41,7	179,9	109,1	33,1	0,3	1,0	4,9	2,7	0,8	0,3	4,8	15,4	7,4	3,0	0,4	4029,7	28	0	8	1	14	5
311	3,2	146,2	81,9	34,3	0,4	0,2	3,1	1,7	0,8	0,4	0,3	5,5	3,1	1,3	0,4	34435,3	41	17	22	0	2	0
312	74,7	169,9	129,0	19,9	0,2	0,0	3,3	1,3	1,0	0,8	0,1	8,0	2,3	1,9	0,8	35481,6	36	22	14	0	0	0
313	36,4	249,2	171,9	39,3	0,2	0,1	3,1	1,3	0,8	0,7	0,3	5,7	2,3	1,4	0,6	56558,4	127	88	30	1	6	2
321	47,4	105,4	77,3	19,0	0,2	0,0	2,5	1,3	0,9	0,7	0,5	7,3	3,1	1,9	0,6	16253,6	32	18	14	0	0	0
322	67,9	171,5	133,7	27,6	0,2	0,1	2,7	1,2	1,0	0,8	0,4	4,6	2,1	1,5	0,7	4342,9	17	9	7	0	1	0
323	38,4	175,2	132,7	36,8	0,3	0,1	3,1	1,3	0,9	0,7	0,3	4,9	2,3	1,4	0,6	12637,2	34	14	15	0	3	2
331	11,2	126,5	87,4	28,9	0,3	0,1	3,6	1,3	0,9	0,7	0,2	6,7	2,8	1,8	0,6	43395,1	107	53	42	0	10	2
332	24,8	169,0	110,9	24,5	0,2	-2,3	2,8	1,3	0,9	0,7	0,2	6,0	2,9	1,5	0,5	25253,2	83	31	36	2	11	3
333	63,6	212,2	140,8	27,8	0,2	-1,1	3,1	1,0	0,8	0,8	0,1	6,0	2,3	1,6	0,7	47868,4	153	82	47	1	20	3
all regions	3,2	249,2	109,4	50,1	0,5	-2,3	22,5	3,3	3,2	1,0	0,1	50,4	6,7	7,6	1,1	406300,3	1077	359	381	14	213	110

Note: The coefficient of variation is printed in bold if its value for a single type of region is greater than that for all regions

AVG: unweighted arithmetic mean

Table A10 continued

Type of regions (code)	Other Gainful Activity (% of total number of farm holders)					Bedplaces per Employees (per employee)					Availability and Proximity of Nature (index, EU 27 = 100)					Total population (in 1000)	No. of regions	No. Of regions in urban - rural classification types according to Poelman				
	MIN	MAX	AVG	‰	coeff of variation	MIN	MAX	AVG	‰	coeff of variation	MIN	MAX	AVG	‰	coeff of variation			PU	IR	IRR	PR	PRR
111	12,8	34,1	26,0	5,4	0,2	2,9	556,3	130,2	116,0	0,9	24,5	258,6	124,1	49,8	0,4	21644,3	79	1	16	2	28	32
112	16,4	31,1	25,0	3,8	0,2	30,2	598,3	232,6	206,8	0,9	95,2	283,9	177,3	58,8	0,3	4409,7	15	1	4	0	2	8
113	7,3	33,3	24,2	7,1	0,3	40,6	1814,5	493,9	473,1	1,0	29,3	270,5	162,8	74,5	0,5	5049,6	31	5	6	2	7	11
121	34,6	40,9	37,6	2,1	0,1	9,3	333,3	119,8	88,5	0,7	29,2	199,4	109,6	43,4	0,4	12032,9	32	1	6	1	19	5
122	35,2	40,6	36,6	2,0	0,1	19,1	492,4	262,3	157,1	0,6	74,7	251,7	165,5	56,9	0,3	2563,3	10	0	1	1	4	4
123	35,3	40,8	36,7	1,8	0,0	132,8	881,3	442,1	276,7	0,6	108,2	255,1	190,6	64,6	0,3	1709,4	7	0	2	1	2	2
131	41,0	73,2	49,7	8,7	0,2	19,2	216,0	100,3	55,4	0,6	56,1	192,6	124,5	47,4	0,4	3733,3	13	0	4	0	6	3
132	45,2	78,0	61,6	23,2	0,4	45,7	139,3	92,5	66,2	0,7	155,7	199,4	177,6	30,9	0,2	211,5	2	0	0	0	1	1
133	41,6	87,2	53,8	16,5	0,3	34,4	1446,3	566,3	549,7	1,0	151,9	348,2	233,1	58,2	0,2	1066,6	9	1	0	1	4	3
211	12,8	33,8	22,7	5,3	0,2	23,3	563,3	147,0	120,2	0,8	20,4	218,5	86,6	44,9	0,5	18965,8	42	0	26	1	12	3
212	12,2	33,6	24,4	5,8	0,2	11,0	640,6	228,4	173,7	0,8	10,7	229,6	106,0	53,7	0,5	8966,5	27	2	16	0	7	2
213	13,0	33,5	26,4	6,3	0,2	11,9	1260,4	409,2	367,6	0,9	8,1	254,7	117,5	69,1	0,6	13456,0	50	7	27	0	12	4
221	35,4	40,9	37,7	1,7	0,0	43,4	256,5	120,1	62,8	0,5	32,3	219,2	122,4	61,0	0,5	11292,0	19	3	7	0	5	4
222	35,7	38,5	37,1	1,5	0,0	33,1	418,0	176,9	166,9	0,9	40,7	257,8	166,5	93,6	0,6	652,9	4	0	1	0	2	1
223	35,3	39,4	36,4	1,3	0,0	34,2	1843,8	513,1	506,4	1,0	69,2	228,9	151,8	45,9	0,3	4013,2	23	3	6	0	12	2
231	41,4	72,6	47,2	7,3	0,2	26,0	536,5	104,5	90,6	0,9	36,8	208,4	110,6	43,7	0,4	13066,8	35	1	16	0	13	5
232	42,7	65,3	53,2	6,6	0,1	17,8	530,7	180,3	141,2	0,8	60,1	242,3	120,4	44,5	0,4	3211,1	21	0	8	0	10	3
233	41,2	88,9	52,2	10,8	0,2	43,3	1317,8	398,9	328,9	0,8	46,3	276,0	167,3	52,5	0,3	4029,7	28	0	8	1	14	5
311	12,4	34,2	23,4	4,8	0,2	25,1	376,8	131,9	97,9	0,7	19,0	235,3	95,4	51,9	0,5	34435,3	41	17	22	0	2	0
312	5,2	33,6	22,6	6,3	0,3	3,3	412,7	101,6	91,2	0,9	7,3	159,6	79,4	36,7	0,5	35481,6	36	22	14	0	0	0
313	8,9	33,3	24,1	6,8	0,3	11,8	1610,7	211,3	306,6	1,5	3,1	293,9	105,6	63,6	0,6	56558,4	127	88	30	1	6	2
321	34,8	40,7	38,5	1,9	0,0	13,3	266,6	90,5	68,7	0,8	35,9	210,9	96,5	39,4	0,4	16253,6	32	18	14	0	0	0
322	35,7	39,8	37,7	1,2	0,0	13,0	147,9	46,9	41,4	0,9	30,3	178,5	90,6	46,5	0,5	4342,9	17	9	7	0	1	0
323	34,3	39,8	37,5	1,4	0,0	18,0	1593,4	234,3	359,8	1,5	69,1	289,0	145,6	51,0	0,4	12637,2	34	14	15	0	3	2
331	41,4	73,7	49,1	7,7	0,2	10,7	392,0	67,9	60,5	0,9	26,0	247,9	94,7	48,6	0,5	43395,1	107	53	42	0	10	2
332	41,2	71,2	53,8	7,5	0,1	19,6	489,5	99,5	85,2	0,9	19,0	228,9	124,7	42,4	0,3	25253,2	83	31	36	2	11	3
333	41,6	94,6	54,0	7,7	0,1	10,4	696,9	122,2	125,2	1,0	26,7	319,6	142,3	49,8	0,3	47868,4	153	82	47	1	20	3
all regions	5,2	94,6	37,3	14,4	0,4	2,9	1843,8	187,0	252,9	1,4	3,1	348,2	121,7	58,9	0,5	406300,3	1077	359	381	14	213	110

Note: The coefficient of variation is printed in bold if its value for a single type of region is greater than that for all regions

AVG: unweighted arithmetic mean

Table A 11 : Human capital - territorial typology statistics

Type of regions (code)	ISCED 3 to 6 (% of population aged 25 years to 64 years)					Economic Activity Rate					Total population (in 1000)	No. of regions	No. Of regions in urban - rural classification types according to Poelman				
	MIN	MAX	AVG	‰	coeff of variation	MIN	MAX	AVG	‰	coeff of variation			PU	IR	IRR	PR	PRR
1	43,5	71,9	57,7	20,1	0,3	40,7	51,0	45,9	7,3	0,2	334,5	2	0	0	0	0	2
2	18,6	95,6	49,5	18,4	0,4	40,0	67,0	47,1	7,9	0,2	20979,7	52	8	15	3	7	19
3	21,7	94,8	54,5	17,7	0,3	46,1	67,0	53,0	5,3	0,1	38040,2	130	29	40	3	17	41
4	23,5	96,7	73,7	14,8	0,2	46,9	67,0	55,9	3,6	0,1	165628,6	425	145	144	8	95	33
6	41,1	96,7	78,7	9,2	0,1	51,3	68,1	59,5	3,1	0,1	171947,5	471	185	160	4	93	29
7	41,1	94,8	76,8	11,2	0,1	53,9	72,8	63,2	3,6	0,1	73788,0	179	48	75	4	36	16
8	45,1	94,5	75,6	16,9	0,2	60,7	74,1	64,9	4,2	0,1	5501,8	15	2	5	0	5	3
9	67,2	71,6	69,4	3,2	0,0	64,3	70,3	67,3	4,2	0,1	814,4	2	0	1	0	0	1
all regions	18,6	96,7	73,0	15,6	0,2	40,0	74,1	57,7	5,4	0,1	477034,7	1276	417	440	22	253	144

Type of regions (code)	Long Term Unemployment Rate					Population change between 1995 and 2005 (%)					Total population (in 1000)	No. of regions	No. Of regions in urban - rural classification types according to Poelman				
	MIN	MAX	AVG	‰	coeff of variation	MIN	MAX	AVG	‰	coeff of variation			PU	IR	IRR	PR	PRR
1	60,9	65,4	63,1	3,2	0,1	-25,5	-5,8	-15,7	14,0	-0,9	334,5	2	0	0	0	0	2
2	35,8	65,4	55,3	7,8	0,1	-29,2	5,4	-5,4	7,9	-1,5	20979,7	52	8	15	3	7	19
3	22,4	65,4	48,4	10,8	0,2	-22,7	10,3	-1,8	6,3	-3,4	38040,2	130	29	40	3	17	41
4	15,2	79,5	46,6	13,5	0,3	-15,6	17,8	-1,8	5,7	-3,1	165628,6	425	145	144	8	95	33
6	13,2	69,8	42,3	12,9	0,3	-8,0	19,4	3,1	4,2	1,4	171947,5	471	185	160	4	93	29
7	0,0	65,4	30,3	14,4	0,5	-6,2	31,0	8,4	6,5	0,8	73788,0	179	48	75	4	36	16
8	9,1	60,8	25,6	20,0	0,8	4,8	29,9	17,3	8,1	0,5	5501,8	15	2	5	0	5	3
9	29,9	43,1	36,5	9,3	0,3	32,7	37,6	35,2	3,5	0,1	814,4	2	0	1	0	1	0
all regions	0,0	79,5	43,0	14,5	0,3	-29,2	37,6	1,5	7,1	4,6	477034,7	1276	417	440	22	253	144

Note: The coefficient of variation is printed in bold if its value for a single type of region is greater than that for all regions

AVG: unweighted arithmetic mean

Table A 12: Human capital - sectoral typology statistics

Type of regions (code)	Managers with Agricultural Training (% of all farm holders)					Age Ratio Farm Holders (Holders < 35 / Holders > 55)					Total population (in 1000)	No. of regions	No. Of regions in urban - rural classification types according to Poelman				
	MIN	MAX	AVG	‰	coeff of variation	MIN	MAX	AVG	‰	coeff of variation			PU	IR	IRR	PR	PRR
12	0,3	19,5	10,2	5,3	0,5	0,0	1,3	0,1	0,2	1,2	86,7	267	53	92	11	39	72
13	12,7	12,7	12,7		0,0	1,7	1,7	1,7		0,0	285330,9	1	0	0	0	0	1
22	19,7	69,3	43,3	14,0	0,3	0,0	1,3	0,3	0,2	0,7	4315,9	474	122	171	8	118	55
23	20,2	59,3	34,1	11,9	0,4	1,4	29,7	7,0	10,2	1,5	33419,6	8	4	1	1	0	2
32	69,7	89,7	74,6	3,9	0,1	0,1	0,5	0,3	0,1	0,5	33419,6	145	53	61	0	31	0
all regions	0,0	89,7	30,6	21,9	0,7	0,0	1,6	0,2	0,2	0,8	356572,7	895	232	325	20	188	130

Note: The coefficient of variation is printed in bold if its value for a single type of region is greater than that for all regions

AVG: unweighted arithmetic mean

Table A 13: Farm competitiveness typology statistics

Type of regions (code)	GVA per AWU (1000 Euro/AWU)					GFCF in Agriculture (Mio. Euro)					Age Ratio Farmers (holders < 35 / holders > 55)					Total population (in 1000)	No. of regions	No. Of regions in urban - rural classification types according to Poelman				
	MIN	MAX	AVG	‰	coeff of variation	MIN	MAX	AVG	‰	coeff of variation	MIN	MAX	AVG	‰	coeff of variation			PU	IR	IRR	PR	PRR
11	1,4	22,5	8,6	4,6	0,5	40,0	6403,0	1555,0	1333,5	0,9	0,0	1,3	0,2	0,2	1,1	22614,9	94	1	20	4	17	52
12	0,1	18,6	6,1	3,9	0,6	77,1	4745,0	1867,0	1415,7	0,8	0,1	1,7	0,3	0,3	0,9	33868,0	91	7	20	3	32	29
13	1,1	18,1	6,9	7,9	1,1	223,9	4045,4	2134,7	2206,3	1,0	1,4	3,2	2,0	0,9	0,4	1003,2	4	1	1	1	0	1
21	0,2	15,7	4,6	3,3	0,7	86,2	28409,5	4384,0	5832,0	1,3	0,0	0,5	0,1	0,1	0,7	83031,9	138	37	63	6	20	12
22	-2,3	13,1	2,8	2,1	0,7	37,2	27616,0	5060,8	5077,8	1,0	0,0	1,1	0,3	0,2	0,6	98321,6	262	72	104	2	62	22
23	0,1	7,9	2,8	1,9	0,7	130,0	11991,0	4982,1	4647,2	0,9	0,1	29,7	0,6	3,1	5,0	22629,3	111	38	47	0	26	0
31	0,2	9,2	2,2	2,0	0,9	18148,0	37597,4	29646,9	5468,2	0,2	0,0	1,2	0,2	0,3	1,8	19927,5	20	11	7	0	1	1
32	0,0	13,7	1,7	2,6	1,5	1011,0	33429,1	19153,0	9800,6	0,5	0,0	0,5	0,2	0,1	0,6	40534,9	56	34	22	0	0	0
33	0,1	14,8	2,0	2,6	1,3	2255,3	37268,0	26247,5	14706,7	0,6	0,1	0,5	0,4	0,2	0,4	13990,1	37	18	14	0	5	0
all regions	-2,3	22,5	4,1	3,7	0,9	37,2	37597,4	6896,7	9403,8	1,4	0,0	29,7	0,3	1,2	4,1	335921,39	813	219	298	16	163	117

Type of regions (code)	Managers with Basic or Full Agricultural Training (%)					Time to Market by Road and Rail weighted by GDP - makro scale (index with EU 27 average = 100)					Total population (in 1000)	No. of regions	No. Of regions in urban - rural classification types according to Poelman				
	MIN	MAX	AVG	‰	coeff of variation	MIN	MAX	AVG	‰	coeff of variation			PU	IR	IRR	PR	PRR
11	0,4	19,4	8,7	5,4	0,6	307,9	395,6	358,7	20,2	0,1	22614,9	94	1	20	4	17	52
12	12,7	67,1	37,9	11,5	0,3	307,4	505,2	381,3	48,3	0,1	33868,0	91	7	20	3	32	29
13	25,2	34,0	29,7	3,6	0,1	336,4	424,8	394,5	40,0	0,1	1003,2	4	1	1	1	0	1
21	0,3	19,5	9,8	4,7	0,5	222,3	391,1	302,5	29,9	0,1	83031,9	138	37	63	6	20	12
22	21,9	69,0	50,0	11,9	0,2	222,1	368,0	288,6	30,2	0,1	98321,6	262	72	104	2	62	22
23	41,2	79,3	74,6	5,2	0,1	226,7	339,1	282,5	27,0	0,1	22629,3	111	38	47	0	26	0
31	3,8	19,4	14,7	3,9	0,3	220,9	339,2	264,7	29,9	0,1	19927,5	20	11	7	0	1	1
32	20,3	69,3	51,4	15,4	0,3	150,6	302,8	238,4	30,6	0,1	40534,9	56	34	22	0	0	0
33	69,7	89,7	73,0	3,6	0,0	189,6	302,6	256,2	28,2	0,1	13990,1	37	18	14	0	5	0
all regions	0,3	89,7	40,9	25,6	0,6	150,6	505,2	303,4	51,2	0,2	335921,39	813	219	298	16	163	117

Note: The coefficient of variation is printed in bold if its value for a single type of region is greater than that for all regions

AVG: unweighted arithmetic mean

Table A 14: Less favoured area typology statistics

Type of regions (code)	Less Favoured Areas (% of UAA)					Total population (in 1000)	No. of regions	N: Urban - Rural Classification according to Poelman				
	MIN	MAX	AVG	‰	coeff of variation			1	2	22	31	32
0%	0,0	0,0	0,0	0,0		100987,9	172	121	46	0	4	1
<= 20 %	0,0	19,4	8,5	6,4	0,7	56336,6	131	53	48	2	19	9
> 20 % - <= 40 %	20,3	39,9	30,6	5,1	0,2	88151,3	183	83	68	2	23	7
> 40 % - <= 60 %	40,3	59,8	48,6	6,1	0,1	74831,2	212	59	80	2	55	16
> 60 % - <= 80 %	60,1	79,8	69,9	5,5	0,1	45331,4	148	31	70	2	35	10
> 80 %	80,1	100,0	95,0	6,3	0,1	64616,6	277	37	62	13	76	89
all regions	0,0	100,0	47,8	35,0	0,7	430255,0	1123	384	374	21	212	132

Note: The coefficient of variation is printed in bold if its value for a single type of region is greater than that for all regions

AVG: unweighted arithmetic mean

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Title: Building a Typology of European Rural Areas for the Spatial Impact Assessment of Policies (TERA-SIAP)

Author(s): Peter Weingarten, Stefan Neumeier, Andrew Copus, Demetrios Psaltopoulos, Dimitris Skuras, Eudokia Balamou, Editors: Stefan Sieber and Tomáš Ratingero

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Abstract

Within the TERA-SIAP project, we developed a set of regional typologies (at NUTS3 level) which provide a suitable basis for Spatial Impact Assessments of a range of current and possible kinds of intervention (Generic Policy Issues) for rural areas. From a range of socio-economic models, we selected Regional Input-Output Models for the Spatial Impact Assessment of two Axis 3 measures (diversification of rural economy, and renovation and development of villages). One of the seven typologies developed, which focused on economic diversification, was used to identify a set of representative case study regions. The modelling results for the 16 case regions illustrated the fact that different types of rural economies are clearly associated with different patterns of policy impacts and that typologies can assist in the choice of appropriate representative regions. The combination of typologies and models are shown to have the potential to enhance the capacity for quantitative Spatial Impact Assessment of rural policy.

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