# Ulysses

## Using applied research results from ESPON as a yardstick for cross-border spatial development planning

Targeted Analysis 2013/2/10

Scientific Report for the Final Report

Multi-Thematic Territorial Analysis

of the

**Upper Rhine Trinational Metropolitan Region**

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# Chapter 1 - Executive Summary

## 1.1. ULYSSES project in brief

ULYSSES is an experimental and innovative project supported by 18 European border and cross-border areas (hereafter CBA) that aims at using applied research results from ESPON as a yardstick for decentralised cross-border spatial development planning. Within this overall framework, a *targeted analysis* including high-quality, comprehensive and multi-thematic territorial analyses (hereafter MTA), has been performed on six specific CBA across Europe. One of these areas is the Upper Rhine Trinational Metropolitan Region.

The MTA has focused on the main topics mentioned by Territorial Agenda of the European Union (EU 2006, 2011), namely (i) cross-border polycentric development, (ii) patterns of urban/rural relationship, (iii) levels of accessibility and connectivity, (iv) effects of demographic change (*territorial profile*), and (v-vi) level of attainment of Lisbon/Europe 2020 and Gothenburg objectives by the CBA (*territorial performance*). In parallel, an in-depth statistical analysis focused on the six CBA was performed as well. This analysis included (i) a catching-up analysis; (ii) a principal components analysis, and; (iii) a multiple regression analysis.

Additionally, a comprehensive cross-border institutional performance analysis has been included as well in every MTA. This analysis captured the diversity of governance frameworks existing within each CBA by paying regard to both the *structural dimension*, i.e. the overall framework that can hardly be influenced by the partners of cross-border cooperation, as well as the *activity dimension*, i.e. the intensity and continuity of institutionalised cross-border cooperation on the regional level.

All the abovementioned activities crystallised in a comprehensive diagnosis for each MTA area that was delivered as an annex to the Interim Report of ULYSSES. On that basis, an integrated analysis taking account of previous inputs was performed at a later stage of the project. From a methodological perspective, this integrated analysis adopted the form of a two-phase SWOT analysis that included (i) a *status-analysis phase* in which the findings derived from previous research tasks were organised and prioritised as main *challenges*, and; (ii) an *action-decision phase* in which a response to each one of the identified challenges was proposed as a potential *strategy*.

Both the challenges and strategies were discussed and eventually validated by stakeholders of the MTA areas. This SWOT analysis is also seen as the main contribution that ULYSSES may do to the Practical Guide that the Association of European Border Regions will develop in the near future. All in all, the final results of ULYSSES project are fully aligned with the expectations set by the project specifications.

## 1.2. Key analysis / diagnosis

### 1.2.1 Demography

Although being a border region, the indicators used show a high attractiveness of the CBA by steadily immigration. Despite low fertility rates, the CBA is slow but steadily growing by immigration. This indicates a strong labour market, especially in the Swiss NUTS3 units of the CBA, with a high share of incoming commuters from France and Germany.

### 1.2.1 Polycentric Development

Polycentricism is a core phenomenon in the analysis of the cross-border Rhine Valley. The main Functional Urban Areas (FUAs) within the German-French-Swiss Upper Rhine Conference are Basel in the South, Strasbourg-Kehl in the middle and Karlsruhe in the North. They are embedded in several neighbouring and surrounding FUAs. These FUAs of different levels build the polycentric structure of the Upper Rhine Valley.

### 1.2.2 Urban-rural relationships

The economic situation of the rural areas concerning agriculture is in comparison to other European regions strong and has a relatively solid added value. This is due to concentration on winery and

arable crops. The area used for agricultural use however is shrinking on an average level. The available data does not allow getting an insight in conflicts of land use. Due to topographical circumstances agglomeration takes place in the plain Rhine valley. Urban development and agriculture have to share the most valuable soil, so there are conflicts which cannot be described with the data.

### 1.2.3 Accessibility and connectivity

The Upper Rhine Valley is a very well connected cross-border region in the centre of Europe. Various important European destinations are readily accessible through motorways or high-speed rail. Three regional airports and the neighbourhood of important international air traffic hubs provide excellent accessibility of worldwide destinations. Numerous road crossings of the River Rhine and the national borders make commuting to the neighbouring countries on a daily bases relatively easy. A fly in the ointment though are issues with intra-regional connectivity in public transportation, which hinder the effective cross-border usage of common infrastructure.

### 1.2.4 Gothenburg and Lisbon / Europe 2020 strategy

The CBA has a quite strong economy which can be seen by the GDP per capita; most of the NUTS3 units of the CBA are above the national and EU averages. In the economic development the CBA could steadily increase GDP per capita and the number of employees. Also unemployment rates are very low, especially in the Swiss and German NUTS3 units of the CBA. These low unemployment rates as well as high GDP rates may be due to a relative high share of high and medium tech enterprises in the CBA.

### 1.2.5 Factor analysis

The Factor Analysis validates the results of the previous chapters, putting them into relation to the involved countries of the CBA and all NUTS3 units in Europe. Again it is affirmed, that the CBA analysed belongs to the stronger regions in Europe regarding economy, unemployment, environmental conditions etc. This is mainly due to the high factor of centrality of the CBA as well as a high amount of funding and investment in R&D.

In this analysis date from Switzerland is missing, but the proximity of the French and German NUTS3 units to Switzerland is important for their (economic) performance as a high share of employees chose to live in France or Germany and work in Switzerland because of higher wages and lower taxes there.

### 1.2.6 Territorial cooperation: governance framework and institutional mapping

The reputation of the Upper Rhine as one of the pioneers of cross-border cooperation must not conceal that the structural dimension of the Upper Rhine does bear considerable challenges. The political situation has to take into account that three countries – one of them being a non-EU member state – are involved, and being divided by a language barrier. Even if Switzerland is a country with several languages, the Swiss border region near Basel belongs to the German speaking part.

The 'institutional thickness' is witness of the long-standing cooperation and can be inspiration for younger cross-border cooperation but the overlapping institutions are sometimes seen as a challenge for political coordination and efficiency.

Through the introduction of the governance structure of the Upper Rhine Trinational Metropolitan Region the governance efforts were enhanced beyond the field of politics through the inclusion of the fields of economy, science and civil society into one integrated four column model. This also allows for the convergence of the existing heterogeneous institutional arrangements into one effective governance structure under the lead of the Upper Rhine Trinational Metropolitan Region.

## 1.3. Identified challenges

The Rhine Valley is one of the European main corridors for passenger and freight transport. There are excessive networks of road and rail, but the interconnection between those are still insufficient. The

expected increases in traffic all over Europe – especially in freight – and new connections through the Alps like the Gotthard will put pressure on the transport networks – which are partly at their capacity limits - in this important part of the North-South connection within Europe.

Also the public transport of the CBA is quite comprehensive in all national parts. The interconnection and quality of service in-between is still an important issue of cross-border cooperation, as a real cross-border network does not exist. The existing transport network is focused on national needs and institutions and a shared use is seldom aspired.

Despite the advantageous figures of a growing region, the CBA shows strong differences between its national parts: while the fertility rates in the Swiss and German units are low and natural population development is already or while be negative, the French units still have natural increases additional to the overall gains by immigration. Besides the overall amount the structure of the population will change dramatically as aging and hence dependency ratios will increase. Also, a lack of skilled workers is predicted for the future.

Regarding environmental issues, existing natural habitats are further dissected by anthropogenic interventions like settlements of traffic infrastructure which leads to a loss of biodiversity in the densely populated parts of the CBA. Also traffic in and through the CBA causes high ratios of emissions in local parts of the CBA.

There is a dense network of larger and medium sized cities in the CBA, though advantages of the development following the principle of decentralised concentration cannot not fully be exploited, as the network does not quite work in a cross border way. While the Rhine Valley is place of various land-use conflicts of environment, settlement, economy and transport, the more rural areas of the mountain ranges suffer from losses of population and functions. The provision of goods and services can be maintained by a dense net of central places as well as innovative and mobile ways.

## 1.4. Proposed strategies

The strategies identified suitable for the CBA were clustered to a sort of "meta-strategies" or "strategies compass", linking single suggestions. The following "meta-strategies" are not supposed to be implemented separately but amend each other.

The development of these strategies revealed great coincidences with the main strategy paper of the Upper Rhine Trinational Metropolitan Region which was drawn up in 2010 in the course of the foundation of the governance structure of the Metropolitan Region. Especially the importance of the science sector and the objective to converge the existing institutional arrangements are to be mentioned here.

**Silicon Rhine Valley**

The innovative urban centres are an excellent basis for further economic development especially regarding knowledge driven technologies of the existing SMEs and the high amount of research institutions and universities. This diversity leads to economic stability also in phases of crisis. Research and development as well as research institutions should be subject of active integration and networking. Existing networks are to be enhanced, widened and deepened. Chances of in-migration have to be used by an active marketing for selective but substantial in-migration of skilled workers. Also high-tech in well accessible rural areas should be promoted e.g. by offering broadband connections.

Physically, the inter-connections of economic, public and research institutions are to be enhanced by a cross-border, integrated system of public transport, relying on integrated timetables and common ticketing for the whole CBA.

Cross-border activities are to be flanked by the promotion of intercultural exchange also on educational levels (i.e. high schools, universities).

**Polycentricity – decentralised concentration (Christaller[1] 2.0):**

The polycentric structure of the CBA should be enhanced based on the principle of decentralised concentration. The normative and often solely descriptive principle of Central Places is applied all over the CBA, consisting of cross-border functional cooperation of the central places (FUAs) of the CBA. By providing a dense network of settlements, the provision of goods and services in the whole region can be secured also in rural areas of the CBA by innovative and/or mobile provision of goods and services.

While urban centres of the FUAs are home of knowledge related economic activities, rural areas profit from offers of gastro-, agro- or wellness tourism as well as using the potentials of renewable energies as additional forms of Added Value. This can be supported by providing and fostering housing in rural towns and centres (e.g. by providing good accessibility by road and public transport as well as attractive towns).

Priority should be given to coordination, cooperation and joint operation rather than investments in physical infrastructure.

**Trademark Upper Rhine**

The Upper Rhine shall be marketed as a recognizable image/trade mark, focussing on few, but recognizable strengths of the Upper Rhine. This marketing is targeted internal to the actors from politics, economy, research and social society within the CBA by a pro-active network management and identity building, as well as external by coherent external presentation. Local development has to be supported and social and cultural identities protected through high quality tourism. To this end, a marketing strategy should develop a strong label of Upper Rhine tourism.

Aim is to foster attractiveness and cross-border cooperation and bind human and social capital into the region through active network management and identity building. Here one can make use of the pressing challenges through globalisation, (i.e. increased mobility and global competition) of the situation to bring together stakeholders to work on an integrated region-wide development strategy.

## 1.5. Further steps

What had to be excluded form the analysis are non-quantitative factors, nevertheless playing a crucial role for the attractiveness of a region: the Upper Rhine is well known for culture, landscape, warm summers, attractive cities, wine etc. Choosing the place of domicile, these factors are important for a lot of people (as long as the working conditions are met). From the quantitative statistical analysis some challenges of the future for the CBA come not in sight:

It became obvious in the discussion of the indicators, that the level of detail is not sufficient. The NUTS3 units involved are not only of uneven sizes (e.g. French NUST3 units compared to Swiss ones) but are to large to measure effects within the CBA, for instance when it comes to places of domicile of the incoming migrates, shrinkage and coexistent growth processes and so on. A further important issue is data availability. Without data for the Swiss NUTS units, the comparison is incomplete and cannot reveal what it could, if data was available.

The results of the ULYSSES project can be used a starting point for joint activities of the stakeholders of the CBA deepening the existing cooperation and making existing institutions durable.

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[1] Walter Christaller is synonym for a hierarchical but at the same time polycentric structure of settlements. His ground-breaking work on "Central places in Southern Germany" lead to the main principle of German spatial development. Also, in analysing the structure of settlements, he included in his research not only the South of Germany, but also Alsace and Northern Switzerland – so all parts of the CBA Upper Rhine.

Figure 1.1: Upper Rhine Trinational Metropolitan Region- Territorial Overview



Upper Rhine Valley
Territorial Synthesis
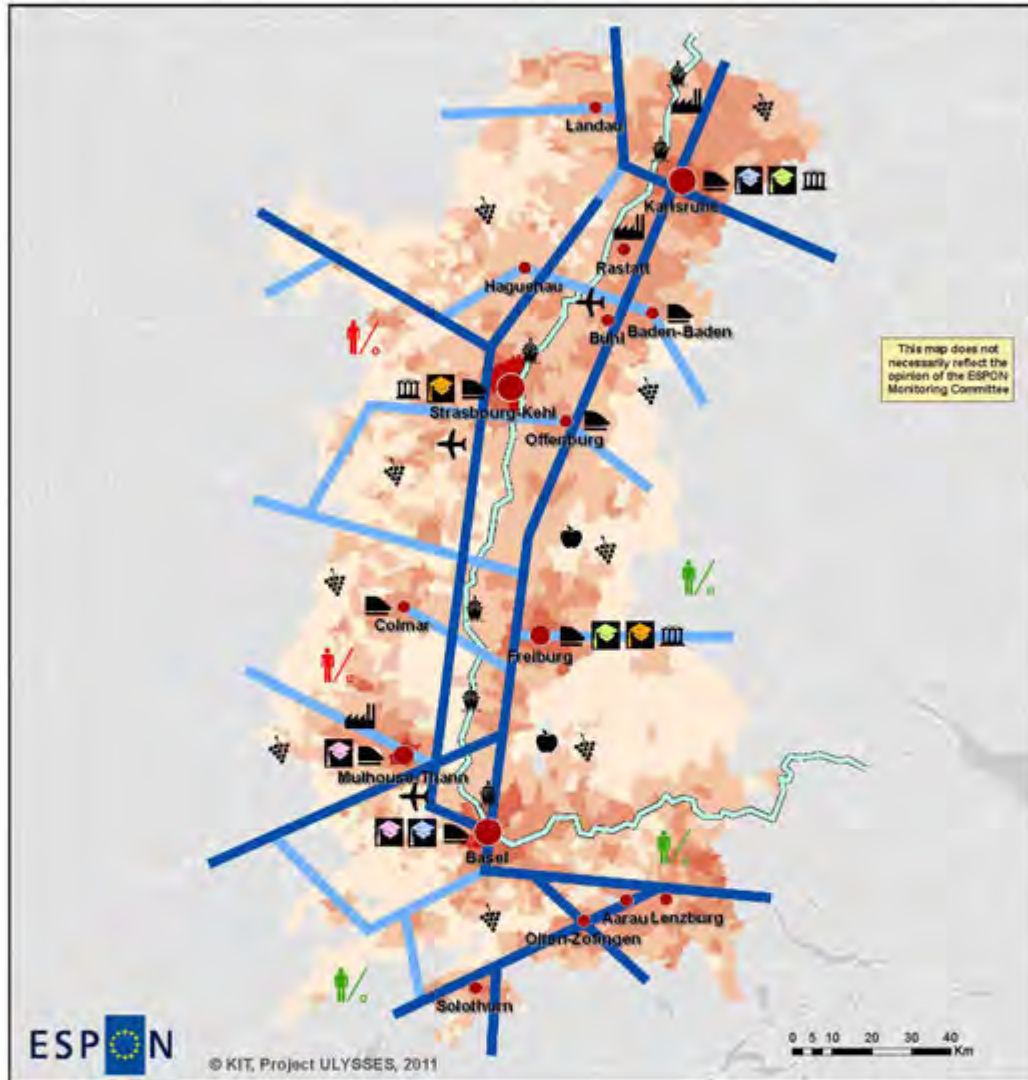
# Chapter 2 - General Overview

## 2.1. ULYSSES project in brief

ULYSSES is an experimental and innovative project supported by 18 European border and cross-border areas (hereafter CBA) that aims at using applied research results from ESPON as a yardstick for decentralised cross-border spatial development planning. Within this overall framework, a *targeted analysis* including high-quality, comprehensive and multi-thematic territorial analyses (hereafter MTA), has been performed on six specific CBA across Europe. One of these areas is the Upper Rhine Trinational Metropolitan Region.

The MTA has focused on the main topics mentioned by Territorial Agenda of the European Union (EU 2006, 2011), namely (i) cross-border polycentric development, (ii) patterns of urban/rural relationship, (iii) levels of accessibility and connectivity, (iv) effects of demographic change (*territorial profile*), and (v-vi) level of attainment of Lisbon/Europe 2020 and Gothenburg objectives by the CBA (*territorial performance*). In parallel, an in-depth statistical analysis focused on the six CBA was performed as well. This analysis included (i) a catching-up analysis; (ii) a principal components analysis, and; (iii) a multiple regression analysis. These analyses have been performed on different scales, so that the indicators of each CBA have been compared on different spatial levels (NUTS III, cross-border, national and EU27/ESPON levels). The data used in the analyses basically included ESPON datasets (e.g. morphological urban areas) and EUROSTAT indicators (e.g. demography indicators), together with additional information provided by local stakeholders.

Additionally, a comprehensive cross-border institutional performance analysis has been included as well in every MTA. This analysis captured the diversity of governance frameworks existing within each CBA by paying regard to both the *structural dimension*, i.e. the overall framework that can hardly be influenced by the partners of cross-border cooperation, as well as the *activity dimension*, i.e. the intensity and continuity of institutionalised cross-border cooperation on the regional level.

For the sake of simplicity and applicability, the *structural dimension* included factors like (i) the political status of the border (e.g. EU membership / historicity, Schengen status); (ii) the planning system (i.e. the planning culture family); (iii) the physical status (e.g. geomorphology), and; (iv) the language barrier (i.e. number of languages existing in the area). These domains have been combined in a synthesis score that allows saying if the borders function as *separation*, *interface* or *link*. In contrast, the *activity dimension* has taken account of: (i) the historicity of cross-border cooperation in general (i.e. earliest founding date of cross-border cooperation); (ii) the maturity of cross-border cooperation (i.e. INTERREG III participation); (iii) the institutional thickness in cross-border cooperation (i.e. number of permanent institutionalisations); (iv) the current activity (in terms of operative EGTC); (v) the cross-border spatial development on regional level (e.g. joint GIS tools), and; (vi) the existing cross-border transport projects (e.g. TEN-T corridors crossing the border). These domains have been combined in a synthesis score that classified the borders function as *integration*, *cooperation* or *separation*.

All the abovementioned activities crystallised in a comprehensive diagnosis for each MTA area that was delivered as an annex to the Interim Report of ULYSSES. On that basis, an integrated analysis taking account of previous inputs was performed at a later stage of the project. From a methodological perspective, this integrated analysis adopted the form of a two-phase SWOT analysis that included (i) a *status-analysis phase* in which the findings derived from previous research tasks were organised and prioritised as main *challenges*, and; (ii) an *action-decision phase* in which a response to each one of the identified challenges was proposed as a potential *strategy*.

Previous ESPON scenarios developed by ESPON 3.2 (ESPON n.d.) were taken into account as well while defining the opportunities and threats linked to any given CBA. In fact, the opportunities and threats identified in the aforementioned research work were contrasted with the scenarios developed by ESPON 3.2. Concretely, (i) the Baseline / trend scenario; (ii) the Danubian Europe / cohesion-oriented scenario, and; (iii) the Rhine-Rhone Europe / competitiveness-oriented scenario and their implications for the CBA under analysis were taken into account while designing the final opportunities and threats.

Both the challenges and strategies were discussed and eventually validated by stakeholders of the MTA areas. This SWOT analysis is also seen as the main contribution that ULYSSES may do to the Practical Guide that the Association of European Border Regions will develop in the near future. All in all, the final results of ULYSSES project are fully aligned with the expectations set by the project specifications.

## 2.2. General overview of the of the Upper Rhine Trinational Metropolitan Region

The Upper Rhine Trinational Metropolitan Region is located centrally in Europe, in the northern part of Switzerland, eastern part of France and south-western part of Germany with the River Rhine as its natural border between these three countries and consists of five Swiss NUTS3 units, two French NUTS3 units, and 16 German NUTS3 units. With 6.076.678 inhabitants in the year 2009, the CBA is a very dense populated cross border area with a strong economy.

Figure 2.1: Map of NUTS3 level units of the CBA



The CBA occupies an area of 22.216,2 sq km. The Swiss part of the CBA covers 16,2% of the CBA (4.390,3 sq km), the German NUTS3 units 46,6% (10.465,7 sq km) and the French part 37,2% (8.280,2 sq km). According to the each national areas, the Swiss part of the CBA accounts for 8,7% of Switzerland, the German NUTS3 units of the CBA 2,9% of Germany and Alsace accounts for 1,3% of France.

The sizes of the NUTS3 units of the CBA are very different due to different administrative settings: The smallest NUTS3 units are the urban centres CH031 Basel-Stadt (37 sq km), DEB37 Pirmasens (61,4 sq km), and DEB33 Landau (83 sq km), while the largest are the two French NUTS3 units FR422 Haut-Rhin (4.755 sq km) and FR412 Bas-Rhin (3.525,2 sq km), followed by the German NUTS3 unit DE134 Ortenaukreis with 1.860,8 sq km.

# Chapter 3 – Demographic Analysis

## 3.1 Population

There were 6.076.678 inhabitants living in the CBA in 2009 which means an increase of about 260.000 persons from 2000 – 2009. The population increase mainly concentrates along the Rhine Valley, while the mountainous areas show population losses in the period watched (see Annex V). Here, the highest gains are to be seen between the urban centres of the CBA. Although the River Rhine is a natural border, dividing the CBA politically and also lingual, the population figures show a high attractiveness of the Rhine Valley, which can be seen by the NUTS3 units not belonging to the Rhine valley performing worse than those within. This outperformance can also be seen looking at the expected population development compared the actual. The development of the regions' natural population growth and net migration is compared to the expected behaviour if they would have followed the patterns of the countries of which they are part of. For this the national averages where weighted according to the proportion of the regions' population belonging to the different countries in the CBA and afterwards compared to their actual data.

Figure 3.1: Expected population development in the CBA
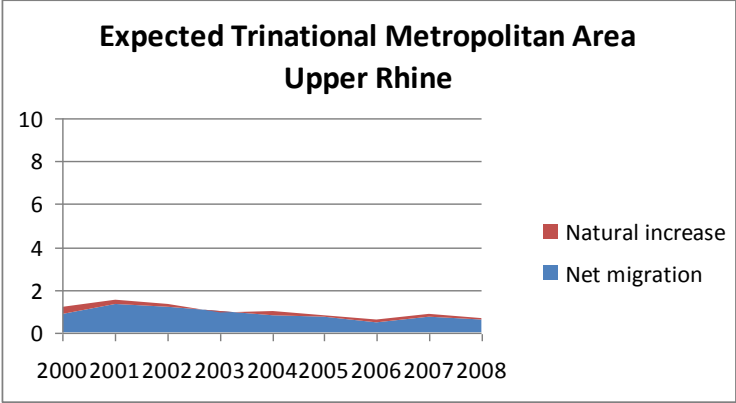


Figure 3.2: Actual population of the CBA
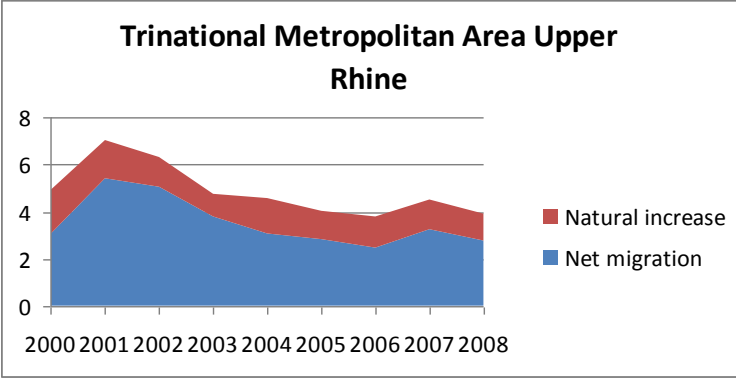


While the expected development states minor increases of population -mainly due to migration- the actual development outperforms this expected development by far – due to the strong crude rates of net migration but also natural increases in Switzerland and France.

The population development is hence driven by contrasting factors: natural increase in Switzerland and France, natural decrease in Germany. Nearly all NUTS3 units could gain (additionally) positive net migration; especially those of high accessibility (see also Annex V).

Nonetheless, the population is aging within the CBA. In all but the both French NUTS3 units and CH033 Aargau, the child dependency ratios were found lower than the aged dependency ratios. This shows that the young population of the CBA represents a smaller portion of total population, as compared to the aged population of the CBA. The highest differences are again to be found in the German NUTS3 units mentioned above.

Population density is a key geographic parameter expressing the total population per unit area, usually per sq km. For the CBA, population density is reported at NUTS1, 2 and 3 level units. The mean population density of the CBA shows steady increase, reaching is 273,52 inhabitants per sq km for the

year 2009, compared to 101,4 inhabitants per sq km in France, 230 in Germany, and 191,2 in Switzerland, the latter both already significant higher than the EU27 average of 116 inhabitants per sq km. The CBA is hence rather dense area, even compared to the national level of for instance Germany, which is one of the densest population countries in Europe. On NUTS4 level, on which no data is available, this figures would show an even more extreme tendency, as the edges of the CBA a significant less dense populated, especially along the Rhine valley, as it is flanked by the Vosges and Black Forest with rather small settlements.

Altogether, most of the CBA could gain population from 2000 – 2009 as positive migration outranged the negative natural development (see also Annex V). Exceptions are Basel-Landschaft, where the positive migration could not compensate the natural losses, as well as DEB37 and DEB3K Pirmasens and Suedwestpfalz with a negative natural increase as well as negative migration. As mentioned before, the latter two are not part of the Rhine Valley and mainly within the Palatine Forest.

## 3.2 Commuters

Regarding commuters an overall increase in all NUTS1 and 2 units can be seen, with a slight downturn during the mid-2000 years. France has the highest proportion of commuters working in a foreign country while Switzerland shows the lowest figures, which can be explained by the attractiveness of the working conditions (wages, taxes and unemployment rates) in the different countries

Figure 3.3: Commuting flows in the Upper Rhine
(Source: ESPON Metroborder 2010: 42)
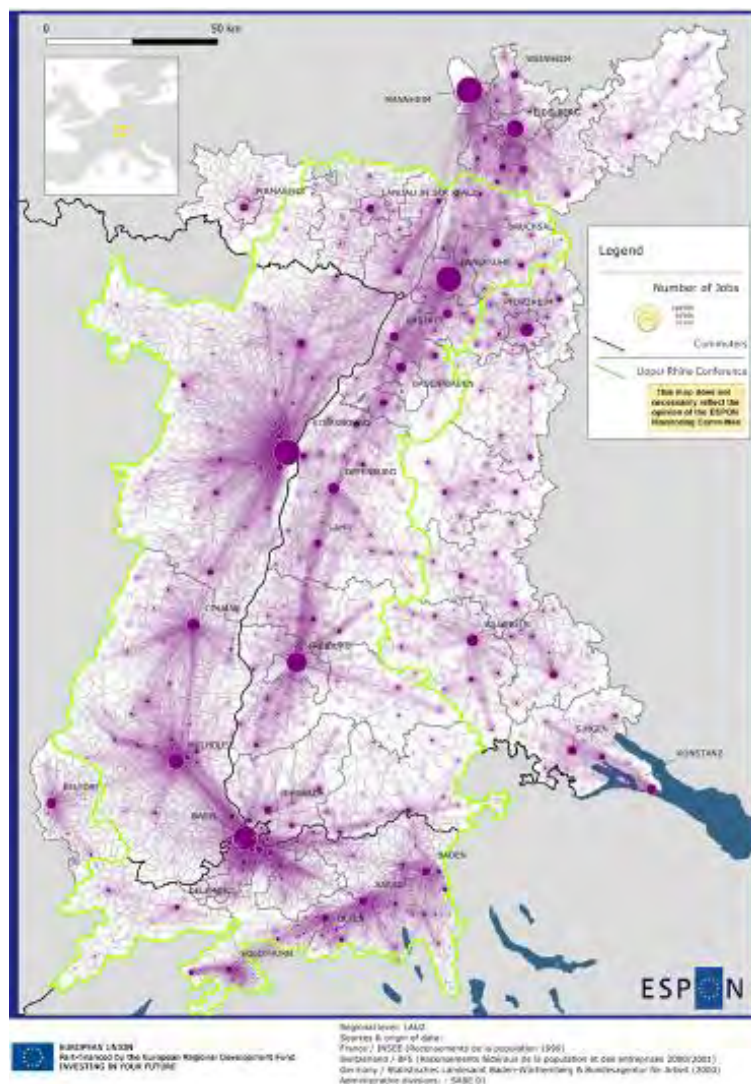
The NUTS2 level (as well as data on NUTS3) is not sufficient for analysing and visualising commuter patterns in the Upper Rhine. Here the municipal level is necessary as used in the ESPON METROBODER project (2013/2/3). By using LAU2 data "border effects can be clearly seen between France and Germany, despite the linkages between Strasbourg and Kehl. In the case of Basel, no border effects are seen. The larger differentials in terms of attractive job offers overcome geographic, cultural, political and other differences. However, the overall picture indicates that commuting is not a predominantly cross-border characteristic: commuting is primarily a domestic phenomenon that is being complemented by cross-border commuting." (METROBORDER, p.41; see Figure 3.3) These patterns can only be shown for one year (2000) as comparable data is not available for all years. "However, comparing the overall data for 1999/2001 and 2006/2008, the general picture is quite stable … Commuting towards Basel is slightly increasing from the German side and stagnating from the French side. Commuting from France towards Germany is stagnating, too. However, some sub-areas show increasing levels, especially the Mulhouse-Basel axis and that along the Rhine valley on the German side." (METROBORDER, p. 43)

# Chapter 4 – Polycentric Development

FUA in the ESPON 1.4.3 are defined by aggregating LAU 2 in a way that they can cover several broader administrative boundaries (NUTS 2 or 3). In this analysis, the FUA were considered to be part of the CBA (defined by NUTS2) if more than 60 % of their area is overlapping with that the CBA or if most of their Morphological Urban Area (MUA) is within the limits of the CBA (the MUA is essentially the cities' core that forms a FUA together with its commuter catchment area). Due to the fact that the analysis is based on NUTS 2 the analysis of the urban systems is made on the extended CBA of the Upper Rhine region.

Figure 4.1: Category map of Morphological Urban Areas (MUAs) and Functional Urban areas (FUAs)

## Morphological and Functional Urban Areas
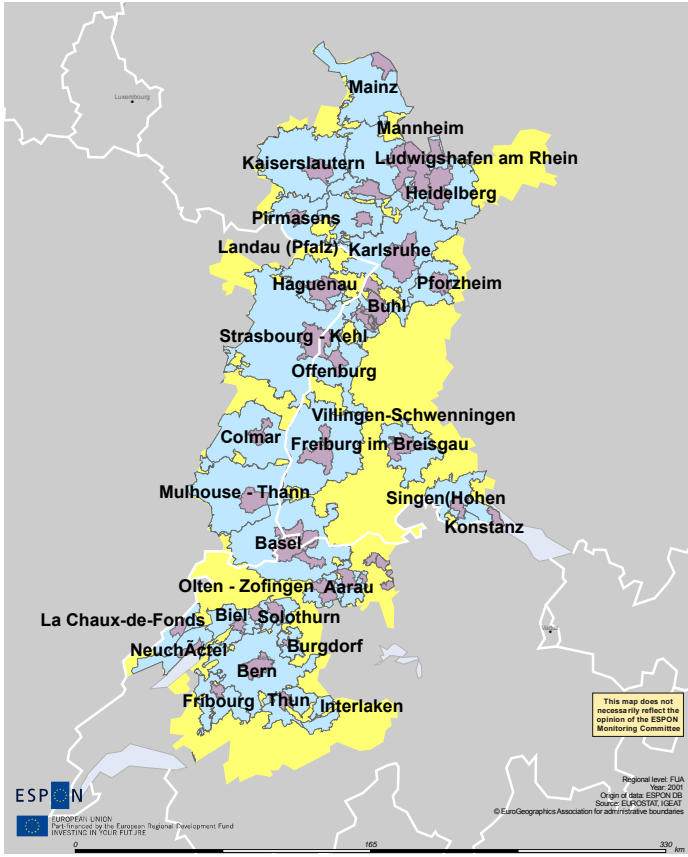


Legend

**Morphological Urban Areas and Functional Urban Areas, according to the ESPON 1.4.3 (established from data from 2001)**

Figure 4.1 shows the polycentric settlement structure of the extended CBA area of the Upper Rhine with its MUAs and FUAs. There is not a single FUA of significant higher importance than the other ones.

Following the definition of „polycentricity" in the ESPON project 1.1.1 (ESPON 2005) polycentricity „first relates to morphology, i.e. the distribution of urban areas in a given territory (number of cities, hierarchy, distribution). The second concerns the relations between urban areas, i.e. the networks of flows and cooperation." The MUAs and FUAs verify this polycentricity of the Upper Rhine.

Polycentric development within the concept of ULYSSES is expected to examine the diversity in the spatial structures, economic performance and social cohesion of each cross-border region at NUTS 3 level. Naturally, the distinction between monocentric or polycentric areas cannot be made area in a dichotomous manner, and polycentricity should be measured by scoring an area with a value ranging from more monocentric to more polycentric.

For the analysis 1 the rank-size distribution has a slope of – 1,02 which is essentially in line with the European value (see Figure 4.2, which presents the rank size distribution on a logarithmical scale with base 10).

The analysis shows what would be the expected amount and size of the FUA in a region according to its total population. One can conclude that the region not only lacks hierarchy (meaning FUA with considerable size), but also lacks an overall amount of FUA.

Figure 4.2: Rank of population of CS1
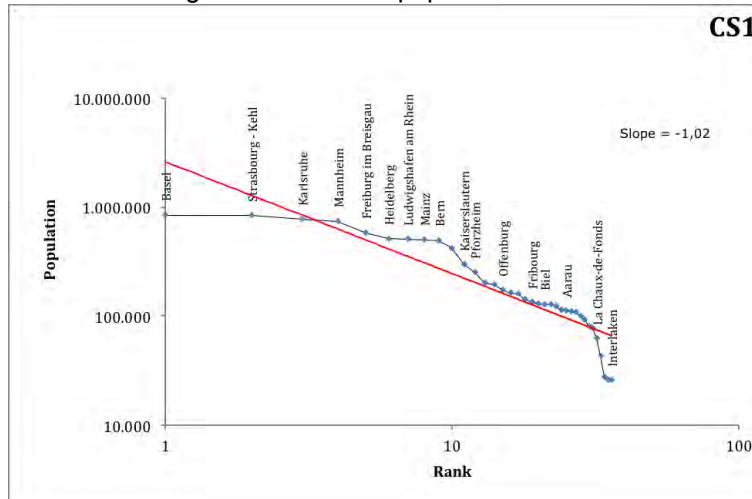


Figure 4.3: Rank of GDP of CS1
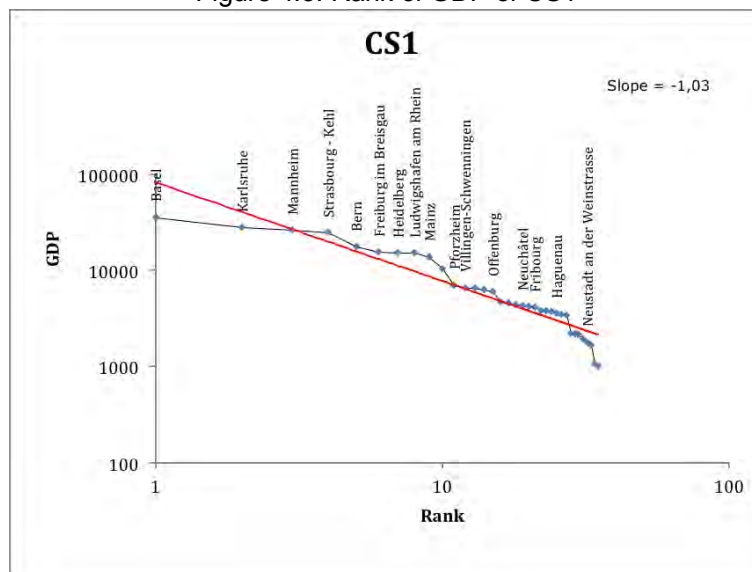


Figure 4.4: FUA number and population of CS1 and EU 27 + CH + NO
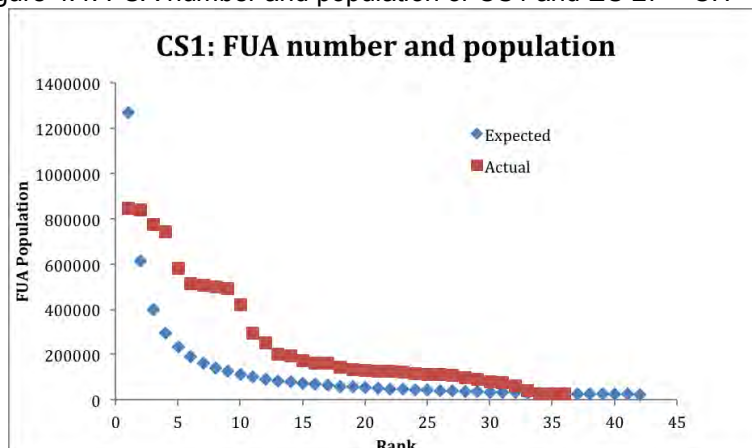
## Reflection on the chosen approach and limits of the FUA

The Upper Rhine is a polycentric metropolitan region embedded in the Rhine-Neckar region in the north, the Stuttgart region in the east, the Bern region in south-west, and the Zurich region in south-east. Being embedded and surrounded by different metropolitan regions the Upper Rhine region, delimit by the territory of the Upper Rhine Conference, the differentiation and the definition in contrast to the Because of the positioning of the Upper Rhine Valley in contrast to the neighbouring, and competing, urban areas the boundaries have to be drawn due to political decisions than due to statistical units which do not reflect this. Therefore the statistical analysis of FUAs within the boundaries of the German-French-Swiss Upper Rhine Conference reflects the political reality in a better way. Analysis in these boundaries was done in the ESPON project Metroborder.

Focussing on the boundaries of the German-French-Swiss Upper Rhine Conference one can consider three core FUAs of the Upper Rhine like Basel in the South, Strasbourg-Kehl in the middle and Karlsruhe in the North. The catchment area of the FUA of Karlsruhe is not only the catchment area of the Upper Rhine, it also interferes with the catchment area of the neighbouring FUAs like the Mannheim-Ludwigshafen (in the North) and Stuttgart (in the East). Beside the three core FUAs the Upper Rhine has also neighbouring FUAs of the core FUAs such as Mulhouse-Thann, Freiburg, Offenburg, Hagenau and Rastatt, Baden-Baden, Buehl as well as Olten-Zofingen, Aarau, Lenzburg.

Figure 4.5: Functional and morphological urban areas (FUAs/MUAs) in the Upper Rhine region (Source: ESPON Metroborder 2010: 25)
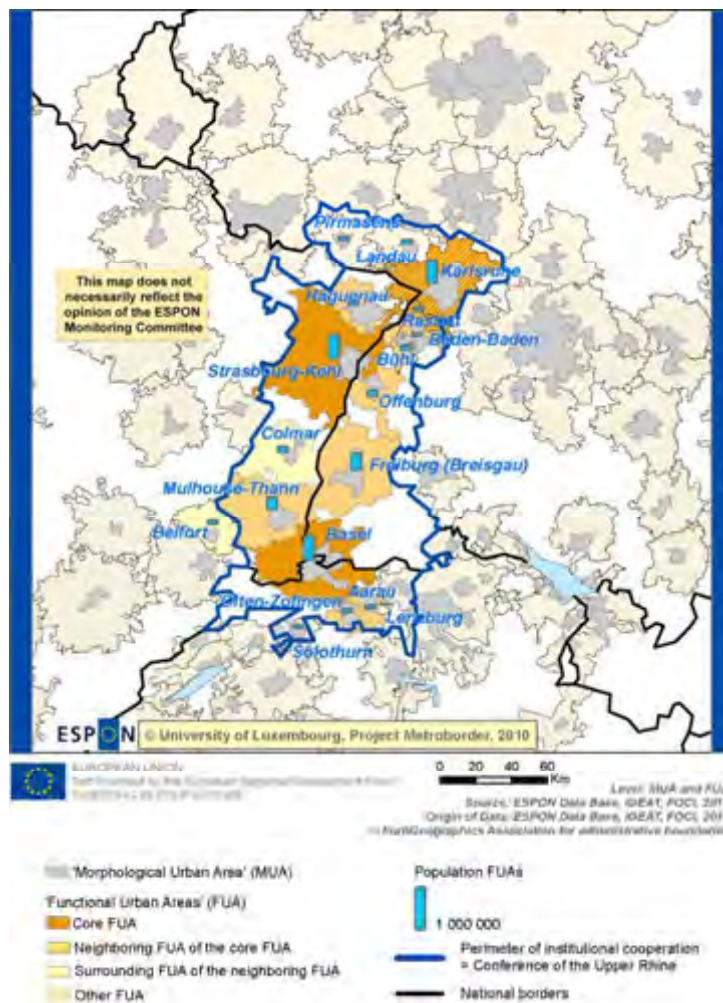


**Map 6**    Functional and morphological urban areas (FUAs/MUAs) in the Upper Rhine region

### 3    Metropolitan positioning

Metropolises are considered as nodes in a globalising world. Above all, they are the cross-roads of economic, political, and infrastructure settings.

# Chapter 5 – Urban Rural relationship

## 5.1 Urban – Rural Typology

To evaluate the interaction between rural and urban areas (meaning flows of people, goods, and services) no data is available on EUROSTAT or ESPON. Regarding the structural indicators such as employment and economical patterns are only available at a NUTS3 level. The urban/rural typologies established by ESPON and EUROSTAT are also only available on a broad scale, limiting the ability to link the indicators with rural or urban areas at a significant dimension.

In the CBA Upper Rhine Trinational Metropolitan Region nearly all NUTS3 units are classified as intermediate regions. The only predominantly urban regions are DE122 Karlsruhe Stadtkreis and DE123 Karlsruhe Landkreis. That means less than 20% of the population in these two regions lives in rural grid cells and the population density is above 300 inhabitants per km² (DE 122 Karlsruhe Stadtkreis: 1.675, DE123 Karlsruhe Landkreis: 397). The only predominantly rural NUTS 3 unit found also on the German side is DE13A Waldshut (147 inhabitants per km²). The two French NUTS 3 units both are classified as intermediate, although the region FR421 Bas-Rhin includes Strasbourg with its nearly 280.000 inhabitants (DE122 Karlsruhe Stadtkreis 290.736). The classification here results from the great areal size of the NUTS3 region. Unfortunate is the missing of Swiss data. The city of Basel has about 170.000 inhabitants, the Trinational Agglomeration Basel (TAB) about 830.000. Basel is the most densely populated area in Switzerland with 5.174 inhabitants per km² (3 times higher than Karlsruhe).

What becomes clearly visible in this context is the problematic of classification and formation of the spatial unit on which the classes are applied.

Nor is it visible that the landscape's influence is a great deal higher than the borders one. Infrastructure has to be orientated along the axis from north to south using the Rhine valley, often being "back to back" in duplicate on the German an French side of the river (see also Chapter 5). Due to these topographical circumstances the border is an agglomeration area, rather than because of the border itself. Departing from the border the structures become less urban, what is an important fact, but not visible to a non-local person looking at the maps. It is obvious using NUTS3 level is not detailed enough for the sufficient illustration of these matters of fact.

## 5.2 Economy

An indicator for a region being more urban or rural is the share of agriculture and fishing in regards of total employment and share of Gross Domestic Product (GDP) or Gross Added Value (GVA).[2] In general agriculture and fishing is only a small economic sector compared to other economic activities in the CBA. The average shares of the CBA´s French NUTS3 units meet the French average while most of the German rural regions within the CBA show higher percentages than the German average and also the total is higher (1,26%/0,90%). This is caused by arable (specialised) crops, especially winery and to some extend orcharding, which account a higher Added Value compared to agriculture based on i.e. wheat or corn. This can be seen exemplarily in the NUTS3 unit DEB3H "Suedliche Weinstraße", belonging to the largest winery areas in Germany, with a GVA share of 5% of the total GVA.

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[2] Although the GVA of agriculture and fishing ha only a small share of the total added value, it will be used here as an indicator.

## 5.3 Land Use

Figure 5.1: Land use change from agricultural to artificial
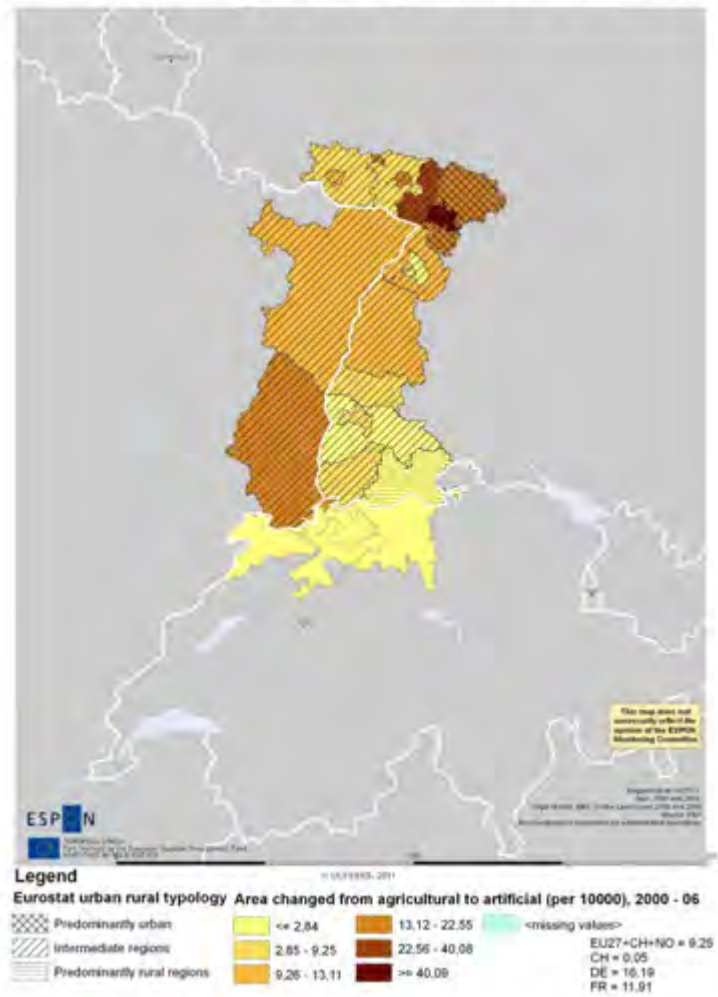


The data regarding agricultural land for CBA Upper Rhine Trinational Metropolitan Region differs slightly from the national average in France (47,45%) and more clearly in the German part (38,99%). Not even one NUTS3 region in the CBA meets or exceeds the respective national average. The annual growth rate is in all NUTS3 regions negative, the average loss of agricultural used soil from 1990 to 2006 on the German side was 630 ha (2,2% (1,59% Germany)), on the French side 2.300 ha (1,15% (0,55% France)) per NUTS3 unit. The amount of artificial surfaces varies depending on how "urban" or "rural" a region really is. Again the limited possibility of sophistication on the NUTS3 level hinders the data to be as significant as it could be.

Concerning land-use change there is data available for agricultural land which was transformed into artificial surfaces. Corresponding with the loss of agricultural used soil in all NUTS3 units (see above) it is a "one-way" land use change to artificial surfaces. The relative changes are higher the more urban a region is classified and the less agricultural used soil it had before. The land use change is with 58,5 m² per ha highest in DE122 Karlsruhe Stadtkreis and with 0,5 m² per ha lowest in DE13A Waldshut, which is the only predominantly rural NUTS3 unit in the CBA. The two French NUTS3 units are according to relative figures on the average, but absolute land use change in German and French NUTS3 regions is summed up nearly the same (1.077 ha (DE) to 1.177 ha (FR)).

## 5.4 Critique

Data for evaluation of interaction between rural and urban areas is not available on EUROSTAT or ESPON. Also economical patterns are only available on NUTS3 level, which – altogether – made using NUTS3 as the basic spatial unit inevitable. The consequence is, neither the interaction between urban and rural area, nor cross-border activities and effects, could be described.

It became obvious in the discussion of urban rural indicators with the available data, the level of detail is not sufficient. There must be smaller and more detailed spatial units with more similar characteristics, such as covered area, for a better comparison within the CBA. A further important issue is data availability. Without data for the Swiss NUTS units, the comparison is incomplete and cannot reveal what it could, if data was available.

# Chapter 6 – Accessibility and connectivity

## 6.1 Road

The road infrastructure of the CBA is characterised by redundant motorways on both sides of the River Rhine, which were constructed in the national French and German contexts independently one from another. Strasbourg is westwards connected directly to Paris while Mulhouse which lies more in the south has a direct motorway link-up to Lyon. East of the river Rhine, the road infrastructure is oriented to follow the direction of the Rhine Valley parallel to the Rhine in north-south direction, with horizontal axes which connect Black Forest and the German-French border. In the northern part of the CBA the A8 connects Mannheim, Karlsruhe and Munich. To the north the A5, the motorway crossing the CBA in north-south direction continues on to Frankfurt (Main), Hamburg and Berlin. Interestingly, there is only one direct motorway-connection between France and Germany, which is situated between Freiburg and Mulhouse.

Figure 6.1: Infrastructure in the CBA
Source: SIGRS/GISOR – Conférence du Rhin Supérieur / Oberrheinkonferenz 2011
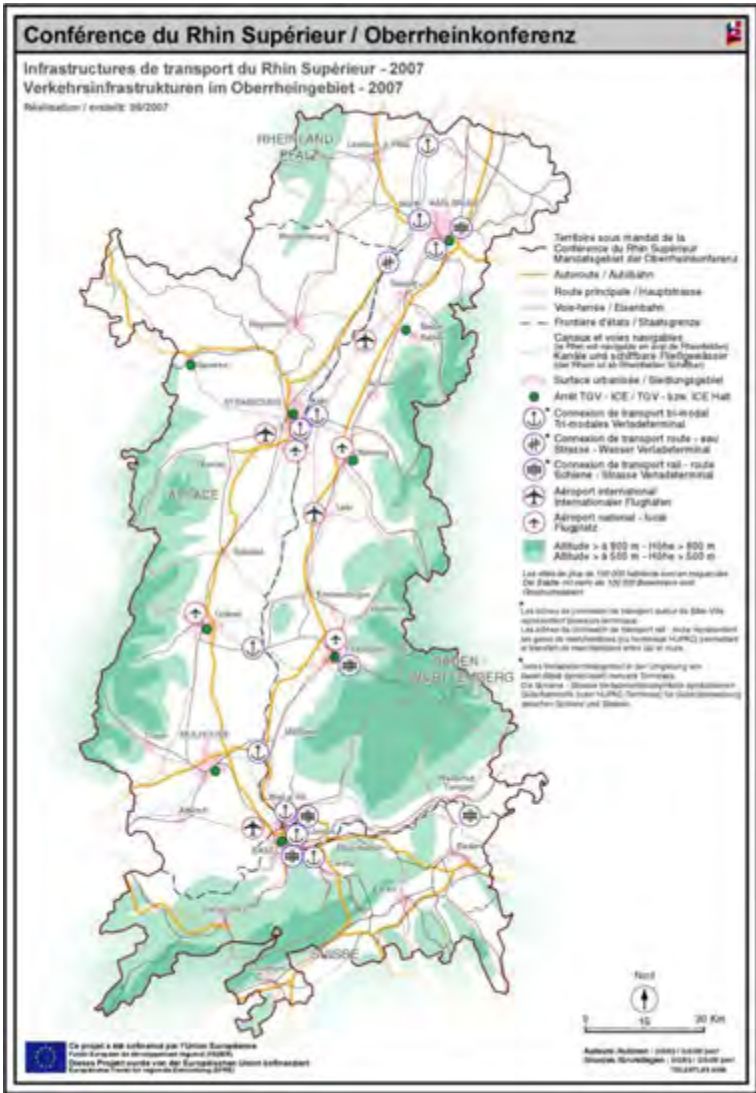


Any other connection is state roads which are partially extended. In the southern part of the CBA Basel forms a narrow passage. From here, the region is southwards connected directly to Zurich, Lucerne and Bern as well as Geneva and Milan.

The CBA profits from a large number of crossings over the Rhine as well as border crossings, where the state border doesn't match the Rhine as a natural border. Especially the high number of bridges, provides the image of a very well integrated and connected cross-border-region when it comes to road infrastructure.

The potential accessibility in comparison to the CBA average reflects the situation of the geographical space. With the low mountain ranges Black Forest and Vosges east and west of the Rhine and the Jura in the South as natural barriers, the northern part has a significant relative accessibility advantage which is furthermore emphasized by the geographic closeness to the central European development cores. In the European context, the intraregional inequalities in accessibility don't seem to be too important as the CBA as a whole shows an excellent overall accessibility index widely over the ESPON average.

## 6.2 Railroad

The "Rheintalbahn" (Rhine Valley Railway) – which is the name of the railroad line in north-south direction of the eastern side of the CBA – is one of the most important railroad corridors in Europe. Figure 6.2 shows the freight volume in 1995. The numbers represent gross freight tonnes per year. As one can see in this map, there are no significant railroad freight movements between Germany and France whatsoever, whereas Basel and hence Switzerland seems to be well connected to as well Germany as France.

Figure 6.2: Railroad freight traffic in the CBA in 1995
Source: SIGRS/GISOR – Conférence du Rhin Supérieur / Oberrheinkonferenz 2011
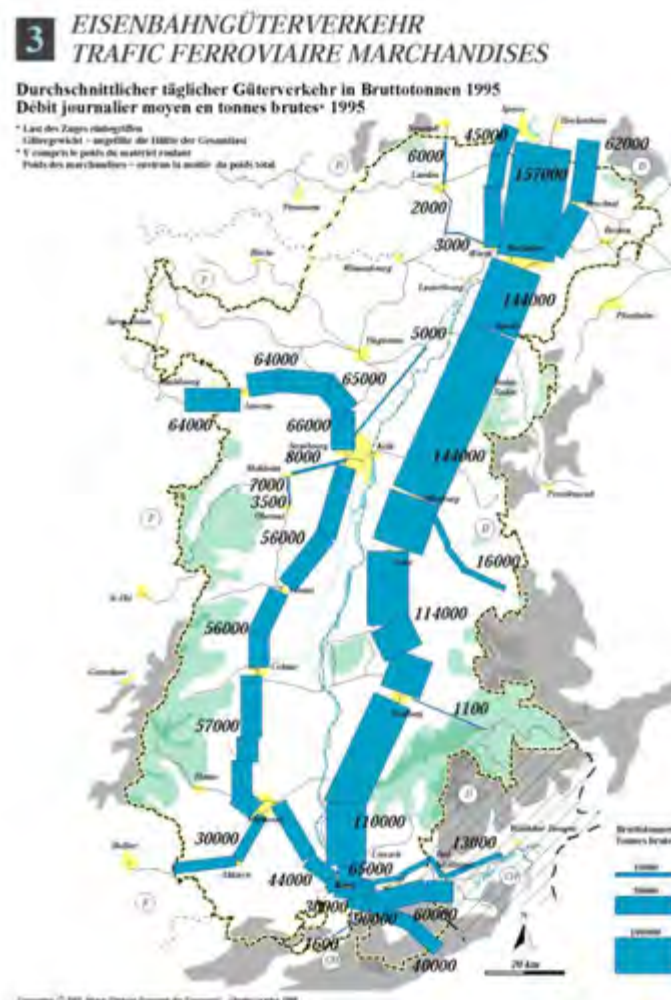


The intra-regional connectivity of the CBA is well represented by the fact, that there are three direct regional train connections between Germany and France (Offenburg-Strasbourg / Wissembourg-Landau / Muellheim-Mulhouse). Nonetheless do the links only enter as far as some kilometres into French or rather German territory only closing the missing links between the two national rail networks. An integrated regional cross-border public transport network doesn't exist up till now. Still, the

suburban lines of Basel penetrate deeply into German and French territory, being an achievement mainly driven by the development pressure of the global city of Basel into the territories on the other sides of the border.

The CBA is well equipped with high speed rail stations, as so are to be found in Karlsruhe, Baden-Baden, Offenburg, Freiburg, and Basel Badischer Bahnhof in Germany; Strasbourg, Mulhouse, and Colmar in France; and Basel in Switzerland. From the CBA, important European cities as Paris, Brussels, Luxembourg, Hamburg, Berlin, Munich, Milan, Zurich, and Lyon are accessible within six hours and with one interchange or less. Again, intra-regional accessibility is an important issue.

## 6.3 Air

The CBA lies in neighbourhood of the important international airports in Frankfurt (Main), Zurich, Munich and Paris, which are all readily accessible via rail. Also, the CBA is equipped with four airports on its own (Baden-Baden, Strasbourg, Lahr, and Basel-Mulhouse) of which one almost only serves for freight purposes (Lahr). The poor intra-regional public transport network makes an effective combined usage of the three passenger airports almost impossible, since they aren't effectively accessible over the border. The linkage between the airports is provided by private bus companies which suffer reliability issues as they are dependent on motorways and thus affected by heavy traffic.

## 6.4 Border effect

Despite various border crossing especially of the road network, the border still plays an important role in rail and air accessibility. Especially the division of the German and French regional public transport is an important issue, which hinders regional development and the effective combination of the regions assets as the regions airports.

# Chapter 7 – Gothenburg and Lisbon/Europe 2020 strategy Analysis

## 7.1 Economy

Figure 7.1: Coefficient of deviation of the CBA compared to France, Germany and EU
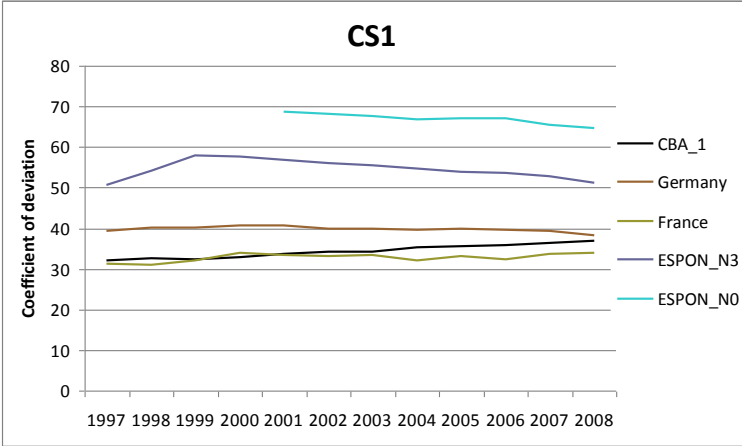


For defining the regional disparities in the GDP per capita per NUTS, the coefficient of deviation was used. The higher the coefficient of deviation, the higher are the disparities within the geographical unit analysed. France and Germany show a much lower disparity compared to the ESPON area, with France and Germany having about a steady coefficient and hence level of disparities over the period watched, while the disparities in CBA are increasing over ten years.

The wealthiest units in the CBA are the bigger urban NUTS3 units of CH031 Basel-Stadt with an index approximately 57% higher than the reference unit of Greater London (in 2003) and DE122 Karlsruhe-Stadt 5% lower than the reference unit. Even taking not only the urbanised area of Basel-Stadt but the agglomeration together with Basel-Landschaft into account, the GDP per capita in 2003 is 16% higher than of Grater London (EUR 51.770 per capita in 2003 for Basel-Stadt and Basel-Landschaft, EUR 44.800 per capita for Greater London).

Less developed regions with an index lower than 50% of the reference unit are all found in Germany with DE133 Emmendingen (45,65), DE132 Breisgau-Hochschwarzwald (44,27), DEB3H Suedliche Weinstraße (36,96), and a laggard region DEB3K Suedwestpfalz of only 26,48 compared to the reference unit.

Compared to the EU and national averages, social cohesion is quite strong in the CBA: France as a total shows higher figures according unemployment, long-term unemployment and youth unemployment, but the NUTS2 unit Alsace is significant lower than the EU and national average. Same is true to the Swiss and German NUTS2 units of the CBA, having a quite low unemployment rate, belonging to the lowest rates within Europe. Not having the data for 'population at risk of poverty' for the Swiss NUTS2 areas, the high figure of Switzerland as total, only slightly lower than the EU average is astonishing and might be explained by the overall high expenses for daily life in Switzerland and a wide gap between income of skilled and/or academic workers to the unskilled

Figure 7.2: Category map of GDP per capita indexed to the leading region
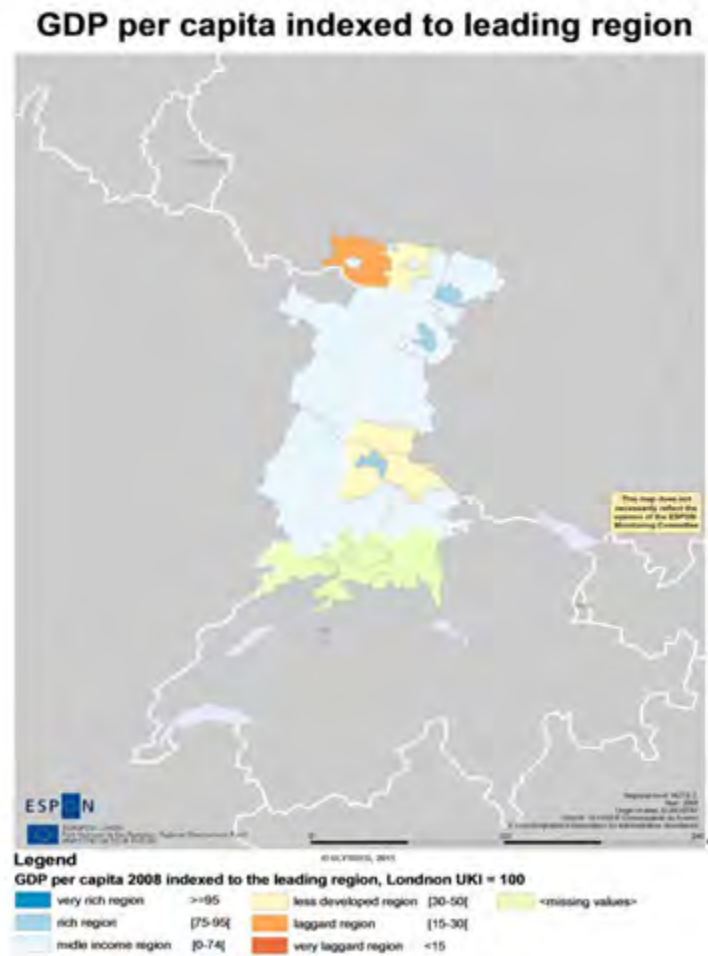


## 7.2 Employment by NACE

From 2000 to 2008 an overall increase of 0,57% of employment can be watched in the CBA. The number of employees rose from 2.087.700 to 2.186.600 in the French and German NUTS3 units. This increase is mainly covered by the tertiary sector of 'Wholesale and retail; hotels & restaurants; transport` (+0,61%), 'Financial intermediation; real estate' (+1,58%), and 'Public administration and community services; activities of households' (+1,60%), while the first ('Agriculture; fishing' -0,61%[3]) and second ('Industry' -0,90%, 'Construction' -0,71%) sector lost employees 2000-2009. Besides the economic not very attractive NUTS3 units of DEB37 Pirmasens (-0,19%) and DEB3K Suedwestpfalz (-0,69%) only FR421 Bas-Rhin (-0,20%) lost employees from 2000-2009.

Also the employed persons in high and medium tech manufacturing activities are quite a lot: the average for France is at 9,26% of the total workforce in 2004, in Germany 75% higher at 16,22% of the total workforce. The total intramural R&D expenditures of the involved national countries are all higher than the EU average (for Innovation and Research see also Annex IV).

## 7.3 Environment

### 7.3.1 Soil sealed area

The CBA's NUTS3 units are nearly all below the national averages of 231,93 sqm per inhabitant (DE) and 249,45 sqm per inhabitant (FR), only DEB3E Germersheim and FR422 Haut-Rhin show higher

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[3] See also Chapter 4 for this.

figures. Most of the urbanised areas of the CBA (like DE131 Freiburg im Breisgau, Stadtkreis, DE122 Karlsruhe, DE121 Baden-Baden, DEB37 Pirmasens) have the lowest figures of soil sealing per inhabitant (and a high proportion of soil sealed of the total area), while the more rural areas are significant higher. This can be explained by the higher densities if settlement realised in these areas, while the area for settlement and traffic purposes per capita is higher in rural areas.

## 7.3.2 Ozone

The ozone concentration exceedances in the CBA have a small range from 6 to 9 days/year with an average of 7,30 days/year in 2008. As described above, the NUTS3 units having the highest values are not those being highly urbanised but on the contrary DE139 Loerrach and DE13A Waldshut.

## 7.3.4 Natura 2000

Overall the CBA has vast Natura 2000 areas, besides DE121 Baden-Baden, DEB37 Pirmasens, and FR421 Bas-Rhine all NUTS3 units of the CBA are above the EU and national averages of France and Germany, more than double of the respective national averages (and DEB3E Germersheim belonging to the Top 20 of all European NUTS3 units regarding the share of Natura 2000 areas).

# Chapter 8 - Factor Analysis

## 8.1 Centrality

This factor has its highest values in central European countries, especially in the Ruhr, Belgium and Southern England, in a pattern that clearly lines out the „Blue Banana". In the less central region, the higher values tend to be concentrated around capitals and other major urban agglomerations. The CBA can be seen as part of the Blue Banana with slightly less centrality indices than the highest scores of Rhine-Ruhr or Belgium. This could also derive from excluding Switzerland as the data is missing here, which could in the analysis lower the centrality index for South-West, Germany and North-West Italy.

All NUTS3 units of the CBA fall into the two highest percentiles of all European NUTS3 units, expressing the high centrality of this region.

## 8.2 Research and Development

The CBA shows high values of the R&D indices, all but the two French NUTS3 units above the national averages and within the highest percentiles in Europe (see also Chapter 6 for that) showing the high capacity of R&D of this region within Europe and in comparison to the German average (see also Annex IV).

## 8.4 Unemployment

In some borders, the regions seem to have higher scores in this indicator than the more centrally located regions. This is the case in Portugal, on the northern border of France and Bulgaria, Finnish Karelia or the Czech Republic where it borders eastern Germany.

The CBA has quite low scores regarding this factor (see Chapter 6), as unemployment rates are significant lower than the national and EU averages. Exceptions are DEB37 Pirmasens and FR422 Haut-Rhin. Including data from Switzerland would have highlighted to good conditions for workers and employees in the CBA.

The coefficients indicate that high levels of unemployment have a strong negative relation to a high investment in R&D, demographic dynamism, central locations and high levels of immigration. As expected, the factor referring to administrative centres has a significant and positive impact and unemployment.

## 8.4 Pollution

The significant variable of this factor is ozone concentration exceedance.

The CBA shows relatively high scores regarding pollution. This can derive from the high density of this region as well as being a major European corridor for passenger and freight, hence increasing emissions from transport.

## 8.5 Immigration

Although the CBA has continuous immigration (see Chapter 2), scores compared to the national averages are relatively low, i.e. in the EU average of all NUTS units has higher migration rates than the CBA.

Figure 8.1: Category map of the factor immigration in Europe
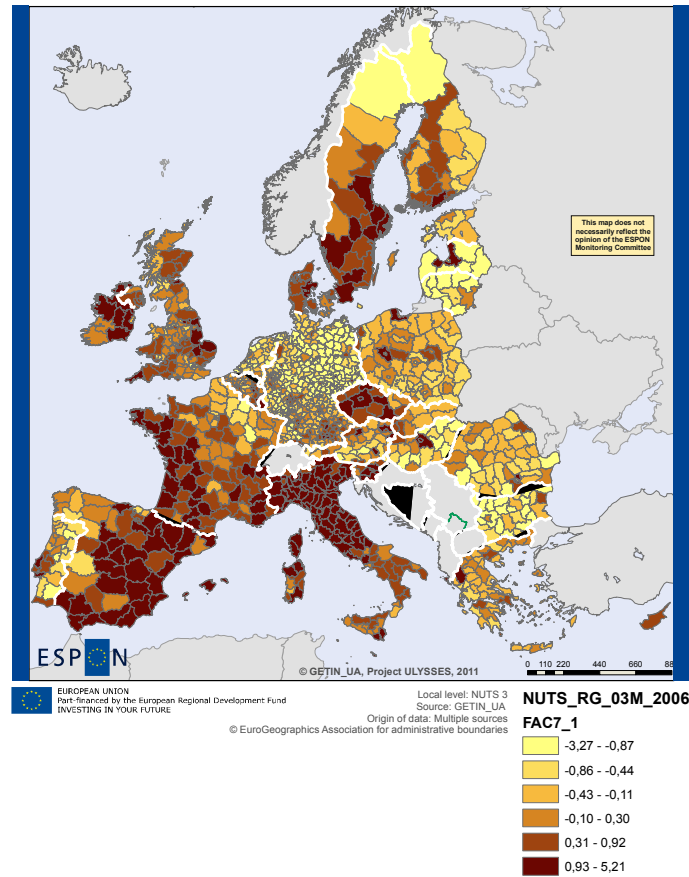


## 8.6 Conclusion

The Factor Analysis validates the results of the previous chapters, putting them into relation to the involved countries of the CBA and all NUTS3 units in Europe. Again it is affirmed, that the CBA analysed belongs to the stronger regions in Europe regarding economy, unemployment, environmental conditions etc. In this analysis data from Switzerland is missing, but the proximity of the French and German NUTS3 units to Switzerland is important for their (economic) performance as a high share of employees choose to live in France or Germany and work in Switzerland because of higher wages and lower taxes there.

# Chapter 9 – Territorial cooperation: governance framework and institutional mapping

## 9.1 Structural Dimension

The reputation of the Upper Rhine as one of the pioneers of cross-border cooperation must not conceal that the structural dimension of the Upper Rhine does bear considerable challenges. The political situation has to take into account that three countries – one of them being a non-EU member state – are involved, and being divided by a language barrier. Even if Switzerland is a country with several languages, the Swiss border region near Basel belongs to the German speaking part.

The planning systems of the three involved countries bring together the centralized French tradition, the federal German system and the Swiss culture of considerable competences on the local and canton level. The border between Germany and France is – according to the quantifying analysis – are stricter barrier mainly due to the different planning traditions and due to the language barrier.

The Rhine River is – on the one hand – a common symbol of this border region which helps to establish a common identity. On the other hand, bridging the large river and organizing the transport infrastructure within the limited scope of the Rhine valley between considerable hill ranges is an ongoing challenge.

Figure 9.1: Institutional Mapping of the Upper Rhine region
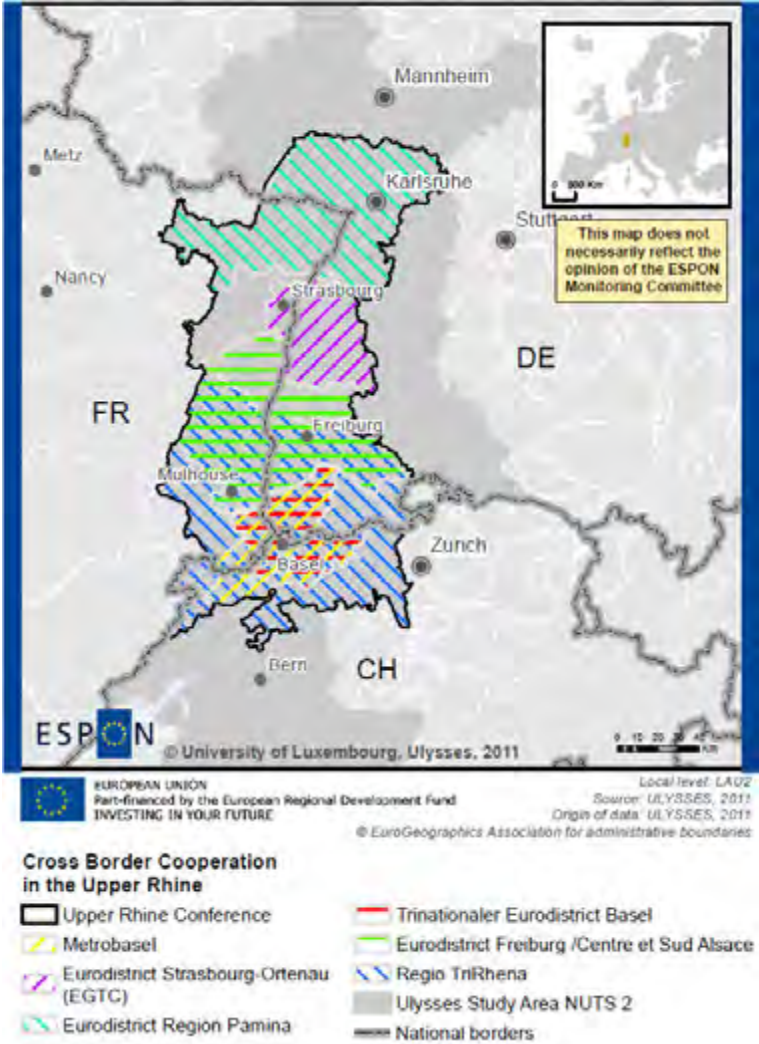
## 9.2 Activity dimension

The density of cross-border institutions is extremely high as the map reveals. This 'institutional thickness' comprises the Upper Rhine conference with its multiple activities, the privately initiated Metrobasel, a series of Eurodistricts and most recently also initiatives for EGTCs. Also the current dynamic is large; notably the leitmotif of the Upper Rhine Trinational Metropolitan Region, which is to be seen as the major institutional innovation of the last decade of the region and a strong new impulse for the cross-border-governance.

Even beyond the institutions shown on the map, a large variety of cross-border activities can be named: The already mentioned *Regio Basiliensis* is not shown as it is not only based on territories but also on individual and corporate membership. Moreover, from the European perspective, the Interred space PAMINA might be one of the most prominent cases of active programme involvement (here not shown as it has just been a temporary programme structure). From the scientific perspective, the *Euro-Institute* in Kehl is an inspiring institution for cross-border development. The high degree of institutionalised cross-border activity can also be illustrated by means of the four *Infobest* along the border that aim to inform and help the civil society with regard to cross-border issues.

On the one hand, this 'institutional thickness' is witness of the long-standing cooperation and can be inspiration for younger cross-border cooperation. On the other hand, the overlapping institutions are sometimes seen as a challenge for political coordination and efficiency.

The governance structure of the Upper Rhine Trinational Metropolitan Region, which was founded by the Upper Rhine Conference in 2010, comprises in a four columns model the fields of politics, economy, science and civil society. These four columns represent on one hand the enhancement of the usual governance efforts beyond the sector of politics. On the other hand it is now possible to include the already well advanced cooperation activities in the field of science into one integrated governance structure. The goal of the Trinational Metropolitan Region as a governance organism is to further rise the effectiveness of the cooperation activities in the Upper Rhine Valley by means of convergence of the existing governance institutions under the lead of the Metropolitan Region.


## 9.3 Spatial development

The Upper Rhine region has shown remarkable efforts with regard to the territorial development, even if the institutional territory is extremely large and morphologically challenging.

Firstly, the common GIS (GISOR/SIGRS) is developing towards a European benchmark for cross-border territorial monitoring. This is true with regard to data harmonisation and stable institutionalisation of the project. Even if the data basis has to further develop, the currently available output also for planning processes is remarkable.

Also with regard to joint spatial development projects, the Upper Rhine can look back on a series of comprehensive strategic documents – some more general (in particular the spatial vision from 2002), others more specific (e.g. with regard to cross-border commercial areas). Also the more recent strategy for the *Trinational Metropolitan Region* does reflect territorial implications and seems to be a promising input.

## 9.4 Transport

Reflecting on the transport situation in the Upper Rhine region recalls automatically the international Airport of Mulhouse/Basel literally *on* the border between two countries, opened just after World War II: This airport is one of the European symbols for cross-border integrations – even if the airport is not embedded into the rail-network, yet.

The integration of the region into the network of the TENs priorities is considerable (priorities 24 and 28). On the regional level, the following projects have to be mentioned: In Strasbourg, the extension of the Tram net across the border is an important project. Moreover, the *New Rhine Bridge* in Strasbourg now allows much higher train speed than before. Near Basel, the Tram line to *Weil am Rhein* is being extended, and also the connection of the airport into the rail net is being discussed.

However, the activity in the transport sector seems to slightly lack behind the ambitious efforts with regard to territorial development strategies. For example, there is neither a comprehensive transport development scheme, nor has a comprehensive cross-border tariff system in public transport yet been established.

# Chapter 10 – Integrated analysis and scenarios

Based on the data achieved in the quantitative analysis, the factor analysis, as well as the tailor made analysis, a SWOT analysis was carried out. This chapter treats the most relevant challenges that pose to the CBA which derive from this step regarding the results of a stakeholder workshop, which was held the 23rd of February 2012. The purpose of the workshop was to validate SWOT analysis as well as to discuss the finding of the action-decision phase. Detailed information about the workshop you can find in Annex III.

## Overall situation

There is a dense network of larger and medium sized cities in the CBA, though advantages of the development following the principle of decentralised concentration cannot not fully be exploited, as the network does not quite work in a cross border way. While the Rhine Valley is place of various land-use conflicts of environment, settlement, economy and transport, the more rural areas of the mountain ranges suffer from losses of population and functions. The provision of goods and services can be maintained by a dense net of central places as well as innovative and mobile ways.

The Rhine Valley is one of the European main corridors for passenger and freight transport. There are excessive networks of road and rail, but the interconnection between those are still insufficient. The expected increases in traffic all over Europe – especially in freight – and new connections through the Alps like the Gotthard will put pressure on the transport networks in this important part of the North-South connection within Europe.

Also the public transport of the CBA is quite comprehensive in all national parts. The interconnection and quality of service in-between is still an important issue of cross-border cooperation, as a real cross-border network does not exist. The existing transport network is focused on national needs and institutions and a shared use is seldom aspired.

## Demography

Demographic change has also an impact on the CBA Upper Rhine. Even though a time lack in demographic decrease and aging is to be expected for the French part of the region, a general decrease in population numbers is starting to take place. With this comes a shift in population composition causing high social dependency ratios through increasing shares of non-working population in the upper part of the former population pyramid. This poses also challenges through an expectable shortage in skilled work force which has to be counterbalanced by strong immigration. These negative effects will take place, with possible take lacks, as already mentioned, for the whole CBA, but especially and most fundamentally in the rural areas in the low mountain ranges.

Stakeholders added that on the one hand in the Alsace, in the French part in the region, local authorities are actually still expecting increasing population numbers due to strong fertility and immigration. In the German part, the pleasant economical performance might brighten up the overall situation, attracting more immigration that expected so far.

## Polycentric development

The polycentric system of the CBA is characterised by the absence of a big metropolis. Nevertheless the settlement structure allows for functional division and regional division of labour, transforming the region itself into an integrated organism providing for metropolitan functions. The strong influence of the border through separation of different social-economic, administrative and cultural systems still hampers the exploitation of this overall positive situation, leaving a lot of potential for the future.

The missing of a well-known metropolis nevertheless poses challenges in terms of marketing and lobbying on a European and global scale, e.g. for causing immigration flows. Even though activities are still distributed widely over the region, the attention focus lies on the valley in the centre of the region, causing on one hand land-use conflicts in already densely population areas, on the other hand leaving the low mountain ranges under the risk of a decline in activities.

Stakeholders added, that on a more local scale, cross-border metropolitan areas are emerging, which is especially visible in the greater Basle area, but also around Strasbourg.

**Urban-rural-relationship**

The above mentioned features of the polycentric system and good connectivity indicators favour rural parts of the region as residential areas as well as for recreation, which is backed by an overall trend towards inland-tourism. The possible decline in activities in rural areas though might cause major shifts in landscape appearance, through natural reforestation.

Stakeholders added, that in the German part of the CBA the effect of the agricultural shift towards energy crops is clearly perceptible - an effect, which can not yet be acknowledged for the French part.

**Accessibility**

In the region two important corridors of the TEN-T link up, making the region thus a major hub in high speed rail traffic. Additionally, the high density of motorways as well as two international air traffic hubs nearby making the region perfectly connected to European and global flows. But being part of an important European corridor, traffic volumes are expected to increase significantly. While the adaptation of infrastructure is lacking behind, conflicts in land-use in the centre are increasingly emerging. Working already on a high capacity utilisation rate, the transport infrastructure is thus likely to meet its limits soon.

Stakeholders explicitly reaffirmed the severity of this challenge, comparing the regional utilisation rate in freight traffic to mega-cities like Paris, even exceeding their numbers. This is worsened by investments going mainly either to economically underdeveloped regions or in east-west corridors, while the geographical situation canalizes traffic flows mainly in north-south direction.

Also connectivity on a regional scale is an important issue with cross-linking of the regional national transport networks lacking behind regional integration processes.

**Lisbon Strategy**

The polycentric structure of the region, diversity in economic activities, the predominant specialisation of industries in growth sectors as life sciences and automotive industries, as well as a system of regional division of labour based on SMEs provide for a strong and stable economic foundation of the CBA. Demographic trends causing aging and the lack of skilled work force might hamper the further development of this regional asset.

Stakeholders stated, that big metropolitan areas have reached their maximum load, whereby the lack of available space as well as prices for ground limit further growth. Further centralisation has thus to be seen as doubtful. Also the polycentric structure will prevent excessive centralisation and marginalisation processes in the Upper Rhine valley. In the region, highly specialised global market leaders are also to be found in remote areas.

**Gothenburg Strategy**

The region shows a certain amount of near-natural areas, which are integrated in the establishment of a cross-border network of Natura 2000 and other environmental protected areas, which provides for a high quality of life due to readily accessible nearby recreational areas. The expected increase in traffic numbers as well as concentration of activities in the centre of the valleys will worsen land-use conflicts putting protected areas under heavy pressure.

Also stakeholders stated that despite several near-natural areas that are left, the most pressing issue is biodiversity caused by the tremendous fragmentation of habitats mainly through transport infrastructure. New high speed rail lines are consistently fenced off. Even though cross-linking of habitats has become some of a matter, the pressure through the continuous extension of transport lines is still highly dominant. Tendencies of population drain in rural areas are not likely to foster conversion into near-natural areas due to the ongoing readiness for green land development.

**Cross-border-governance**

Cross-border cooperation in the region has a long tradition. Even though the affiliation to national spaces is still dominant, the region disposes of a diverse and differentiated governance structure, with several cross-border institutions on different scales with different tasks coexisting complementarily. This causes a twofold situation, as stakeholders pointed out.

On the hand institutional simultaneities hinder the regional ability for marketing, lobbying and strategy-building, as it is often criticized. Also time consumption due to engagement in multiple institutions is an issue. On the other hand, stakeholders reminded, that institutional differentiation and redundancy provide for a plurality of arenas and levels on which cross-border cooperation can be achieved. Also, the density of regional stakeholder networks is positively affected by this, as well as the regional governance system is less prone to stagnation due to institutional blockades or dependency on charismatic leaders.

# Chapter 11 – Suggested strategies

The strategies identified suitable for the CBA (see Annex II and III) were clustered to a sort of "meta-strategies" or "strategies compass", linking single suggestions. The following "meta-strategies" are not supposed to be implemented separately but amend each other.

Table 11.1 shows the strategies identified by the SWOT-Analysis. The colours represent to which "meta-strategies" the single strategy belongs to.

The meta strategies identified, as well as components of the single strategies each match essentially with the **strategy-paper of the Trinational Metropolitan Region**: "Gemeinsam handeln und gestalten: Eine Strategie für die Trinationale Metropolregion Oberrhein 2020" / Agir et se développer ensemble: Un stratégie 2020 pour la Région Métropolitaine Trinationale du Rhin Supérieur.

This strategy paper, which is an annex of the foundation declaration of the Upper Rhine Trinational Metropolitan Region of 2010, contains detailed proposals for strategies and objectives, which are geared to the four-column-structure (politics, economy, science, civil society) of the Metropolitan Region. Thereunder is inter alia formulated the objective to become Europes most competitive knowledge driven cross-border region until 2020. Furthermore the Metropolitan Region sets itself the goal of the integration of not only economy and science sector but also of the civil society into one effective governance structure together with the field of politics. In addition, the paper aims at the convergence of the existing governance institutions of the region, to further rise transparency and effectiveness of the cooperation efforts.

"**Silicon Rhine Valley**" stresses the economic and R&D aspects of the Upper Rhine, as represented in the "Pillar Science" and "Pillar Economy" of the Trinational Metropolitan Region. Both sectors – science and education as well as knowledge driven economy – are crucial for the further performance and development of the CBA.

The "**Trademark Upper Rhine**" matches with the chapter VI and VII of the strategy paper on regional identity and governance in the Upper Rhine. Sharing a common cultural, historical and lingual basis, the Upper Rhine is more an entity on its own rather the conglomerate of three national border regions. Enhancing this identity is a task of internal marketing and network activities as well as cross-border cooperation in education on school and university level. External, a coherent representation and policies towards Europe are needed for marketing the strengths of the Upper Rhine bit at the same time needs and challenges beyond national interests and governmental/administrative structure of the countries involved.

**Polycentricity – decentralised concentration** - also named after the scientist laying the basis for the main principle of spatial planning in Germany "Christaller 2.0" - amends the strategies mentioned above by a spatial aspect of functional cooperation of the FUAs or central places of the CBA. Background of this principle is that not all goods and services have to offered ubiquitous in the CBA but in locations of good accessibility. While this principle works quite well in all of the national parts of the CBA, functional *cross-border* cooperation is still lacking behind as spatial development is bound to the administrative delimitations of the involved stakeholders and their national systems.

| | SO | WO | ST | WT |
|---|---|---|---|---|
| **Demographic change** | Foster in-migration by marketing for the region, providing affordable housing and integration policies. | Foster integration of immigrants, providing childcare facilities.<br><br>Provide good quality education services (schools, universities).<br><br>„Promote selective, but substantial immigration together with active integration policies for immigrants and groups originating from immigrant families (language, education, accommodation etc.).“ (3.2, 181) | Provide and foster housing in rural towns and centres (e.g. by providing good accessibility by road and public transport, attractive towns).<br><br>Follow the principle of decentralised concentration providing basic services also in rural towns. | "Policies supporting families, adaption of social systems, sufficient and affordable child care facilities, special services and technologies for the elderly." (3.2, 181)<br><br>„An affordable infrastructural policy in less densely populated territories,<br><br>concentrating services in mid-size towns as centres of provision of services of general interest,<br><br>practising innovative forms of infrastructural provision, e. g. mobile health care services.“ (3.2, 187) |
| **Polycentric development** | Support the existing decentralised concentration of settlement structure.<br><br>"Backing metropolitan areas by mitigating negative agglomeration effects (e.g. congestion),<br><br>improving competitiveness based on innovation in urban areas." (3.2, 186) | "More support and investments on public transport, mainly in cities and metropolitan areas including the respective wider surrounding territories,<br><br>to create opportunities for commuting as well as for weekend tourism." (3.2, 186), also crossing national borders. | "More support and investments on public transport for commuting as well as for weekend tourism." (3.2, 186), also promoting small centres. | "Development of sufficient and affordable social services (health, education, child care facilities, facilities for the elderly etc.) in remote, sparsely populated and depopulating areas.<br><br>Innovative solutions for the provision of such services in the countryside, especially in the very sparsely populated areas." (3.2, 184)<br><br>Make use of the cross-border separation of functions. |
| **Urban/rural relationship** | Support renewable energies production, esp. geothermal and forestry.<br><br>„Enhancement of the quality of tourism in order to better exploit its resources and raise its competitiveness.<br><br>Support local development and protect social and cultural identities through high quality tourism." (3.2, 182)<br><br>To this end, a marketing strategy should develop a strong label of Upper Rhine tourism. | "Management of urban sprawl through specific policies and land use regulations." (3.2, 185)<br><br>Address land-use conflicts. Protect natural areas, create a network of Natura 2000 areas. | "Innovative tailor-made solutions per region/area to support environmentally and socially sustainable tourism and protect cultural heritage." (3.2, 183)<br><br>Promote cash-crops over food-crops.<br><br>Promotion of high-tech industries in rural areas e.g. renewable energies. | „Support of agro-tourism.<br><br>Improvement of forest management, support to forestation.“ (3.2, 186)<br><br>Promotion of high-tech in good accessible rural areas. Broadband connections in rural areas. |
| **Accessibility & connectivity** | "Expanding the network of high-speed trains within the pentagon." (3.2, 186)<br><br>Bring freight traffic onto the railway.<br><br>Make use of road pricing and intelligent transport systems. | "Support should also be given to a number of strategic regional transport axes in the context of rural development plans and to the interlinking of these secondary networks with the primary, long-distance network." (3.2, 186)<br><br>Investments in the extension of the long-distance rail network should also create synergies for the regional mass transport. | "More public-private partnerships as well as privatisation of networks could contribute to provide the necessary financial resources for transport systems' improvement as for example in the railway sector." (3.2, 182)<br><br>Traffic avoidance should accompany the enhancement of traffic capacities. | Create a cross-border public transport system. Realize integrated timetables and fares.<br><br>Priority should be given to co-ordination, cooperation and operation rather than investments in physical infrastructure. |
| **Lisbon Strategy** | „Particular support of policies for certain technology clusters in specific locations without locking development into certain technologies.<br><br>Particular support should be given to local SMEs and researchers which have already demonstrated ability for restructuring, development and competitiveness." (3.2, 183)<br><br>Cooperation in R&D-sectors should produce cross-border cluster-effects. | "Enhance the market opportunities and the human potential assets of the CBA by improving its external and internal accessibility, especially its transport links with the neighbouring countries." (3.2, 183)<br><br>Develop a region-wide cross-border concept for the establishment of enterprises, to balance territorial disparities. | Promote the image of the 'region of the metropolises'.<br><br>Present the Upper Rhine as a decentralised competitive knowledge-driven region. (e.g. Silicon Valley). | Focus on endogene development factors, i.e. SMEs..<br><br>and tourism.<br><br>Foster attractiveness and cross-border-cooperation. Bind human and social capital into the region through active network management. Make use of the severeness of the situation to bring together stakeholders to work on an integrated region-wide development strategy. |
| **Gothenburg strategy** | Enhance the production of renewable energies, e.g. geothermal sources, biomass, wind energy.<br><br>Transform the region into a laboratory of research on those types of energies production. | "Better management of Natura sites.<br><br>Further implementation of networking and interlinking of natural sites and protected areas." (3.2, 185)<br><br>Make use of pro-active land-use management. | Promotion of cross-border linkups of Natura 2000 and other protected areas.<br><br>Establish intelligent transport systems.<br><br>Promote efficiency & sufficiency in transport, water usage, energy production / consumption. | Promotion of cross-border link-ups of Natura 2000 and other protected areas.<br><br>Establish intelligent transport systems.<br><br>Promote efficiency & sufficiency in transport, water usage, energy production / consumption. |
| **Cross-border governance** | Rise the density of stakeholder-networks within the region.<br><br>Establish and strengthen institutions like GISOR or Euro-Institute, as they play a role as intercultural cooperation & coordination hubs. | Strengthen the informal cooperation.<br><br>Provide public services that support with information in the case of institutional mismatches.<br><br>Promote intercultural exchange also on educational levels (i.e. high schools, universities). | Make use of the existing social capital to substitute missing economic capital. | Shift funding towards establishment and maintenance of regional networks, even though results might not be as visible and immediate as with infrastructure projects. |

Table 11.1: Strategies deriving from the finalised opportunities and threats of the SWOT-Analysis

**Silicon Rhine Valley**

The innovative urban centres are an excellent basis for further economic development especially regarding knowledge driven technologies of the existing SMEs and the high amount of research institutions and universities. This diversity leads to economic stability also in phases of crisis. Research and development as well as research institutions should be subject of active integration and networking. Existing networks are to be enhanced, widened and deepened (see also the "Pillar Science" of the Strategy Paper of the Upper Rhine Trinational Metropolitan Region, p12 and pp26ff, e.g. "Innovation Observatory", "BioValley", "Pole de compétivité automobile de future"). Chances of in-migration have to be used by an active marketing for selective but substantial in-migration of skilled workers. Also high-tech in well accessible rural areas should be promoted e.g. by offering broadband connections.

Physically, the inter-connections of economic, public and research institutions are to be enhanced by a cross-border, integrated system of public transport, relying on integrated timetables and common ticketing for the whole CBA (see also Strategy Paper of the Upper Rhine Trinational Metropolitan Region, pp24f).

Cross-border activities are to be flanked by the promotion of intercultural exchange also on educational levels (i.e. high schools, universities).

### Polycentricity – decentralised concentration (Christaller[4] 2.0):

The polycentric structure of the CBA should be enhanced based on the principle of decentralised concentration. The normative and often solely descriptive principle of Central Places is applied all over the CBA, consisting of cross-border functional cooperation of the central places (FUAs) of the CBA. By providing a dense network of settlements, the provision of goods and services in the whole region can be secured also in rural areas of the CBA by innovative and/or mobile provision of goods and services.

While urban centres of the FUAs are home of knowledge related economic activities, rural areas profit from offers of gastro-, agro- or wellness tourism as well as using the potentials of renewable energies as additional forms of Added Value. This can be supported by providing and fostering housing in rural towns and centres (e.g. by providing good accessibility by road and public transport as well as attractive towns).

Priority should be given to coordination, cooperation and joint operation rather than investments in physical infrastructure.

### Trademark Upper Rhine

The Upper Rhine shall be marketed as a recognizable image/trade mark, focussing on few, but recognizable strengths of the Upper Rhine. This marketing is targeted internal to the actors from politics, economy, research and social society within the CBA by a pro-active network management and identity building, as well as external by coherent external presentation (see also Strategy Paper of the Upper Rhine Trinational Metropolitan Region, p30). Local development has to be supported and social and cultural identities protected through high quality tourism. To this end, a marketing strategy should develop a strong label of Upper Rhine tourism.

Aim is to foster attractiveness and cross-border cooperation and bind human and social capital into the region through active network management and identity building. Here one can make use of the pressing challenges through globalisation, (i.e. increased mobility and global competition) of the situation to bring together stakeholders to work on an integrated region-wide development strategy.

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[4] Walter Christaller is synonym for a hierarchical but at the same time polycentric structure of settlements. His ground-breaking work on "Central places in Southern Germany" lead to the main principle of German spatial development. Also, in analysing the structure of settlements, he included in his research not only the South of Germany, but also Alsace and Northern Switzerland – so all parts of the CBA Upper Rhine.

# Chapter 12 – General conclusions

The project ULYSSES was thought of using mainly results of previous ESPON projects and the ESPON data base. The multi-thematic territorial analysis of the CBA was mainly based on a quantitative approach, using the ESPON data base in order to analyse the performance of the CBA. Here, some pitfalls and hurdles had to be overcome or are still parts of the analysis: the ESPON data base is partly outdated and has data gaps, especially regarding data for Switzerland. With the Swiss data missing, results are only based on French and German data and are not representative for the CBA.

Also, most of the ESPON data is available on NUTS3 and sometimes only NUTS2 level, insufficient for the CBA Upper Rhine with its relatively small delimitation. It became obvious in the discussion of the indicators and with the stakeholders, that the level of detail is not sufficient. The NUTS3 units involved are not only of uneven sizes (e.g. French NUST3 units compared to Swiss ones) but are too large to measure effects within the CBA, for instance when it comes to places of domicile of the incoming migrates, shrinkage and coexistent growth processes and so on. A further important issue is data availability. Without data for the Swiss NUTS units, the comparison is incomplete and cannot reveal what it could, if data was available. Spatial processes and developments – regardless of demography, traffic, commuting etc. – in the CBA cannot be analysed on this level but the former NUTS4 / LAU1 and 2 level would have been needed for analysis. For a more detailed analysis, in particular measuring the border effect and the disparities between the Rhine Valley and the edges of the CBA, more detailed and updated data on LAU 1 and 2 level, including the Switzerland, is needed.

Additional, some methodical steps have no real relevance for the analysis of the CBA. For instance, the catching-up analysis, measuring whether a region has a stronger, weaker or even economical development compared to the leader region in Europe, does not produce results exploitable for the region, as a) the leading region (London) had a tremendous but unsustainable growth in GDP by the financial sector, b) excluded spatial units like Basel have GDP higher than the leading region, c) new member states like Bulgaria, Romania, or Latvia are not comparable to "old states". Another example is the method of defining FUAs and MUAs relying on geographical units rather on interconnections of core, intermediate and hinterland structures.

What had to be excluded form the analysis are non-quantitative factors, nevertheless playing a crucial role for the attractiveness of a region: the Upper Rhine is well known for culture, landscape, warm summers, attractive cities, wine etc. Choosing the place of domicile, these factors are important for a lot of people (as long as the working conditions are met). From the quantitative statistical analysis some challenges of the future for the CBA come not in sight:

- The Rhine Valley is one of the European main corridors for passenger and freight transport. There are excessive networks of road and rail, but the interconnection between those are still insufficient. The expected increases in traffic all over Europe – especially in freight – and new connections through the Alps like the Gotthard will put pressure on the transport networks in this important part of the North-South connection within Europe.

- Also the public transport of the CBA is quite comprehensive in all national parts. The interconnection and quality of service in-between is still an important issue of cross-border cooperation, as a real cross-border network does not exist. The existing transport network is focused on national needs and institutions and a shared use is seldom aspired.

- Besides the quantities figures of the change in land use patterns, it is the conflict of different uses of land, e.g. for settlement or for agriculture, often competing for the same strips of land. The trend towards renewable energy produced from biomass may sharpen this conflict, as flat, fertile, machinery capable arable land is needed for the large-scale cultivation of energy crops.

Taking the above mentioned shortcomings into account, the main findings of the MTA were most of the time not surprising for the researchers and stakeholders, as most of the findings were already well known for the people familiar with the CBA. This is also due to the longstanding cooperation of the stakeholders of the CBA, resulting in common understanding and actions regarding the CBA. Nevertheless, those already known results – as a sort of "prior beliefs" – got an empirical evidence by the project ULYSSES and further actions will have a common ground to start from.

What became obvious in the MTA of the Trinational Metropolitan Region is its outstanding position compared to other cross-border areas under full research:

The Upper Rhine Trinational Metropolitan Region is a peripheral and at the same time central region in Europe: it is peripheral as it is located in the northern part of Switzerland, eastern part of France and south-western part of Germany with the River Rhine as its natural border between these three countries. And it is at the same time centrally located within Europe, being part of the "Blue Banana" respectively the "Pentagon". With this central position in Europe and the existence of a variety of small, medium und larger cities and conurbations, the CBA hosts a quite strong economy, administrative centres (e.g. the European Parliament), and research centres, resulting in rather low unemployment rates and high GDP respectively GVA.

Although there is a high potential of research and development in the CBA, the interconnection between the research institutions is still lacking behind. This is true for cross-border activities between the research institutions as well as between research and industry/economy, also across the borders of the CBA.

Although the CBA can be seen as an entity, more attached towards its own parts than to the administrative units belonging to, there are differences not to be ignored and stressed by the stakeholders as those might affect future performance and common actions:

- Regarding demography there is a big gap between the French and the Swiss, especially German parts of the CBA: while the Swiss and German parts of the CBA show low fertility rates and hence a negative natural development (with the Swiss NUTS units having a time lack but on the way to negative growth), the French parts is profiting from high fertility rates and hence a stable natural development.

- The CBA has an overall positive net migration, concentrating along the mayor axis of the CBA. Rural areas as well as the peripheral NUTS3 units in the Northwest (Pirmasens and Suedwestpfalz) suffer outmigration, which puts additional pressure on the overall development of this units.

- Despite the overall well economic performance of the CBA, there is clear ranking in-between the national parts of the CBA: the Swiss parts performs best, followed by the German parts, both having high rates of GDP per capita and a low unemployment rates, belonging to the lowest rates within Europe and already causing shortages of skilled workforce in some sectors. France as a total shows higher figures according unemployment, long-term unemployment and youth unemployment, but the NUTS2 unit Alsace is significant lower than the EU and national average but significant higher compared to the Swiss and German units of the CBA.

- This afore mentioned difference in economic performance results in strong commuting figures, especially from the rather peripheral NUTS3 units of Pirmasens and Suedwestpfalz and across the national borders from France to Germany and France-Germany to Switzerland. Settlement patterns of the economic strong city of Basel can be interpreted by this outstanding economic position, resulting in a trinational conurbation, stretching its outskirts to France and Germany.

- Within the CBA there is a clear difference between the centrally located Rhine Valley and the fringe of the CBA, especially of then low mountain ranges in the West, East and South. Development – regarding settlement and population growth, immigration, economy, research, traffic – concentrates along the main axis of the CBA, resulting in functional losses at the edges of the CBA, while land-use conflicts in the Valley sharpen over the time.

The ULYSSES project might serve as catalyst for several issues, some more or less important for the Upper Rhine Trinational Metropolitan Region:

- The project supports to open a "window to Europe", putting the issues of cross-border regions onto the European agenda. Territorial cohesion is one of the main objectives of European policies, and territorial cooperation is among the key strategies to reach this objective. In this context, cross-border cooperation plays a vital role. It contributes to creating synergies and coordinating actions between different Member States' regions, featuring different governance systems and performance realities. On regional scale, cross-border cooperation is representative of the actual performance of the European territorial cohesion process. This territorial dimension of European policy is also highlighted in the document "Europe 2020: New European strategy"

(2010) approved by the European Commission. Stressing the needs, challenges and added value of cross-border cooperation is a political contribution of ULYSSES.

- Stakeholder involvement and participation was a key principle of ULYSSES. By the cooperation between researchers and stakeholders from "both sides of the border", an ongoing cross-border cooperation process might be fostered, which is true for those CBAs which cannot rely on existing structures. The Upper Rhine as an "old border" shows a long standing tradition of cross-border cooperation, whereby such an initial process is not required. Emphasis is more on enduring such governance structures, also beyond the funding periods of the EU, and highlighting institutions like the Euro-Institute (education and research) or GISOR/SIGRS (GIS) for cross-border cooperation and governance.

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# List of maps and tables

# List of abbreviations and glossary

**CBA:** Abbreviation for the Cross Border Area representing the Trinational Metropolitan Area Upper Rhine

**GDP:** Gross Domestic Product. GDP refers to the market value of all final goods and services produced within a country in a given period.

**GVA:** Gross Value Added. GVA is a measure in economics of the value of goods and services produced in an area, industry or sector of an economy. In national accounts GVA is output minus intermediate consumption GVA is related to GDP as follows: GVA + taxes – subsidies = GDP

**LAU:** Local administrative unit. LAUs are basic components of Nomenclature of Territorial Units for Statistics (NUTS) regions. For each EU member country, two levels of Local Administrative Units (LAU) are defined: LAU-1 and LAU-2, which were previously called NUTS-4 and NUTS-5

**NACE:** Nomenclature statistique des activités économiques dans la Communauté européenne (Statistical classification of economic activities in the European Community): European industry standard classification system consisting of a 6 digit code

**NUTS:** Abbreviation of the Nomenclature of Units for Territorial Statistics. It represents a 'geocode standard' for referencing the subdivisions of EU space for statistical purposes.

**NUTS 1:** First level definition of the EU space, corresponding to countries

**NUTS 2:** Second level definition of the EU space, corresponding to regions

**NUTS 3:** Third level definition of the EU space, corresponding to districts

**NUTS 4:** Fourth level definition of the EU space, corresponding to municipalities replaced by the LAU 1 and LAU 2

**Population Growth:** Represents the change of total population over a certain time period.

**Population Density:** Represents a key geographic parameter expressing the total population per unit area, usually per sq km.

**Total Dependency Ratio:** Represents the ratio of the combined youth and senior population to the working-age population.

**Total Fertility Rate:** Represents the number of children that would be born to a woman if she were to live to the end of her childbearing years and bear children in accordance with current age-specific fertility rates.

# Annex I – Description of ESPON scenarios

## I.1 Integrated baseline scenario

### *I.1.1 Objectives and principles of the integrated baseline scenario*

"By nature, a baseline scenario is based on the continuation of trends and on the principle that no major changes occur in main-stream and on-going policies applied which have played a part in shaping them. It is however important to consider that in certain fields, such as demography, the evolution over past decades (structural development of the European population, with decreasing fertility rates and mortality rates, leading to population ageing) is also valid for the coming decades, while in other fields, such as energy (particularly price), the recent developments seem much more relevant for the future, than trends over a longer period. In addition, a baseline scenario has also to consider a number of policy measures adopted recently (such as the Kyoto agreement), even if the impacts of such measures are not yet well known. In other words, a baseline scenario is not identical to the extrapolation into the future of long-range past evolutions." (ESPON 3.2, 48).

### *I.1.2 Hypotheses of the integrated baseline scenario*

| | |
|---|---|
| Demography | Reduced population ageing as a result of lower fertility and mortality rates<br>Stable total European population (+ enlargement)<br>Increasing, but globally controlled external migration<br>Unchanged constraints on internal migration |
| Economy | Slowly increasing total activity rate<br>Slowly growing R&D expenditure, but constant technological gap vis-a-vis the USA<br>Decreasing public expenditure |
| Energy | Steady increase of energy prices<br>Stable or decreasing European consumption<br>Increasing use of renewables |
| Transport | Continued growth of traffic, but moderately curbed by energy price with possible modal shift<br>Constant increase of infrastructure endowment, but below demand needs<br>Partial application of the Kyoto Agreement |
| Rural development | Further liberalisation of international trade<br>Increasing industrialisation of agricultural production, including the production of bio-fuels<br>Further diversification of functions of rural areas; stronger dependence upon the residential economy and new forms of tourism<br>Progressive reduction of CAP budget |
| Socio-cultural sector | Heterogeneous and insufficient policies related to integration<br>Growing ethnic, religious and social tensions |
| Governance | Increasing cooperation between cross-border regions<br>Increase in multi-level and cross-sectoral approaches, but limited to specific programmes (rural development);<br>Maintenance of competition and incoherence between policies devoted to innovation and competitiveness and others devoted to cohesion |
| Climate change | Moderate overall climate change (+1°)<br>Increase in extreme local events<br>Moderate emission levels due to new technologies<br>Few (too few) structural adaptation measures |
| Enlargement | Bulgaria & Romania by 2007<br>Western Balkans (with Croatia acceding first) By 2020<br>Turkey By 2030<br>Continued combination of deepening and widening<br>Modest impact of neighbourhood policy |

Table I.1: Hypotheses of the integrated competitiveness-oriented scenario until 2030
(Source: ESPON 3.2, 48f)

### I.1.3. Impact of the baseline scenario onto the cross-border region Upper Rhine

Thanks to the relatively high fertility rates and ongoing migration gains the region suffers less from negative effects of ageing. Shortages in skilled workforce, which can be observed in other regions, don't as much of a problem in the CBA. Nevertheless the region will face increasing intraregional disparities due to depopulation and ageing in the low mountain ranges cause by migratory movements towards the Rhine valley.

Starting already from a high level, the cross-border integration of the CBA will advance slowly but steadily in the baseline scenario. The generally rising importance of cross-border and multi-level-governance emphasizes the already well-developed governance-system in the region leading to adequate decision-making capacities. "Over-institutionalisation" and contradicting European and national policies though still hinder the effectiveness of the regional governance-system.

Even though the region doesn't contain any MEGA, it plays an important role in the EU polycentric system. The already existing polycentric settlement structure in the region is thus further consolidated. In spite of the favourable position inside of the European pentagon the growing inner-regional disparities take effect on the more remote areas of the CBA. Peripheral centres show a significant loss in service level, while rural areas struggle to keep up the economic bases specialising in tourism and gastronomy.

This process is further accelerated by cutbacks in the CAP, leaving agriculture under high market pressure. Decline in agricultural activities causes major shifts in landscape appearance. As a consequence, the regional periphery i.e. the low mountain ranges, become increasingly disconnected from the major developments and flows in the Rhine valley. Due to high recreation quality though, the rural areas of the region become important destinations for wellness and health tourism. Having closeby natural areas, makes the region attractive for immigration, with depopulation tendencies in the low mountain ranges compensating for eventual environmental sacrileges and urban sprawl in the valley.

Due to the location in the centre of Europe, the region stays highly accessible from all important parts of the continent. With the ongoing cross-border integration, inner-regional public transport is also improving, making European accessibility also an asset of more remote regional centres. The increasing accessibility of the regional periphery boosts tourism of the low mountain ranges further. This comes with downsides though. Due to continuing growth of traffic, especially transit in the Rhine valley, and infrastructure investments lacking behind, the region becomes a constant European narrow passage, as well in road as in the rail freight traffic.

The growing demand for traffic infrastructure as well as immigration flows have severe impact on already existing land use conflicts. Unfortunately the Natura 2000 concept proves ineffective against high pressure on the settlement structure in the region. Correspondingly, measures against extreme weather events owing to climate change as flooding lack behind their severity.

The regions economic base as a highly competitive knowledge driven cross-border-region is further improved. Cross-border integration, positive cluster effects and the slowly increasing expenditure in R&D strengthen the region providing for a stable economic growth. Unemployment rates though are not corresponding with the regional growth rates due to cut backs in public spending witch affects the large public sectors in the regions cities.

## I.2 Danubian Europe: Integrated cohesion-oriented scenario

### I.2.1 Objectives and principles of the integrated cohesion-oriented scenario

This is a prospective, policy-oriented scenario. In this scenario, the main priorities of public policies at EU level, in a context of growing globalisation, are focused on economic, social and territorial cohesion and not on global competitiveness. This does not mean that the improvement of competitiveness is excluded, but rather, that in case of incompatibility between cohesion and competitiveness priority will be given to cohesion. This is for instance the case if growing competitiveness is likely to increase territorial disparities. It is however important to indicate that measures related to competitiveness in the context of structural policies are fully integrated in the scenario, even if they are likely to generate intra-regional disparities in less developed regions.

### I.2.2 Hypotheses of the integrated cohesion-oriented scenario until 2030

| | |
|---|---|
| Demography | Restrictive external migration policies<br>More flexible retirement ages<br>Better balance of population structure through encouragement of higher fertility rates<br>More flexible arrangements for child care<br>Unchanged constraints on internal migration |
| Economy | Maintaining the volume of the EU budget<br>Reinforcement of structural funds and concentration on weakest regions<br>Further harmonization of taxation and social security systems, as far as non detrimental to the competitiveness of less developed countries |
| Energy | Steady increase of energy prices<br>Realisation of TEN-E<br>Promotion of decentralised energy production, particularly renewables |
| Transport | Development of TEN-T with priority given to peripheral regions at different scales<br>Support to transport services in rural and less developed areas<br>Application of the Kyoto Agreement |
| Rural development | Minor CAP reforms, but shift from pillar 1 to pillar 2. Priority given to less developed rural regions in the field of direct payments to farmers (pillar 1)<br>Priority given to environmental and animal health criteria<br>Promotion of quality products<br>Active policy for economic diversification in rural areas, including SMEs, tourism, residential functions etc. |
| Socio-cultural sector | Promotion of regional and European identities<br>Integration of marginal groups like romany in peripheral areas<br>Proactive socio-cultural integration policies, particularly in cities<br>Increased fiscal and/or social investment in quality of life issues , like health, personal care, local environment, etc...) |
| Governance | Active multi-level territorial governance, particularly in areas supported by structural funds<br>Strong role of public actors in territorial governance<br>Stronger role for the European Commission |
| Climate change | Moderate overall climate change (+1°)<br>Increase of extreme local events<br>Constant emission levels<br>strict mitigation measures (taxes, road pricing as far as non detrimental to peripheral regions)<br>Wide range of adaptation measures like EU hazard funds and large investments |
| Enlargement | Deepening preferred to widening<br>Brake on further enlargements (except Bulgaria and Romania)<br>Only lip service to neighbourhood policy |

Table I.2: Hypotheses of the integrated cohesion-oriented scenario until 2030
(Source: ESPON 3.2, 85f)

### I.2.3. Impact of the integrated cohesion-oriented scenario onto the cross-border region Upper Rhine

According to the integrated cohesion-oriented scenario (Danubian Europe) domestic fertility rates are stimulated via measures such as childcare support and tax incentives. As part of a new proactive social policy stricter immigration controls for non-EU countries are installed and integration of minorities into mainstream European society is promoted. Within the CBA it means a reduction of the effects of aging, but the restrictive immigration policy could nullify the fertility increase. Nonetheless the population in the CBA will rise slightly. The problems of demographic change yet are not solved.

As regions are strengthened in the cohesion scenario instead of metropolitan areas, structural funds are distributed mainly to the most needy regions. The CBA will not benefit from that policy as it is economically relatively strong. Neither in energy infrastructure nor in the transport sector are great investments or funding expected. But as the potentials of its policentristic structure are activated and strengthened, the CBA can gain from concentration of cohesion in this scenario. The promotion of rural and remote areas (e.g. Vosges, Black Forrest, Palatine Forest) as locations for living and working helps intensify tourism and reduces the gap between these and the Rhine axis.

Promotion of especially railways can lead to optimization in the system which still is orientated along national borders. Within the cohesion-oriented scenario the connectivity between regions and intraregional access to public transport is supported. Therefore accessibility within the CBA and performance of public transport in general is increasing. The territorial development which is more balanced in economic terms leads to increased mobility, particularly in peripheral regions.

With the environment being considered one of the main pillars of European solidarity, large investments are possible to protect the environment, mitigate Green-House-Gas emissions and adapt to the impacts of climate change. The application of Kyoto Agreement supports the national mitigation strategies and paves the way for investments into renewable energy production within the CBA. Low energy consumption through better effectiveness, resilient cities and low emissions are the consequences. This environmental friendly policy can support R&D in the CBA in the field of climate change and environment studies.

The cohesive policy environment supports the CBA's traditional strong cooperative governance initiatives. Cross-border cooperation will be strengthened, the public stakeholders play a strong role in cooperative decision making process. Even in this scenario the special situation with Switzerland is not being considered. To help overcome different policy approaches and weaken the effects of the national borders, cooperation of the stakeholders is the key. However the different approaches also contain the threat of Switzerland and the rest of the CBA drifting apart from each other.

## I.3 Rhine-Rhone Europe: competitiveness-oriented scenario

### I.3.1 Objectives and principles of the integrated competitiveness-oriented scenario

„This scenario is a prospective, policy-oriented scenario. It is based on the assumption of a significant reshaping of EU policies originating in the disappointing results of the implementation of the Lisbon Strategy during the period 2000-2005. The EU budget is being reduced and EU expenditures are being targeted towards R&D, education, ICT and strategic external accessibility, including in structural policies. The CAP is subject to rapid and radical liberalisation, with a significant reduction of support, of external tariffs and of export subsidies. The budget of structural policies is also being reduced, with a part of former EU interventions being re-nationalised and EU support being concentrated on the most competitive areas of less developed regions. As a counterpart, public services are further liberalised and privatised, labour markets are regulated in a more flexible way and the third pillar of EU policies (foreign policy, justice, security etc.) is being strengthened. Widening of the market through further EU enlargements is part of the strategy of increased competitiveness. After Romania and Bulgaria join the EU in 2007, the Western Balkans will join in 2015 and Turkey and Ukraine in 2020. The neighbourhood policy is being strengthened and the Maghreb countries are integrated into the European Economic Area." (ESPON 3.2, 117)

### I.3.2 Hypotheses of the integrated competitiveness-oriented scenario until 2030

| | |
|---|---|
| Demography | Increase in selective external in-migration: economic sectors & destination<br>Abolition of constraints to internal migration<br>Increase in retirement age<br>Encouragement of fertility rate through fiscal incentives |
| Economy | Stronger reduction of total public expenditure compared with the baseline scenario<br>Further privatisation and liberalization of public services<br>Prioritisation of public expenditures in R&D, education, ICT and strategic external accessibility (ICT and transport)<br>More and easily accessible venture capital<br>'Flexibilisation' of labour markets |
| Energy | Steady increase of energy prices<br>European consumption increasing<br>Realisation of TEN – E: investment in infrastructure according to market demand<br>Priority to large-scale energy production for metropolitan areas as an alternative for oil and gas |
| Transport | Realisation of TEN-T: investment in infrastructure according to market demand<br>Prioritisation of links between metropolitan areas<br>Application of the Kyoto Agreement |
| Rural development | Rapid and radical liberalisation of CAP (reduction of tariffs, o budget and of export subsidies)<br>Reduction of support to rural development policy<br>Rapid industrialisation of agricultural production<br>Strong dualisation of rural areas, resulting from market forces |
| Socio-cultural sector | Reactive management of social problems in large cities<br>Increase of surveillance and security systems |
| Governance | Abolishment of barriers to cross-border cooperation<br>Less public intervention<br>Wider application of the Open Method of Coordination<br>Increased role of private sector in decision making<br>Strengthening of the third pillar of the EU policies: foreign policy, justice, security |
| Climate change | Moderate overall climate change (+1°)<br>Increase of extreme local events<br>Constant to increasing emission levels<br>Mitigation measures based on flexible schemes & stimulation of alternative technologies.<br>Adaptation measures only where cost efficient |
| Enlargement | Continuing enlargement to widen the market:<br>Romania, Bulgaria in 2007<br>Western Balkan, EFTA/EEA countries in 2015<br>Turkey in 2020,<br>Strengthening of the neighbourhood policy (Maghreb, Ukraine, Russia etc.) |

Table I.3: Hypotheses of the integrated competitiveness-oriented scenario until 2030
(Source: ESPON 3.2, 117f)

### I.3.3. Impact of the Rhine-Rhone scenario onto the cross-border region Upper Rhine

According to the competitiveness-oriented scenario (Rhine-Rhone) it is expected to have an overall increase in fertility rates and a selective immigration from countries outside the EU. Inter-European migration as well as incoming migration will concentrate on the already existing bigger agglomerations and "second-rank or potential MEGAS". With the Upper Rhine located in the Pentagon (London, Paris, Milan, Munich, Hamburg), the CBA will profit from this strengthening of the European core area. The effects of aging –especially in the Swiss and German parts of the CBA are reduced by increased fertility and in-migration, the social systems hence "disburdens" by rising fertility rates and increase of retirement age, though still high dependency ratios exist. While younger generations and immigrants concentrate in and around metropolitan areas, retirees move towards attractive rural areas, small and medium-sized towns and develop new patterns of mobility more related to recreation, cultural activities, health care, leisure travelling etc. Although the CBA has no real metropolis within is delimitations, it will be destination of incoming migration flows, especially to the already bigger and economic strong centres. The hierarchy of the urban system sharpens as a matter of fact.

Despite the reduction of the CAP (and main transfer to new member states) agricultural activities are mainly stable due to specialized activities (wine, orchading). Forestry has a growing importance due to demand of renewable energy sources. Another effect is that the marginalisation of rural areas is speeded up by reduced funds, especially on parts of the CBA relying on typical mean agricultural activities ("marginal revenue") and being peripheral regarding then CBA (Vosges, Black Forrest, Palatine Forest).

Due to the economic activity will concentrate inter alia within the Pentagon, increased flows of traffic along the existing axis with side-effects of emissions are to be expected. The EU concentrates on investments in the road and motorway network, by which bottlenecks along the Rhine will be diminished. The reduced investments in rail infrastructure leads to capacity problems along the Rhine axis, as high increases of freight traffic between the metropolises of the Pentagon are to be expected.

The concentration on the Pentagon favours the CBA economically, although it is not directly part of core economic centres in Europe. Also the EU stressing of R&D and growth sector industries investments and activities favour economic development in the CBA. The selected in-migration supplies the labour market with skilled workers. In absence of a real metropolis, the CBA can only partly keep pace with overall economic development of the core agglomerations, which bears the threat of only serving as a transport corridor between the strong centres of the Pentagon.

Despite the shortage of fossil fuels the further expansion of metropolitan areas brings with it new waves of suburbanisation and land-claims, soil-sealing and devastation of natural habitats. New needs of travel in expanding metropolitan areas are accompanied by increasing emission from passenger transport. Renewable energies play an increasing role. This will lead to new conflicts of land-use in the already densely populated and used Rhine Valley, where settlements, traffic infrastructure, mean and specialized agricultural activities, biomass etc. Geothermal energy can be a chance for the CBA, especially –again in the Rhine Valley.

The concurrence situation in the competitiveness based scenario forces the region to emphasize cross-border cooperation against the loss of significance. Governance structures and aims concentrate on only market-relevant projects. On the other hand funding for cross-border activities is cut to the bone, making long-term cooperation programmes unprofitable. Cross-border cooperation and governance will rely on personal contact of the stakeholders of the CBA.

# Annex II – SWOT analysis

Based on the integrated analysis, a SWOT-analysis for the CBA was elaborated, based on the **S**trength and **W**eaknesses identified, and **O**pportunities and **T**hreats deriving from the ESPON 3.2 scenarios Baseline, Danubian and Rhine-Rhone Europe (see Annex I). By choosing the most likely development, a final version of O&T built the basis for the action-decision-phase by suggesting strategies. Those opportunities O&T as well as strategies identified were validated by the stakeholders of the CBA in a workshop on 23rd of February 2012.

| | Integrated baseline scenario | | Danubian Europe: Integrated cohesion-oriented scenario | | Rhine-Rhone Europe: competitiveness-oriented scenario | |
|---|---|---|---|---|---|---|
| | **opportunity** | **threat** | **opportunity** | **threat** | **opportunity** | **threat** |
| **Demography** | Negative effects of ageing are mitigated by ongoing migration gains and relatively high fertility rates | Growing intraregional disparities: depopulation and ageing in the low mountain ranges towards the Rhine. | Effects of aging reduced by increased fertility | Restrictive in-migration nullifies fertility increase | Effects of aging reduced by increased fertility and in-migration; social system "disburdens" by rising fertility rates and increase of retirement age, though still high dependency ratios | social integration of in-migrating workforce |
| **Polycentric development** | Slow but steady progress in cross-border integration of the CBA, leading to a robust polycentric structure. Though not containing any MEGA, the region plays an important role in the EU polycentric city system. | Rural areas in the CBA transform into recreational areas being somewhat disconnected from the major developments and flows in the Rhine valley. Peripheral centres show significant loss in service level. | Potentials of polycentristic structure are activated and strengthened; national borders may be weakened and network strengthened; CBA profits from investments in transport and economic diversification in rural areas (such as tourism) | more reason to commute result in more traffic and traffic jam; greenhouse-gas mitigation measures less efficient | "second-rank or potential MEGAS" show high performance; While younger generations and immigrants concentrate in and around metropolitan areas, retirees move towards attractive rural areas, small and medium-sized towns and develop new patterns of mobility more related to recreation, cultural activities, health care, leisure travelling etc. | Regions with metropolitan areas and large cities are clearly favoured, hence the hierarchy of the urban system sharpens |
| **Urban/rural relationship** | Due to high recreation quality, the rural areas of the region become important destinations for wellness and health tourism, with stable value added. Having closeby natural areas, makes the region attractive for immigration. | Due to cutbacks in the CAP, agriculture finds itself under high market pressure, causing major shifts in the landscape appearance of the rural areas and the valley. | promotion of rural and remote areas helps intensify tourism; subsidies to farmers and investment in rural areas reduce the gap between urban and rural areas | urban sprawl and land-claims rise; competitiveness between environmental issues and investment plans rises | despite reduction of CAP (and main transfer to new member states) stable agricultural activities due to specialized activities (wine, orchading); growing importance of forestry due to demand of renewable energy sources | marginalisation of rural areas speeded up by reduced funds, especially on parts of the CBA relying on typical mean agricultural activities ("marginal revenue") |

Table II.1: Opportunities and Threats deriving from the ESPON 3.2 scenarios 1/2

| | Integrated baseline scenario | | Danubian Europe: Integrated cohesion-oriented scenario | | Rhine-Rhone Europe: competitiveness-oriented scenario | |
|---|---|---|---|---|---|---|
| | **opportunity** | **threat** | **opportunity** | **threat** | **opportunity** | **threat** |
| **Accessibility and connectivity** | High accessibility of all important parts of the EU from within of the region. Slow but steady improvement of the inner regional public transport. | Due to continuing growth of traffic, especially transit in the Rhine Valley and infrastructures investments lacking behind, the region becomes a constant European narrow passage, as well in road as in the rail freight traffic. | By investments in transport (esp. train system) the accessibility of the CBA and within itself rises, therefore performance is increasing | more reason to commute result in more traffic and traffic jam; greenhouse-gas mitigation measures less efficient | road and motorway investments in large-scale important TEN projects reduce bottle-necks in the CBA | increase flows of traffic along the existing axis with side-effects of emissions; reduced investments in rail infrastructure leads to capacity problems along Rhine axis |
| **Lisbon Strategy** | Strengthening of the regional R&D activities also across the border and stable economic growth. | Decline in unemployment not corresponding to the growth rates due to cut backs in public spending witch affects the large public sectors in the regions cities. | strengthening of peripheral areas reduces gap of economic performance; more jobs in the rural areas support local economy | outflow from anyway polycentristic structure weakens urban centres | concentration on Pentagon favours CBA, although not directly part of core economic centres within Europe; selected in-migration supplies labour market with skilled workers; concentration on R&D as well as growth sector industries favour economy in the CBA | CBA serves as transport corridor between the strong centres of the Pentagon; in absence of a real metropolis, CBA can only partly keep pace with overall economic development |
| **Gothenburg Strategy** | Depopulation in the low mountain ranges compensates for eventual environmental sacrileges in the valley. | Natura 2000 proves ineffective against sprawl due to the high pressure on the settlement structure in the region. Measures against extreme weather events owing to climate change as flooding lack behind their severity. | large investments in adaptation to Climate Change rise resilience; application of Kyoto Agreement supports national mitigation strategies | urban sprawl and land-claim endanger linkages of Natura 2000 areas; pressure on landscape rising, esp. in rural areas | Shortage of fossil fuels favours renewable energy like geothermal energy in the CBA. | The further expansion of metropolitan areas brings with it new waves of suburbanisation and land-claims, soil-sealing and devastation of natural habitats. New needs of travel in expanding metropolitan areas accompanied by increasing emission from passenger transport. |
| **Cross-border governance** | General rising importance of cross-border and multi-level-governance emphasizes the already well-developed governance-system in the region leading to powerful decision-making capacities. | Over-institutionalisation and contradicting European and national policies hinder the effectiveness of the regional governance-system. | cohesion policy supports cooperative cross-border governance in the CBA | developments of France and Germany and on the contrary Switzerland drift apart by different policies concerning rural and remote areas due to EU membership, might result in different policy approaches and weaken cross-border cooperation | The concurrence situation in the competitiveness based scenario forces the region to emphasize cross-border cooperation against the loss of significance. Only market-relevant project are approached. | Funding for cross-border activities is cut to the bone, making long-term cooperation programmes unprofitable and thus impossible. |

Table II.2: Opportunities and Threats deriving from the ESPON 3.2 scenarios 2/2

| I – Demographic Change | STRENGTH (S) positive net migration | WEAKNESS (W) low fertility rates, aging of population, high dependency ratios (except for French units) |
|---|---|---|
| **OPPORTUNITY (O)** Due to decreasing fertility rates, the EU fosters selective in-migration, which owing to high attractiveness favours significant migration of high skilled workforce into the region, causing steady but low population increase. | **SO-STRATEGY** Foster in-migration by advertising for the region, providing affordable housing and integration policies. | **WO-STRATEGY** Foster integration of immigrants, providing childcare facilities and good quality education services (schools, universities); see also ESPON 3.2, p 181: „Promote selective, but substantial immigration together with active integration policies for immigrants and groups originating from immigrant families (language, education, accommodation etc.)" |
| **THREAT (T)** Fertility rates continue to decline. Since migration gains affect only the centres in the valley, growing disparities between the major cities and the rural areas namely the low mountain ranges can be observed. | **ST-STRATEGY** Provide and foster housing in rural towns and centres (e.g. by providing good accessibility by road and public transport, attractive towns). Follow the principle of decentralised concentration providing basic services also in rural towns. | **WT-STRATEGY** Policies supporting families, adaptation of social systems esp. retirement funds: "Development of sufficient and affordable child care facilities as well as special services and technologies for the elderly." (3.2, 181); „Conducting an affordable infrastructural policy in less densely populated territories either by concentrating the respective facilities in mid-size cities and towns which might serve as centres of provision of services of general interest (communications, health, education etc., esp. in child care facilities and specific services for the elderly) and by practising innovative forms of infrastructural provision, e. g. mobile health care services" (3.2, 187) |

Table II.3: Strategies from SWOT, I – Demographic Change

| | STRENGTH (S)<br><br>Polycentric nature of the urban system with high capacity transport links provides close connections between cities, their population and activities; also trends of depopulation or rural parts can be lowered | WEAKNESS (W)<br><br>Concentration along the Rhine axis, outgoing migration in rural, mountain parts. Polycentric network mainly bound to national borders, no real cross-border polycentric functions |
|---|---|---|
| **II – Polycentric Development** | | |
| **OPPORTUNITY (O)**<br><br>The existing polycentric structure prevents total centralisation on one regional centre. Existing major towns are strengthened. | **SO-STRATEGY**<br><br>"Backing metropolitan areas by mitigating negative agglomeration effects (e.g. congestion); improving competitiveness based on innovation in urban areas." (3.2, 186) Support the existing decentralised concentration of settlement structure. | **WO-STRATEGY**<br><br>"More support and investments on public transport, mainly in cities and metropolitan areas including the respective wider surrounding territories, to create opportunities for commuting as well as for weekend tourism" (3.2, 186), also crossing national borders. |
| **THREAT (T)**<br><br>The existing hierarchy of centres becomes altered. Smaller centres loose importance. | **ST-STRATEGY**<br><br>"More support and investments on public transport for commuting as well as for weekend tourism" (3.2, 186), also promoting small centres. | **WT-STRATEGY**<br><br>"Development of sufficient and affordable social services (health, education, child care facilities, facilities for the elderly etc.) in remote, sparsely populated and depopulating areas; innovative solutions for the provision of such services in the countryside, especially in the very sparsely populated areas." (3.2, 184) Make use of the cross-border of functional cooperation. |

Table II.4: Strategies from SWOT, II – Polycentric Development

|  | **STRENGTH (S)**<br><br>Marginal but solid Added Value of agricultural activities; agriculture plays only a minor role in economy but is important for the image of the CBA (esp. wine and orcharding) and for tourism (esp. "gastro-tourism") | **WEAKNESS (W)**<br><br>Development mainly in plain parts of the Rhine Valley resulting in exhaustive land-claims and sprawl as well as conflicts in land-use and loss of agricultural land in the valley. |
|---|---|---|
| **III – Urban/rural relationship** | | |
| **OPPORTUNITY (O)**<br><br>The rural areas develop activities in creation tourism and lumber industry for renewable energy. Having closeby natural areas contributes considerably to the regions attractiveness. | **SO-STRATEGY**<br><br>„Enhancement of the quality of tourism in order to better exploit its resources and raise its competitiveness as well as to support local development and protect social and cultural identities." (3.2, 182) To this end, a marketing strategy should develop a strong label of Upper Rhine tourism. Support renewable energies production, esp. geothermal and forestry. | **WO-STRATEGY**<br><br>"Management of urban sprawl through specific policies and land use regulations" (3.2, 185) Address land-use conflicts. Protect natural areas; create a network of Natura 2000 areas. |
| **THREAT (T)**<br><br>Food crops loose importance for the rural areas. Due to the lack of high technology sectors, rural areas run the risk of being marginalised. | **ST-STRATEGY**<br><br>"Innovative tailor-made solutions per region/area to support environmentally and socially sustainable tourism and protect cultural heritage" (3.2, 183) Promote cash-crops over food-crops. Promotion of high-tech industries in rural areas e.g. renewable energies. | **WT-STRATEGY**<br><br>„Support of agro-tourism.<br>- improvement of forest management, support to forestation." (3.2, 186) Promotion of high tech in good accessible rural areas. Broadband connections in rural areas. |

Table II.5: Strategies from SWOT, III – Urban/rural relationship

| IV – Accessibility and Connectivity | STRENGTH (S)<br><br>High accessibility of CBA within Europe regarding road and rail. | WEAKNESS (W)<br><br>Intra-regional accessibility, esp. regarding public transport, still lacking behind; networks are bound to national networks; no major air hub, proximity to Zurich and Frankfurt hinders development of existing airports. |
|---|---|---|
| OPPORTUNITY (O)<br><br>Due to the location in the pentagon and continuing efforts for cross-border-transport-systems, intraregional as well as interregional accessibility increase steadily. | **SO-STRATEGY**<br><br>"Expanding the network of high-speed trains within the pentagon" (3.2, 186) Bring freight traffic onto the railway. Make use of road pricing and intelligent transport systems. | **WO-STRATEGY**<br><br>"Support should also be given to a number of strategic regional transport axes in the context of rural development plans and to the interlinking of these secondary networks with the primary, long-distance network." (3.2, 186) Investments in the extension of the long-distance rail network should also create synergies for the regional mass transport. |
| THREAT (T)<br><br>Due to continuous lacking behind of infrastructure investments, the regional infrastructure is continuously overloaded. This concerns road infrastructure as well as regional and long-distance public transport and railway freight traffic. The region becomes a European narrow passage. | **ST-STRATEGY**<br><br>"More public-private partnerships as well as privatisation of networks could contribute to provide the necessary financial resources for transport systems' improvement as for example in the railway sector." (3.2, 182) Traffic avoidance should accompany the enhancement of traffic capacities. | **WT-STRATEGY**<br><br>Create a cross-border public transport system with integrated timetables and fares; priority should be given to co-ordination, cooperation and operation rather than investments in physical infrastructure. |

Table II.6: Strategies from SWOT, IV – Accessibility and Connectivity

| | STRENGTH (S) | WEAKNESS (W) |
|---|---|---|
| **V – Lisbon Strategy** | Strong economy: high GPD per capita and low unemployment rates due to: high accessibility within Europe and high share of R&D, industry and number of patents. | Deviation within the CBA: economic activities tend to concentrate in the core, while more peripheral areas (Vosges, Black Forest, Palatanian Forest) are lacking behind (with some exceptions, esp. in German rural parts); gap of economic performance and unemployment rates between the three national parts of the CBA |
| **OPPORTUNITY (O)**<br><br>Stability through diversity! Thanks to the regions industry structure (R&D, renewable energies), the region shows steady economic growth, as well as proofing relatively resistant against crises. Immigration provides for a skilled workforce. | **SO-STRATEGY**<br><br>"Particular support of policies for certain technology clusters in specific locations without locking development into certain technologies. Particular support should be given to local SMEs and researchers which have already demonstrated ability for restructuring, development and competitiveness" (3.2, 183) Cooperation in R&D-sectors should produce cross-border cluster-effects. | **WO-STRATEGY**<br><br>"Enhance the market opportunities and the human potential assets of the CBA by improving its external and internal accessibility, especially its transport links …" (3.2, 183) Develop a region-wide cross-border concept for the establishment of enterprises, to balance territorial disparities. |
| **THREAT (T)**<br><br>The lack of a genuine metropolis, assigns the region the role of a transport corridor, with a large part of flows just passing by. The scarce public budgets require important cutbacks in personnel. The imminent withdrawal of the European parliament would inflict an important loss of significance. | **ST-STRATEGY**<br><br>Promote the image of the 'region of the metropolises'. Present the Upper Rhine as a decentralised competitive knowledge-driven region. (e.g. Silicon Valley). | **WT-STRATEGY**<br><br>Focus on endogen development factors, i.e. SMEs, tourism, attractiveness of the region, cross-border-cooperation. Bind human and social capital into the region through active network management. Make use of the severeness of the situation to bring together stakeholders to work on an integrated region-wide development strategy. |

Table II.7: Strategies from SWOT, V – Lisbon Strategy

| VI – Gothenburg Strategy | STRENGTH (S)<br><br>Regarding environmental issues, the CBA is relatively good positioned with relatively few days of ozone exceedances, high share of waste water treatment capacities and a fair amount of Natura 2000 areas. | WEAKNESS (W)<br><br>The interlinkages between the national Natura 2000 areas are still missing, esp. with Switzerland having only national protection areas of small sizes; economic and demographic development creates high pressure on landscape. |
|---|---|---|
| OPPORTUNITY (O)<br><br>The rising price of fossil fuel encourages the usage of renewable energy sources, providing for a reasonable market price, which supports the local production of such energy forms. The depopulation of rural areas results in retransformation into untouched countryside. | SO-STRATEGY<br><br>Enhance the production of renewable energies. Transform the region into a laboratory of research on those types of energies production, e.g. geothermal sources, biomass, wind energy. | WO-STRATEGY<br><br>"Better management of Natura sites; further implementation of networking and interlinking of natural sites and protected areas." (3.2, 185) Make use of pro-active land-use management. |
| THREAT (T)<br><br>Existing Natura2000 become further fragmented; the cross-border linkage of protected areas becomes increasingly unlikely. Due to high traffic, emission in the Rhine valley rise severely. | ST-STRATEGY<br><br>Promotion of cross-border linkups of Natura 2000 and other protected areas. Establish intelligent transport systems. Promote efficiency & sufficiency in transport, water usage, energy production/consumption. | WT-STRATEGY<br><br>Promotion of cross-border link-ups of Natura 2000 and other protected areas. Establish intelligent transport systems. Promote efficiency & sufficiency in transport, water usage, energy production/consumption. |

Table II.8: Strategies from SWOT, VI – Gothenburg Strategy

| VII – Cross-border Governance | STRENGTH (S)<br><br>There is a high density of cooperation structures ('institutional thickness') with a longstanding experience and high degree of current activity like the Upper Rhine conference with its multiple activities, the privately initiated Metrobasel, a series of Eurodistricts and most recently also initiatives for EGTCs. Also the current dynamic is large; notably the leitmotif of the Trinational Metropolitan Region is currently discussed in the framework of the Upper Rhine Conference. | WEAKNESS (W)<br><br>The Rhine is an "old" border with France and Germany among the founders of European community and Switzerland traditionally not joining international institutions and a non-EU member state. The planning systems of the three involved countries bring together the centralized French tradition, the federal German system and the Swiss culture of considerable competences on the local and canton level. The border between Germany and France is a stricter barrier mainly due to the different planning traditions and due to the language barrier, than their borders with Switzerland are. |
|---|---|---|
| OPPORTUNITY (O)<br><br>The conviction for the need of cross-border governance is paired with the immediate necessity of region-wide coordination. The availability of a wide range of governance-institutions facilitates the ongoing integration process. The remarkable tradition of cross-border cooperation can serve as a basis for the promotion of the Upper Rhine region as 'EU benchmark' border region | SO-STRATEGY<br>Raise the density of stakeholder-networks within the region e.g. by stronger tools of cross-border cooperation (further developed EGTC etc.) which might help to better structure the current diversity of cross-border institutions. Establish and strengthen institutions like GISOR or Euro-Institute, as they play a role as intercultural cooperation & coordination hubs.<br>Structural funds might further be aligned towards developed regions if they concentrate on pioneer activities | WO-STRATEGY<br><br>Strengthen the informal cooperation. Promote intercultural exchange also on educational levels (i.e. high schools, universities). Provide public services that support with information in the case of institutional mismatches. |
| THREAT (T)<br><br>Cutbacks in public spending are likely. Spearhead projects for cross-border cooperation are thus unlikely to receive public funding. | ST-STRATEGY<br><br>Make use of the existing social capital (networks and their actors) to substitute missing economic capital. Focus on lobbying and visibility Concentrate on developing synergies between existing actors and institutions. | WT-STRATEGY<br><br>Consolidation: Shift funding towards establishment and maintenance of most efficient regional networks, even though results might not be as visible and immediate as with infrastructure projects. |

Table II.9: Strategies from SWOT, VII – Cross-border Governance

# Annex III – Summary of the SWOT validation process

The workshop held with the stakeholders for the purpose of validating the SWOT analysis took place the 23rd of February 2012 in Karlsruhe. Participants of the workshop were Catherine Goure-Rauch for the Région Alsace, Dr. Gerd Hager and Markus Granget for the Regional Verband Mittlerer Oberrhein as well as Dr. Wolfgang Jung, Benedikt Brester and Andreas Putlitz for the research team.

The workshop started with a detailed presentation of the steps performed within the scope of Ulysses and the accomplished results. Special focus was put on the discussion of the results of the SWOT analysis and the underlying scenarios, as well as the derived strategies in the course of the action-decision-phase, which were with a view to improved communicability clustered into three different so called meta-strategies.

The stakeholders agreed, that the study carried out reflects well their own perception of the regional situation and that they were thus pleased with the outcome of the work done. Subsequently, the comments and on each topic of the SWOT analysis, as well as the comments on the meta-strategies will be discussed step-by-step.

## III.1 SWOT

### Demography

Ageing and reproduction is an issue especially in Germany, whereas the situation in France is somewhat less severe, which is also provided by the Ulysses data. In fact, for Alsace region an increasing number for the total population is being expected by local authorities. The situation in Germany shows, that natural reproduction rates will cause a massive decline in population numbers, which is only partially suspended by strong immigration rates. Improving economical numbers might still brighten up the overall situation.

The stakeholders request a better differentiation between the particular national situations in the data examination, which allow for a comparison of national systems if significantly different trends are visible. The proximity of a border can be seen as a regional asset in this context when the complementarity of the systems provides for synergies.

Also it was generally questioned, if the scenario of selective immigration is feasible and realistic.

### Polycentric Development

It was stated that the polycentric development in the Upper Rhine Valley is generally well represented. In parts of the region cross-border metropolitan areas are emerging, which is especially visible in the greater Basle area, but also around Strasbourg.

### Urban-Rural Relationship

In the German part of the CBA the effect of the shift of energy crops are clearly perceptible, which can not yet be acknowledged for the French part.

### Accessibility

Even though the major air traffic hubs Zurich and Frankfurt are already operating near the capacity limits, a hub function for the Upper Rhine Valley can very likely be excluded.

The situation of a narrow passage in the Upper Rhine Valley especially concerning the transmission of goods and people in north-south direction, which is also mentioned in ULYSSES, can not be underestimated. The stakeholders request a particular notice on the high degree of capacity utilisation of the transport infrastructure.

Also an important issue is the cross-linking of the regional national transport networks. It can be stated, that incentives for closing gaps are too weak, due to a bad ratio between the cost of technical infrastructure and funding in the framework of INTERREG. Also the low level of cost-coverage in public transport hinders unification.

**Lisbon Strategy**

The big metropolitan areas such as Paris have reached their maximum load, whereby the lack of available space as well as prices for ground limit further growth. Further centralisation as stated by the competitiveness based scenario as thus to be seen as doubtful. Also the polycentric structure will prevent excessive centralisation and marginalisation processes in the Upper Rhine Valley. In the region, highly specialised global market leaders are also to be found in remote areas.

**Gothenburg Strategy**

Despite several near-natural areas that are left, the most pressing issue is biodiversity caused by the tremendous fragmentation of habitats mainly through transport infrastructure. New high speed rail lines are consistently fenced off. Even though cross-linking of habitats has become some of a matter, the pressure through the continuous extension of transport lines is still highly dominant. Tendencies of population drain in rural areas are not likely to foster conversion into near-natural areas due to the ongoing readiness for green land development.

**Governance**

It is stated, that the institutional differentiation and redundancy is not imperatively to be seen as a regional weak point. On the contrary this provides for a plurality of arenas and levels on which cross-border cooperation can be achieved. Also, the density of regional stakeholder networks is positively affected by this, as well as the regional governance system is less prone to stagnation due to institutional blockades or dependency on charismatic leaders.

The regional ability for marketing, lobbying and strategy-building can be considered as hampered though. Also time consumption due to engagement in multiple institutions is an issue.

**Regional key issues**

On special request which should be considered as the most important regional issues, traffic, skilled personnel and the habitat fragmentation are mentioned particularly. It is stated that the analysis reflects well the regional priorities.

## III.2 Meta-Strategies

Due to the fruitfulness of the previous discussions it is decided to proceed subsequently to the discussion of the meta-strategies. The approach of clustering the results of the action-decision-phase is appreciated. Generally the regional objectives are consistent with the strategies developed in ULYSSES.

It is noted that the title „Christaller 2.0" might not be comprehensible for non-German readers. The meta-strategy „Trade Mark" is not sufficiently defined. Also, the description is misleading, leading to the false conclusion, that the three meta-strategies represent options of which can be chosen, instead of being perceived as portions of one integrated threefold overall strategy.

Generally the concluded strategies are not neither overly innovative nor excessively explicit. Scope and scale vary strongly between the different strategies.

It is prompted that it might be helpful to make allowance for the concerned implementation levels and stakeholders. One has to bear in mind that on a regional level all the mentioned goals and measure have to be implemented, which is facilitated by considering the addressed positions explicitly.

Also it is reminded that the Upper Rhine Trinational Metropolitan Region has already drafted a paper on the regional development strategy for 2020, which is not considered in the scope of the project. It would be desirable to cross-link meta-strategies with the latter strategy paper

It can be presumed that the target audience of political stakeholders will appreciate the processing of the outcomes of the project in form of the meta-strategies, even though it is needless to say that not everyone will agree on every particular point.

## III.3 General remark

One very important strength as well as strategy in the region is the excellent inter-linking between private and public research institutions and the universities. Thereby, in the field of research and development, the region is able to compete with regions that some metropolises aren't even a match to, e.g. Hamburg and Berlin. This is a potential which is not sufficiently stressed by the analysis.

# Annex IV

## IV.1 R&D potential of the CBA Upper Rhine

The subject of the tailor-made analysis lies in the field of Research & Development in the Upper Rhine Trinational Metropolitan Region , as agreed on with the local stakeholders of Ulysses at an earlier stage of the project. In the strategy paper from the 9th of June 2010 the Metropolitan Region Upper Rhine Valley set itself the ambitious goal to become the most competitive knowledge based economy amongst the cross-border regions in the EU until 2020. The region already possesses well integrated and highly competitive automotive, chemical industry and life science clusters. Still it is a great challenge to effectively combine the resources of the research institutions of an entire region, especially in the cross-border context. The assumption is, as long as two research institutions aren't readily accessible one from another, their potentials can't be combined on a daily basis to create an integrated whole, which is more than just the sum of its elements. To achieve this kind of 'emergence' is considered to be one of the most critical goals in building a knowledge driven cross-border economy.

### IV.1.1 Method

To assess the performance of the cross-border R&D-landscape we chose an approach to analyse the cooperation potential of the regional research institutions with regard to the accessibility by road infrastructure. As input data served a vector-graph of the regional road network as well as a list of the relevant regional research institutions provided by one of the local stakeholders (Regio Basilensis). The road network was subdivided into different classes and applied reasonable average travelling speeds. In this way we were able to calculate the movement cost by time for every stretch of road in the CBA.

In the next step we performed a calculation of the cooperation potential for every research institution. To this end, we discounted the R&D potential of each institution using the time of travel from the institution trough the road network. The values range from 100 at the site of the institution down to 0 in more than one hour travel distance, following in a cosine curve function. These values afterwards were interpolated into the area using the 'r.surf.idw' command in GRASS GIS which uses an interpolation method by E. H. Isaaks and R. M. Srivastava (in: Applied Geostatistics, Oxford University Press, 1989). At last these raster layers were summed up to five different sectors which were defined in the list of institutions by our stakeholder.

### IV.1.2 Interpretation

The values represent the potential for added values through cooperation between research institutions of the same sector at any point in the CBA, assuming that it is necessary to have regular face-to-face contact for effective cooperation. The time of travel from the institution is assumed to reduce the potential for cooperation until it reaches zero at one hour travel time, which we considered the limit for reasonable accessibility for regular face-to-face interaction.

Low values at a site mean, that at this spot of the CBA few or no relevant R&D-activities are accessible by road. High values mean, that several R&D-institutions of a sector are within a range, which is considered commuting distance. Persons or institutions in these areas with high values can thus reach different R&D-activities, which raises the probability or rather the **potential for an emergent value added through R&D-cooperation**.

If cooperation actually happens can not be determined this way. In areas with high values though, it can be reliably assumed, that the accessibility costs between R&D-institution are sufficiently low, not to impede R&D-cooperation due to accessibility issues. Cognitive boundaries, language barriers or institutional difficulties however might still be present and effective.

To obtain an indicator for the whole region, the values of the raster cells higher than certain threshold can be summed up to create a 'regional cooperation indicator'. Given that calculated in the same manner and with the same dimensions of the raster cells, it would thus be possible to compare the cooperation potentials of different regions.

Being represented in a map, the values visualise the finding that below a certain critical mass, there are no relevant positive 'cluster-effects' likely to happen, without which a regional knowledge driven economy can hardly be imagined. Through the maps even an actor not familiar with the region determine at a glance, in which fields of research cluster-effects can be expected and in which parts of the region the activity density is the highest.

By these findings it is possible for the region, to promote the targeted establishment of R&D-institutions in the future, strategically situate public institutions for the promotion of R&D-cooperation, as well as to plan infrastructure investments with special regard to the impact on the potential of positive cluster-effects within the region.

## IV.1.3 Data, formulas and values applied

The following map shows the road network and the different research institutions by sector that were included in the study.

Figure IV.1: R&D institutions by sector
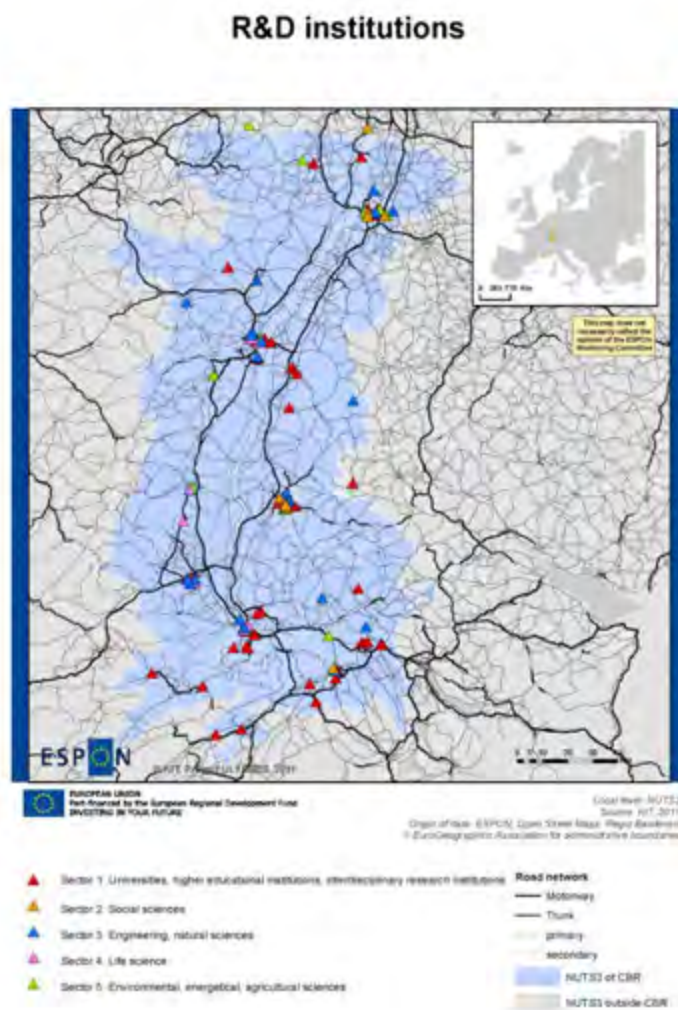


| Research sector | Fields of science |
| --- | --- |
| Sector 1 | Universities, higher educational institutions, interdisciplinary research institutions |
| Sector 2 | Social sciences |
| Sector 3 | Engineering, natural sciences |
| Sector 4 | Life science |
| Sector 5 | Environmental, energetical, agricultural sciences |

Table IV.1: Fields of science by research sectors

The road network data distinguishes different types of roads, which were applied hypothetical average speeds to match real accessibility.

| Road class | Average speed assumed in km/h |
|---|---|
| Motorway link | 60 |
| Motorway | 130 |
| Trunk link | 40 |
| Trunk | 110 |
| Primary link | 20 |
| Primary | 70 |
| Secondary | 50 |

Table IV.2: Average speeds by road classes

In dependency to these speeds the following formula was applied to calculate the corresponding values for the research potential: $(\cos(0{,}05*t)+1)*50$

The following table shows the time classes and corresponding values, that were used in the model.

| Time from institution (in minutes) | Value for potential applied |
|---|---|
| < 5 | 100 |
| 5 – 10 | 96 |
| 10 – 15 | 90 |
| 15 – 20 | 80 |
| 20 – 25 | 69 |
| 25 – 30 | 56 |
| 30 – 35 | 43 |
| 35 – 40 | 31 |
| 40 – 45 | 20 |
| 45 – 50 | 10 |
| 50 – 55 | 4 |
| > 55 | 1 |

Table IV.3: Values for R&D potential by travel time from institution

## IV.2 Results

### IV.2.1 General results

As was to be expected, the potential spreads out along the higher infrastructure. This creates two parallel branches of very high potential for combined R&D activities along the two motorways in France as rather Germany in north-south direction. Only where bridges connect the two networks on both sides of the Rhine, the potential is able to spread out onto the other side of the river. The model makes the effect and the importance of crossings of institutional and natural borders visible. Where accessibility is poor, regions are liable to fall apart.

This effect is also visible in the southern part of the region, where the potentials created in Basel spread out easily along the well developed Swiss road network. Due to missing links in high infrastructure to the German side of the border – with its natural barrier of the Black Forest – as well as to the French side – which in this part of region is scarcely populated – the potential remains only a Swiss asset, which doesn't contribute to an increasing cross-border integration of the region. Exception is here of course the two already mentioned motorways parallel to the Rhine.

As well easily perceptible are the effects of the low mountain ranges Black Forest and Vosges which narrow up the outspreading of the potentials in the central part of the valley whereas in the northern and southern parts the effects penetrate deeper into the areas surrounding the research institutions.

## IV.2.2 Sector 1 – Universities, higher educational institutions, interdisciplinary research institutions

The sector of universities, higher educational institutions and interdisciplinary research institutions is the largest of all five sectors. It compromises 83 of the total 157 institutions. Leading region with a very high potential is the zone around Basel. But also Strasbourg and Karlsruhe appear to have a high potential for combined research activity within the one hour travel threshold. Since indicators of size aren't part of the calculations only the number of institutions provides for a high potential, which might be misleading.

Figure IV.2: R&D potential in sector 1 – universities, higher educational institutions and interdisciplinary research institutions
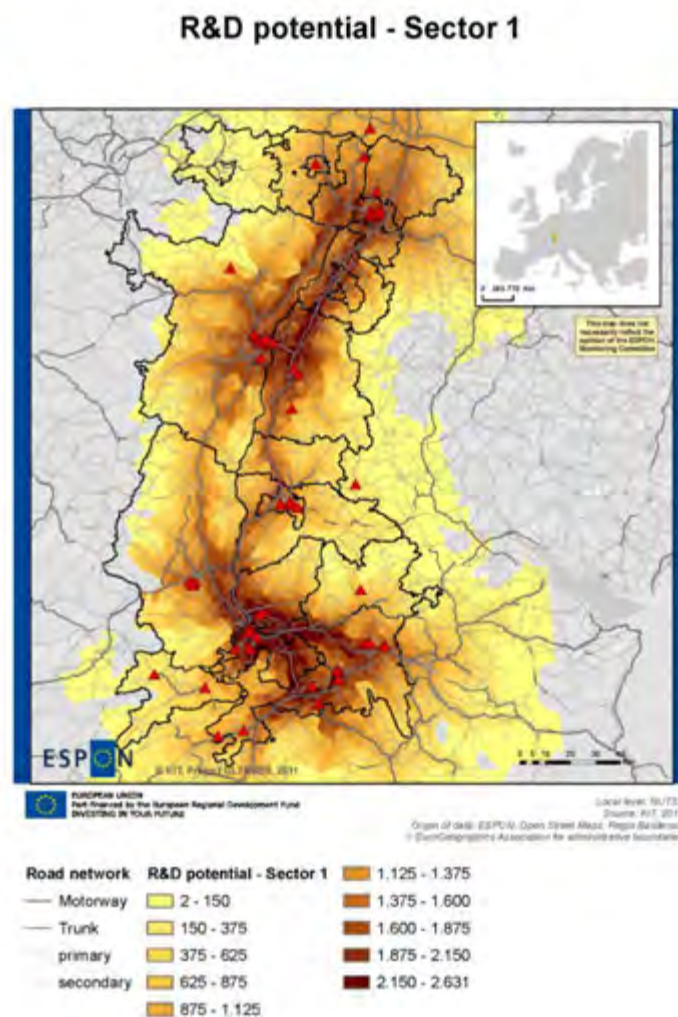
## IV.2.3 Sector 2 – Social sciences

The next sector consists of thirteen institutions in the field of social sciences, the smallest sector in the Upper Rhine Valley. Freiburg offers by far the strongest potential for combined research in this field, but also Karlsruhe appears on the map. Since the faculties of social sciences of the universities are only considered in conjunction with their universities, their potentials only appear in the first sector. Thus these values might as well be misleading, as also Strasbourg and Basel have important capacities in social sciences. This problem might be helped in splitting the universities up into their faculties, assigning each one its corresponding sector.

Figure IV.3: R&D potential in sector 2 – social sciences
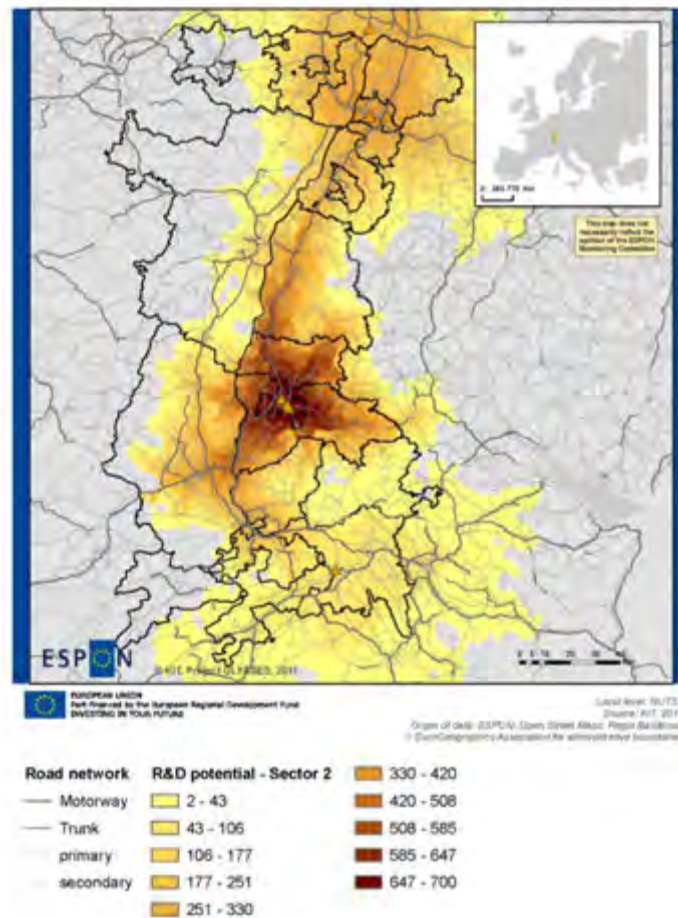
## IV.2.4 Sector 3 – Engineering and natural sciences

In the field of natural sciences and engineering the triangle Basel-Mulhouse-Freiburg appears as an important cluster. Strasbourg seems to be on his own with a couple of institutions in the surroundings, whereas Karlsruhe almost doesn't appear on the map. Again, this doesn't perfectly reflect the regional realities. As already mentioned, since there weren't any indicators of size included in the calculation, Karlsruhe as an important location of natural sciences and engineering in the Upper Rhine Valley suffers from the integration of the majority of the important research institutions into the University of Karlsruhe. Due to the lack of size indicators, only a high number of different institutions provides for a high research potential.

Figure IV.4: R&D potential in sector 3 – engineering and natural sciences
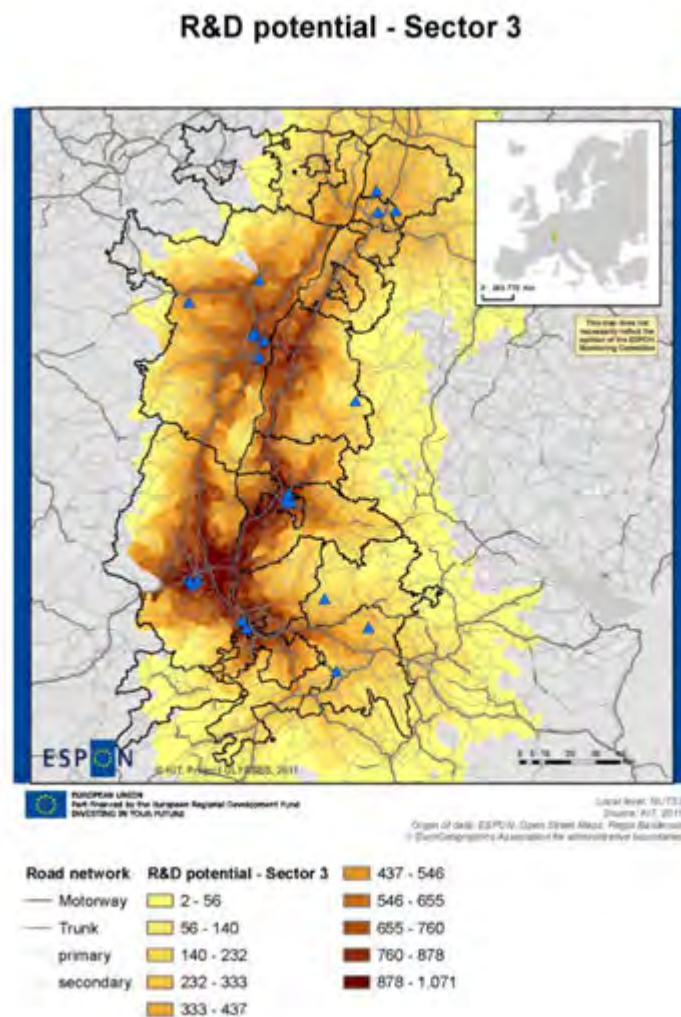
## IV.2.5 Sector 4 – Life science

The fourth sector, Life Sciences, although reflects very well the regional situation around Basel, Mulhouse and Freiburg where several international enterprises of this sector are based and organised in clusters like 'BioValley'.

Figure IV.5: R&D potential in sector 4 – life science
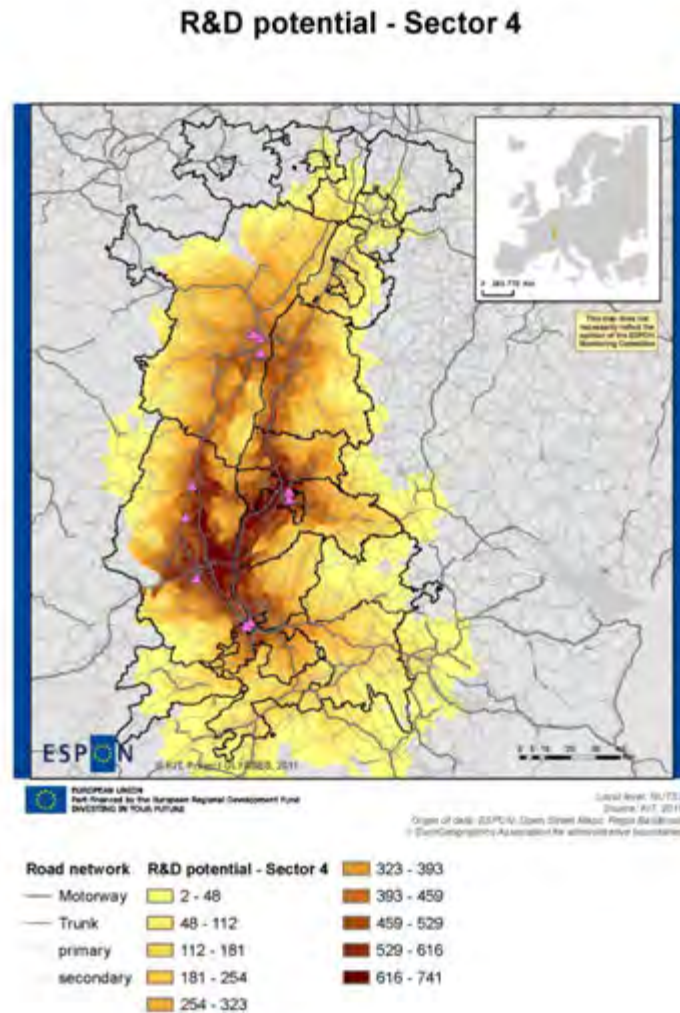
### IV.2.6 Sector 5 - Agricultural, energetical and environmental sciences

The sector of agricultural, energetical and environmental research seems quite evenly distributed over the region. Freiburg and Colmar seem to form a special entity, which in the case of Freiburg isn't surprising, since it was the first city in Germany governed by a green party mayor.

Figure IV.6: R&D potential in sector 5 – Agricultural, energetical and environmental sciences
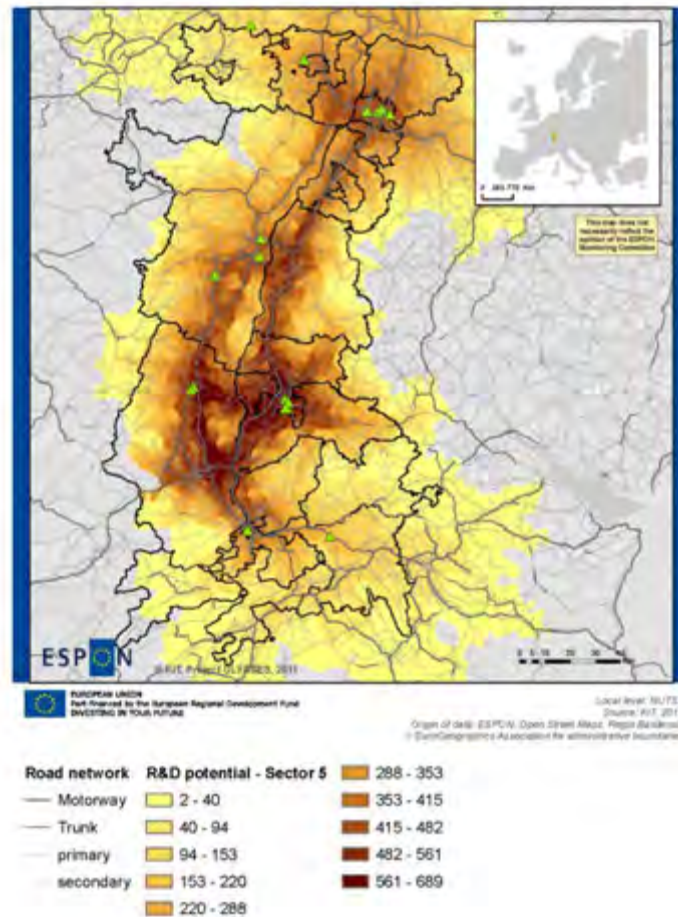
## IV.3 The weighted analysis of higher educational institutions

### IV.3.1 Adapted methodology

Thanks to the fact that the number of students registered to the higher educational institutions (i.e. universities, 'Fachhochschulen' and 'Grands écoles') were included in the list of R&D-institutions and thus readily available, we performed an additional query that includes only these institutions, which were before part of the first sector. In this query we used the number of students registered to each institution to balance the weight of the higher educational institutions against each other in the calculation.

The work flow for the calculation of the potential was the same as before, with the difference, that the R&D potential for each institution was multiplied with the number of students registered for this institution, before summing up all values to one layer. Due to technical reasons the values had to be divided by 100 before producing the map. One unit in the map thus represents the accumulated R&D-potential of one hundred students.

### IV3.2 New results

For comparison, the following map was calculated with the older methodology but using only higher educational institutions. It shows a high level of R&D potential in the southern part of the region, namely around Basel and Aarau.

The weighted map shows different results though. Since Karlsruhe and Strasbourg have fewer universities with a higher number of students, the high potential of the Swiss part of the region moves to the north. In the weighted map, the area around Strasbourg especially on the German side of the Rhine appears to provide the greatest potential through accumulated potentials by higher educational institutions.

Figure IV.7: Unweighted R&D potential of higher educational institutions



**Unweighted R&D potential of higher educational institutions**

| Road network | Unweighted R&D potential | | |
|---|---|---|---|
| Motorway | 2 - 125 | | 895 - 1.100 |
| Trunk | 125 - 303 | | 1.100 - 1.302 |
| primary | 303 - 497 | | 1.302 - 1.541 |
| secondary | 497 - 692 | | 1.541 - 1.833 |
| | 692 - 895 | | 1.833 - 2.258 |
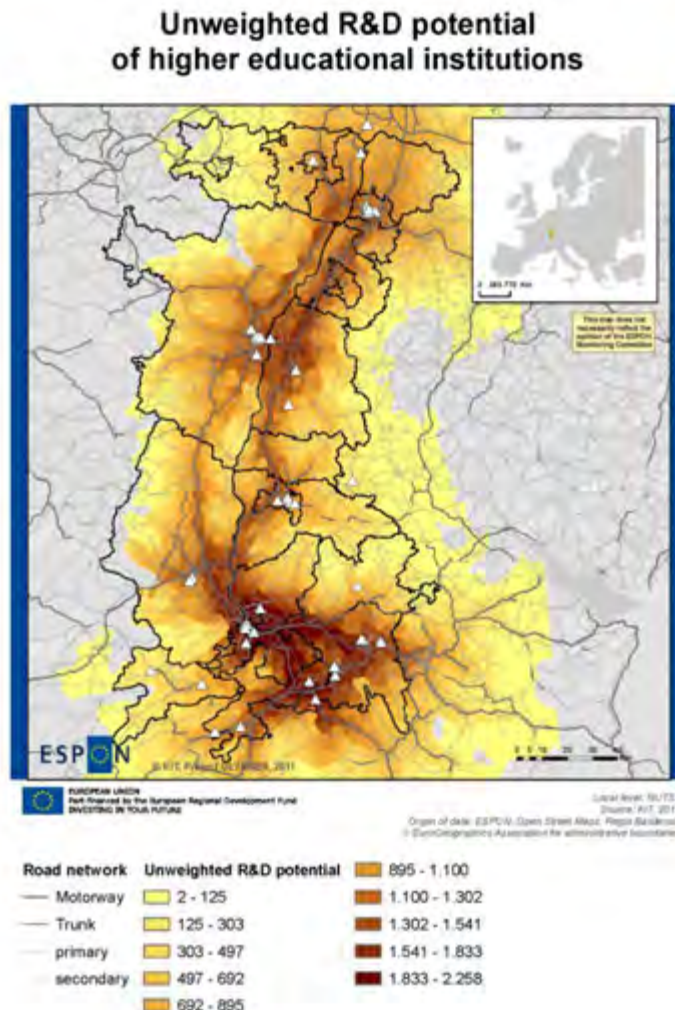
Figure IV.8: R&D potential of higher educational institutions weighted by number of students



Weighted R&D potential
of higher educational institutions
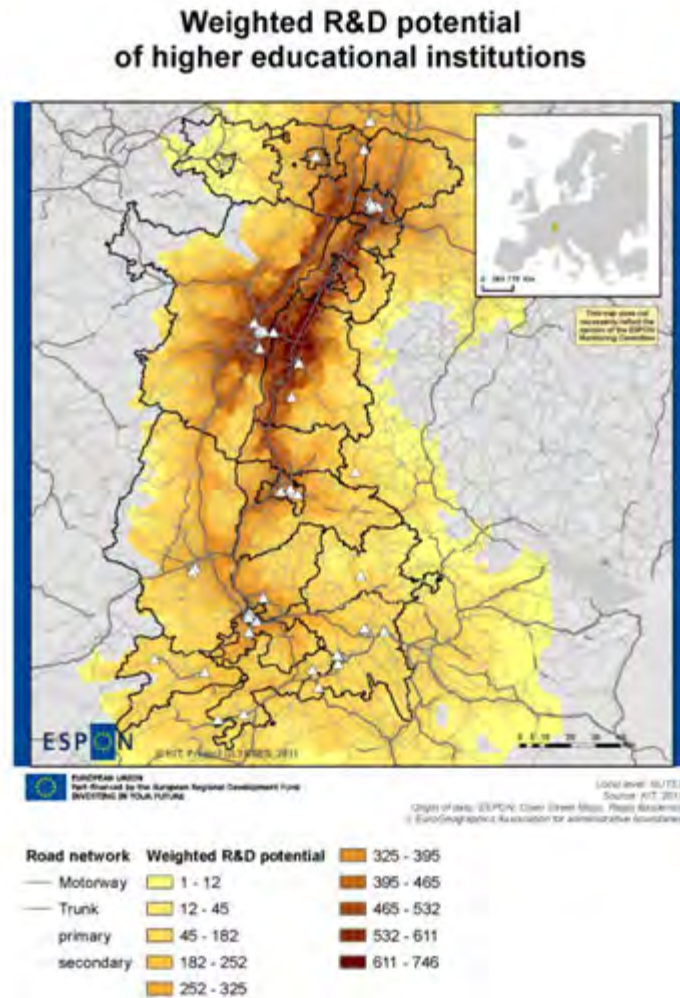
# IV.4 Chapter conclusion

## IV.4.1 Accomplishments of the approach

By means of this approach we were able to sidestep the weaknesses of the coarseness of the NUTS3 units in the Upper Rhine Valley being limited by the extend of spatial entities that may or may not reflect the realities of the space. Using the exact location of research institutions and the actual road network, the precision of the results is only limited by the resolution of the raster output layers. The border effect and the importance of border crossings as well as the effect of natural barriers become clearly visible as they have direct influence on the outspread of the road network. Later on, it is easily possible at any time to integrate the values obtained into the NUTS system for further analyses, or to calculate a research potential indicator for the entire region to enable cross-border performance rankings.

## IV.4.2 Need for further research

The analysis carried out has several weaknesses which were partly already mentioned.

**Indicators of size:** Due to no indicator of size available for all of the institutions in the analysis of the sectors 1 to 5 each institution has the same impact on the regional R&D potential. Regions with many small research institutions thus appear to have a higher potential than a region with few but large research organisms. Possible indicators of size could be number of employees in R&D or expenditure for R&D, as well as the number of patent applications. In this way, also enterprises that have a significant activity in R&D without being an exclusive research institution could be taken into account.

**Determine impact:** Indicator of size, of course, is only a very limited indicator of the actual impact of a research institution or even the quality of the research being done. What quantitative indicators might provide reliable insight into the importance of an institution is a highly disputed subject, as not carefully chosen indicators emphasize decisions which might actually damage the quality of the R&D landscape rather than to improve it. This issue is similar to the discussion around the usefulness of the GDP to represent wealth.

**Movement cost:** The movement cost was calculated using hypothetically assumed average travel speeds. To obtain realistic results the use of real world accessibility, which considers capacity issues and road condition is indispensable. Also, commuting on a daily bases is not only a question of the time to spend on the way, but also a question of the financial cost, as well as a subjective/cognitive cost. This is especially important when comparing car and rail accessibility.

**Public transport:** Data for regional accessibility by public transport was not available for the calculation. Besides it is a much more complex matter than travelling time by car. Nonetheless, to build a sustainable European knowledge based cross-border region one has necessarily to take into account connectivity by means of a regional rail network.

**Actual cooperation networks:** Even if all of the above mentioned weaknesses are eliminated, the result of such an analysis can only be a hypothetical potential. The actual performance of the existing regional innovation system can approximately determined only through an assessment of the existing cooperation and coordination networks. A social network analysis of the relations of the regional players can offer considerable insight into these matters. Even though such an analysis can be performed without the need of a particular data foundation, it goes beyond the scope of the Ulysses project.

# Annex V

## V.1 General Overview of the Upper Rhine Trinational Metropolitan Region

| | NUTS_ID | NUTS level |
|---|---|---|
| Switzerland | CH | NUTS1 |
| Espace Mittelland | CH02 | NUTS2 |
| Solothurn | CH023 | NUTS3 |
| Jura | CH025 | NUTS3 |
| Nordwestschweiz | CH03 | NUTS2 |
| Basel-Stadt | CH031 | NUTS3 |
| Basel-Landschaft | CH032 | NUTS3 |
| Aargau | CH033 | NUTS3 |
| Germany | DE | NUTS1 |
| Karlsruhe | DE12 | NUTS2 |
| Baden-Baden, Stadtkreis | DE121 | NUTS3 |
| Karlsruhe, Stadtkreis | DE122 | NUTS3 |
| Karlsruhe, Landkreis | DE123 | NUTS3 |
| Rastatt | DE124 | NUTS3 |
| Freiburg | DE13 | NUTS2 |
| Freiburg im Breisgau, Stadtkreis | DE131 | NUTS3 |
| Breisgau-Hochschwarzwald | DE132 | NUTS3 |
| Emmendingen | DE133 | NUTS3 |
| Ortenaukreis | DE134 | NUTS3 |
| Loerrach | DE139 | NUTS3 |
| Waldshut | DE13A | NUTS3 |
| Rheinhessen-Pfalz | DEB3 | NUTS2 |
| Landau in der Pfalz, Kreisfreie Stadt | DEB33 | NUTS3 |
| Pirmasens, Kreisfreie Stadt | DEB37 | NUTS3 |
| Germersheim | DEB3E | NUTS3 |
| Suedliche Weinstraße | DEB3H | NUTS3 |
| Suedwestpfalz | DEB3K | NUTS3 |
| France | FR | NUTS1 |
| Alsace | FR42 | NUTS2 |
| Bas-Rhin | FR421 | NUTS3 |
| Haut-Rhin | FR422 | NUTS3 |

Table V.1: Administrative levels of CBA

## V.2 Demographic Analysis

### 2.1. Aims, Indicators and Methods

Demographic Analysis of the CBA aims to identify the behaviour of the cross-border region in terms of population spatial distribution and temporal dynamics. The main objective is to understand the influence of the border on the settlement and population patterns of the CBA. The key questions to be answered are: Is the border attracting or repulsing local population? Is the population of the border region growing faster or slower than non-border regions? Is the population of the border region ageing more or less rapidly than in non-border regions?

To answer to the above questions, a set of indicators has been identified, as the CBA's total population; the population growth; the population density; the total and partial dependency rates; the ageing index; and the fertility rates.

More specifically, the parameters and indicators analysed for the Cross-Border Region, are shown in Table V.2.

| Variable name | Geographical scale | Source | Time frame |
|---|---|---|---|
| Total fertility rates | NUTS 2 | EUROSTAT | 1997-2009 |
| Commuters to other countries among by active population | NUTS 2 | EUROSTAT | 2009 |
| Commuters to other regions among by active population | NUTS 2 | EUROSTAT | 2009 |
| Old and young age dependency rates | NUTS 3 | EUROSTAT | 2009 |
| Net migration, natural growth, total growth | NUTS 3 | EUROSTAT, Demipher Project | 2000-2009 |
| Population | Several | EUROSTAT, National Statistical Institutes | 2000-2009 |

Table V.2: Demographic Parameters studied for the CBA.

## 2.2 Total Population

There were 6.076.678 inhabitants living in the CBA in 2009, hence about 1,22% of the EU27 population (499,705,496 inhabitants in 2009). The CBA's population of each national parts of the CBA represent 18,1% of the total population of Switzerland (7.593.494 in 2009), 3,48% of the total German population (82.217.837 in 2009), and 2,89% of the total population in France (64.007.290 in 2009).

The Swiss part of the CBA has a population share of 27,3% of the total CBA, the German Part 33,1%, and the French part 39,6% of the total CBA.

| | NUTS_ID | NUTS level | 2009 |
|---|---|---|---|
| Switzerland | CH | NUTS1 | 7.593.494 |
| Espace Mittelland | CH02 | NUTS2 | 321.652 |
| Solothurn | CH023 | NUTS3 | 251.830 |
| Jura | CH025 | NUTS3 | 69.822 |
| Nordwestschweiz | CH03 | NUTS2 | 1.049.518 |
| Basel-Stadt | CH031 | NUTS3 | 186.672 |
| Basel-Landschaft | CH032 | NUTS3 | 271.214 |
| Aargau | CH033 | NUTS3 | 591.632 |
| Total CBA CH | | | 1.371.170 |
| Germany | DE | NUTS1 | 82.217.837 |
| Karlsruhe | DE12 | NUTS2 | 1.004.005 |
| Baden-Baden, Stadtkreis | DE121 | NUTS3 | 54.777 |
| Karlsruhe, Stadtkreis | DE122 | NUTS3 | 290.736 |
| Karlsruhe, Landkreis | DE123 | NUTS3 | 431.381 |
| Rastatt | DE124 | NUTS3 | 227.111 |
| Freiburg | DE13 | NUTS2 | 1.434.536 |
| Freiburg im Breisgau, Stadtkreis | DE131 | NUTS3 | 219.665 |
| Breisgau-Hochschwarzwald | DE132 | NUTS3 | 250.132 |
| Emmendingen | DE133 | NUTS3 | 157.667 |
| Ortenaukreis | DE134 | NUTS3 | 417.613 |
| Loerrach | DE139 | NUTS3 | 222.596 |
| Waldshut | DE13A | NUTS3 | 166.863 |
| Rheinhessen-Pfalz | DEB3 | NUTS2 | 42.002 |
| Landau in der Pfalz, Kreisfreie Stadt | DEB33 | NUTS3 | 43.008 |
| Pirmasens, Kreisfreie Stadt | DEB37 | NUTS3 | 41.358 |
| Germersheim | DEB3E | NUTS3 | 125.603 |
| Suedliche Weinstraße | DEB3H | NUTS3 | 109.625 |
| Suedwestpfalz | DEB3K | NUTS3 | 100.508 |
| Total CBA DE | | | 2.858.643 |
| France | FR | NUTS1 | 64.007.290 |
| Alsace | FR42 | NUTS2 | 1.846.865 |
| Bas-Rhin | FR421 | NUTS3 | 1.097.045 |
| Haut-Rhin | FR422 | NUTS3 | 749.820 |
| Total CBA FR | | | 1.846.865 |
| Total CBA | | | 6.076.678 |

Table V.3: Total Population in 2009 for CBA

The two French NUTS3 units FR421 Bas-Rhin and FR422 Haut-Rhin have the highest contribution in the total population in the CBA due to their much bigger size compared to the Swiss and German NUTS3 units. The cities of Landau (DED33) and Pirmasens (DEB37) have the smallest amount of population of the whole CBA (see also Figure V.1, Figure V.2).

Figure V.1: Population of each NUTS3 unit 2009 in the CBA
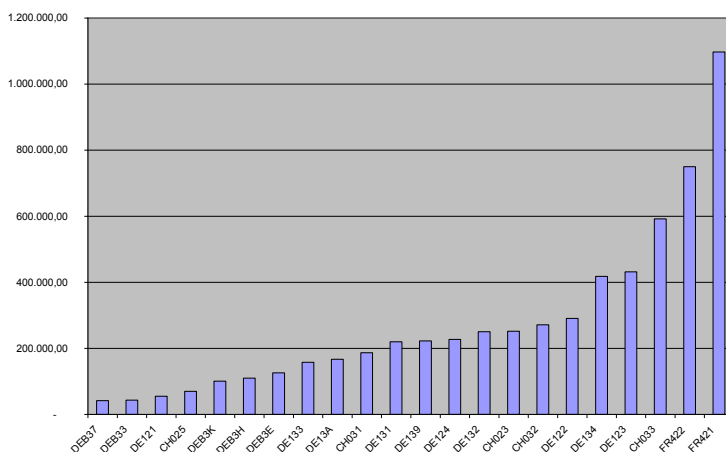


Figure V.2: Percent of each NUTS3 level unit contribution in the Total Population of the CBA
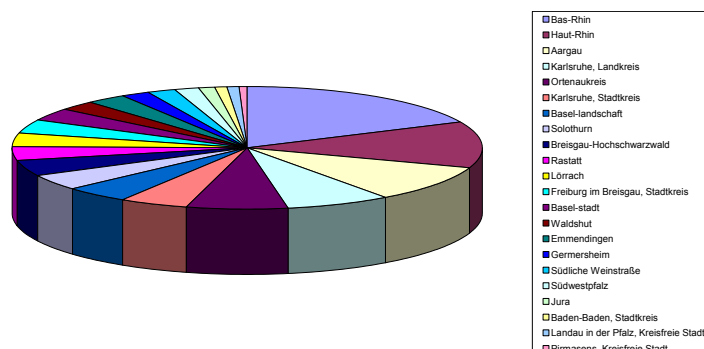


## 2.3 Total Population by Age

Three age classes were considered in the analysis: a) total population aged between 0-14 years old; b) total population aged between 15-64 years old; and c) total population aged over 65 years old. Data for all NUTS3 units of the CBA are only available from 2006 – 2009.

The average proportions of total population of the CBA in the three above defined age classes are in 2009: 15,47% (between 0-14 years old), 66,74% (between 15-64 years old) and 17,79 (over 65 years old). As to be expected, compared to Germany these proportions are higher for the class of the minor 15 (13,58%) and lower than the 65+-agers (20,40%). For France, these proportions are vice versa (minor 15: 18,51%, 65+: 16,50%), due to a much higher fertility rate in France compared to Germany. Switzerland shows about the same proportion of younger people (15,32%) but less elderly (15,41%) and hence a higher proportion of 15-64 years old (69,06%).

Also not surprisingly, the three "oldest" NUTS3 units of the CBA are all German ones, with DE121 Baden-Baden[5] (26,45%), DEB37 Pirmasens (25,26%), and DEB3K Suedwestpfalz (22,64%), while those three with lowest population of 65 years and older are CH033 Aargau (15,07%), FR421 Bas-Rhin (15,16%), and FR422 Haut-Rhin (16,07%).

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[5] In Germany, the city of Baden-Baden is a typical place for retired people of high income.

The "youngest" NUTS3 units of the CBA are FR422 Haut-Rhin (18,32%), FR421 Bas-Rhin (17,64%) and CH025 Jura (16,80%), while those with the lowest proportion of 14 and younger are found in the urban parts of the CBA, with DE121 Baden-Baden (11,72%), CH031 Basel-Stadt (11,99%), and DE122 Karlsruhe (12,19%) (see also Figure V.3)

Figure V.3: Relative proportions of the three age classes for each NUTS3 level unit of the CBA (year 2009)



## 2.4 Dependency Ratios

Another measure of the proportion of age classes is the expression of dependency ratios. The total demographic dependency ratio is the ratio of the combined youth population (0 to 14 years) and senior population (65 or older) to the working-age population (15 to 64 years). It is expressed as the number of "dependents" for every 100 "workers"[6]:

The (total) dependency ratio can be decomposed into the child dependency ratio and the aged dependency ratio, as:

Changes in demographic dependency ratios highlight changes in the age composition of the population.

Table V.4 presents the NUTS 3 level units' total, child, and aged dependency rates of the CBA and the EU27 mean values.

---

[6] Just taking the working age population into account is of course insufficient. In fact, the employment rate plays an important role of how many "workers" pay for "dependents".

| | NUTS_ID | NUTS level | Total dependency Ratio | Young age dependency Ratio | Old age dependency Ratio |
|---|---|---|---|---|---|
| Switzerland | CH | NUTS1 | 46,8 | 22,5 | 24,3 |
| Solothurn | CH023 | NUTS3 | 46,7 | 21,47 | 25,27 |
| Jura | CH025 | NUTS3 | 52,7 | 25,65 | 27,07 |
| Basel-Stadt | CH031 | NUTS3 | 48,7 | 17,84 | 30,84 |
| Basel-Landschaft | CH032 | NUTS3 | 49,6 | 21,57 | 28,01 |
| Aargau | CH033 | NUTS3 | 44,2 | 22,44 | 21,72 |
| Germany | DE | NUTS1 | 51,5 | 20,6 | 30,9 |
| Baden-Baden, Stadtkreis | DE121 | NUTS3 | 61,8 | 18,97 | 42,82 |
| Karlsruhe, Stadtkreis | DE122 | NUTS3 | 46,3 | 17,83 | 28,45 |
| Karlsruhe, Landkreis | DE123 | NUTS3 | 51,6 | 22,14 | 29,49 |
| Rastatt | DE124 | NUTS3 | 52,8 | 21,84 | 30,94 |
| Freiburg im Breisgau, Stadtkreis | DE131 | NUTS3 | 40,5 | 17,68 | 22,80 |
| Breisgau-Hochschwarzwald | DE132 | NUTS3 | 53,6 | 23,45 | 30,20 |
| Emmendingen | DE133 | NUTS3 | 52,1 | 23,38 | 28,74 |
| Ortenaukreis | DE134 | NUTS3 | 53,2 | 23,26 | 29,92 |
| Loerrach | DE139 | NUTS3 | 52,4 | 22,68 | 29,76 |
| Waldshut | DE13A | NUTS3 | 55,0 | 23,95 | 31,00 |
| Landau in der Pfalz, Kreisfreie Stadt | DEB33 | NUTS3 | 48,3 | 19,71 | 28,56 |
| Pirmasens, Kreisfreie Stadt | DEB37 | NUTS3 | 60,6 | 20,03 | 40,57 |
| Germersheim | DEB3E | NUTS3 | 48,1 | 22,05 | 26,09 |
| Suedliche Weinstraße | DEB3H | NUTS3 | 53,6 | 21,05 | 32,51 |
| Suedwestpfalz | DEB3K | NUTS3 | 54,9 | 19,79 | 35,07 |
| France | FR | NUTS1 | 53,9 | 28,5 | 25,4 |
| Bas-Rhin | FR421 | NUTS3 | 48,8 | 26,24 | 22,55 |
| Haut-Rhin | FR422 | NUTS3 | 52,4 | 27,92 | 24,49 |
| Total CBA (average) | | | 51,3 | | |
| EU27 | | | 48,9 | 23,3 | 25,6 |

Table V.4: Total, child and aged dependency ratios and ageing indices for the NUTS3 level units of the CBA (2009)

Figure V.4: Scatter diagram of child vs. aged dependency ratios for year 2009 in CBA
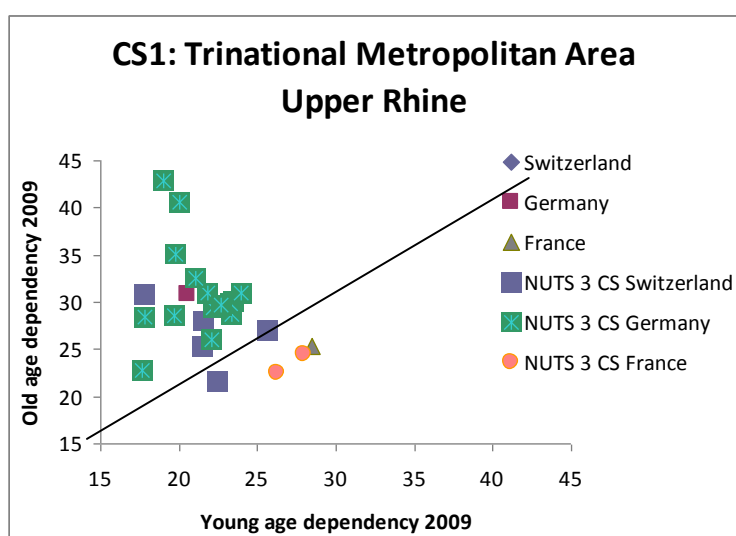


Simultaneous to Chapter 2.3, the NUTS3 units having the highest aged dependency are the German ones of DE121 Baden-Baden (42,82) DEB37 Pirmasens (40,57), and DEB3K Suedwestpfalz (35,07), all significant higher than the EU27 average of 25,6. Those NUTS3 units having high aged dependency ratios are at the

same time the NUTS3 units with the highest total dependency ratios. I.e. the aged dependency determines the total dependency while the child dependency plays a minors role. This is due to the fact that the child dependency ratios are much lower (compared to the aged dependency), the highest ones to be found in FR422 Haut-Rhin (27,92), FR421 Bas-Rhin (26,24), and CH025 Jura (25,65).

In all but the both French NUTS3 units and CH033 Aargau, the child dependency ratios were found lower than the aged dependency ratios. This shows that the young population of the CBA represents a smaller portion of total population, as compared to the aged population of the CBA. The highest differences are again to be found in the German NUTS3 units mentioned above.

Figure V.4 illustrates the scatter diagram of child vs. aged dependency ratios for year 2009 for the CBA at NUTS1 and 3 levels, showing that only the NUTS3 units mentioned above are having higher child dependency ratio than the corresponding aged dependency ratio.

## 2.5 Population Development

There were 6.076.678 inhabitants living in the CBA in 2009 which means an increase of about 260.000 persons from 2000 – 2009 (see Table V.5). This increase accounts to 27% for the Swiss part of the CBA, a third to the German part of the CBA, and 40% for the French. In relation to the overall population in the CBA, France and Switzerland record the highest increases (5,6 % and 5,2%), while the German part only records an increase of 3,0%.

| | | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CH023 | Solothurn | 243.908 | 243.700 | 245.200 | 246.300 | 247.000 | 247.379 | 247.937 | 248.613 | 250.240 | 251.830 |
| CH025 | Jura | 68.818 | 68.800 | 69.000 | 69.100 | 69.200 | 69.091 | 69.110 | 69.292 | 69.555 | 69.822 |
| CH031 | Basel-Stadt | 188.458 | 187.300 | 186.700 | 186.700 | 187.300 | 186.753 | 185.601 | 184.822 | 185.227 | 186.672 |
| CH032 | Basel-Landschaft | 258.602 | 260.000 | 261.200 | 262.900 | 264.500 | 265.305 | 266.089 | 267.166 | 269.145 | 271.214 |
| CH033 | Aargau | 540.639 | 544.700 | 549.900 | 555.800 | 559.900 | 565.122 | 569.344 | 574.813 | 581.562 | 591.632 |
| DE121 | Baden-Baden, Stadtkreis | 52.700 | 52.800 | 53.200 | 53.700 | 54.000 | 54.301 | 54.581 | 54.855 | 54.853 | 54.777 |
| DE122 | Karlsruhe, Stadtkreis | 277.400 | 278.100 | 279.800 | 281.500 | 282.700 | 284.163 | 285.263 | 286.327 | 288.917 | 290.736 |
| DE123 | Karlsruhe, Landkreis | 416.500 | 419.300 | 422.900 | 425.900 | 427.100 | 428.312 | 429.603 | 430.351 | 431.519 | 431.381 |
| DE124 | Rastatt | 223.200 | 223.400 | 224.500 | 225.900 | 226.700 | 227.549 | 228.408 | 228.006 | 227.929 | 227.111 |
| DE131 | Freiburg im Breisgau | 202.600 | 204.700 | 207.700 | 210.300 | 212.300 | 213.998 | 215.966 | 217.547 | 219.430 | 219.665 |
| DE132 | Breisgau-Hochschwarzwald | 238.900 | 240.800 | 243.500 | 245.500 | 247.000 | 248.400 | 249.535 | 250.013 | 250.183 | 250.132 |
| DE133 | Emmendingen | 150.300 | 151.400 | 153.000 | 154.300 | 155.200 | 156.069 | 156.728 | 157.265 | 157.629 | 157.667 |
| DE134 | Ortenaukreis | 405.800 | 408.200 | 411.400 | 413.200 | 414.300 | 415.405 | 416.410 | 416.973 | 417.754 | 417.613 |
| DE139 | Loerrach | 216.100 | 217.300 | 219.200 | 220.500 | 220.900 | 220.689 | 221.357 | 221.787 | 222.528 | 222.596 |
| DE13A | Waldshut | 164.900 | 165.200 | 166.200 | 166.900 | 167.100 | 167.266 | 167.274 | 167.168 | 167.200 | 166.863 |
| DEB33 | Landau in der Pfalz | 40.900 | 40.900 | 41.100 | 41.300 | 41.500 | 41.821 | 42.028 | 43.048 | 43.063 | 43.008 |
| DEB37 | Pirmasens | 45.800 | 45.200 | 44.800 | 44.400 | 44.000 | 43.637 | 43.137 | 42.427 | 41.875 | 41.358 |
| DEB3E | Germersheim | 122.800 | 123.300 | 124.200 | 124.700 | 124.900 | 125.348 | 125.268 | 125.425 | 125.822 | 125.603 |
| DEB3H | Suedliche Weinstraße | 109.000 | 109.300 | 109.900 | 110.300 | 110.500 | 110.938 | 110.639 | 110.211 | 109.957 | 109.625 |
| DEB3K | Suedwestpfalz | 105.700 | 105.300 | 105.300 | 105.100 | 104.600 | 104.018 | 103.309 | 102.512 | 101.596 | 100.508 |
| FR421 | Bas-Rhin | 1.032.498 | 1.040.521 | 1.048.305 | 1.055.890 | 1.063.274 | 1.071.160 | 1.079.016 | 1.084.840 | 1.091.015 | 1.097.045 |
| FR422 | Haut-Rhin | 711.457 | 715.557 | 719.749 | 723.685 | 727.871 | 732.242 | 736.477 | 742.408 | 746.072 | 749.820 |
| **Total CBA CH** | | 1.300.425 | 1.304.500 | 1.312.000 | 1.320.800 | 1.327.900 | 1.333.650 | 1.338.081 | 1.344.706 | 1.355.729 | 1.371.170 |
| **Total CBA DE** | | 2.772.600 | 2.785.200 | 2.806.700 | 2.823.500 | 2.832.800 | 2.841.914 | 2.849.506 | 2.853.915 | 2.860.255 | 2.858.643 |
| **Total CBA FR** | | 1.743.955 | 1.756.078 | 1.768.054 | 1.779.575 | 1.791.145 | 1.803.402 | 1.815.493 | 1.827.248 | 1.837.087 | 1.846.865 |
| **Total CS** | | 5.816.980 | 5.845.778 | 5.886.754 | 5.923.875 | 5.951.845 | 5.978.966 | 6.003.080 | 6.025.869 | 6.053.071 | 6.076.678 |

Table V.5: Population Development in the CBA 2000 - 2009

Besides the NUTS3 units DE131 Freiburg and DE 132 Breisgau-Hochschwarzwald (and to only a small extend DE133 Emmendingen, DE134 Ortenaukreis, and DEB3E Germersheim), all the German increase in population is due to positive migration, as the natural development is negative in all other German NUTS3 units of the CBA, respectively changed from positive to negative growth (see Table V.6). This corresponds to the overall German development of negative growth rates over the whole period analysed. The Swiss and French NUTS3 units all have –besides the urban NUTS3 unit CH031 Basel-Stadt- positive natural growth rates and hence a positive natural population development from 2000 – 2009 (see Table V.5).

| | | Natural increase Years 2000 - 2009 |
|---|---|---|
| EU27 | EU27* | 3.048.671 |
| CH | Switzerland | 128.821 |
| DE | Germany | -1.335.145 |
| FR | France | 2.715.222 |
| CH023 | Solothurn | 219 |
| CH025 | Jura | 755 |
| CH031 | Basel-Stadt | -5.579 |
| CH032 | Basel-Landschaft | 2.605 |
| CH033 | Aargau | 13.655 |
| DE121 | Baden-Baden | -2.784 |
| DE122 | Karlsruhe, Stadtkreis | -2.651 |
| DE123 | Karlsruhe, Landkreis | -581 |
| DE124 | Rastatt | -2.299 |
| DE131 | Freiburg im Breisgau | 1.923 |
| DE132 | Breisgau-Hochschwarzwald | 1.571 |
| DE133 | Emmendingen | 329 |
| DE134 | Ortenaukreis | 196 |
| DE139 | Loerrach | -891 |
| DE13A | Waldshut | -346 |
| DEB33 | Landau in der Pfalz | -553 |
| DEB37 | Pirmasens | -2.994 |
| DEB3E | Germersheim | 101 |
| DEB3H | Suedliche Weinstraße | -2.085 |
| DEB3K | Suedwestpfalz | -3.403 |
| FR421 | Bas-Rhin | 45.798 |
| FR422 | Haut-Rhin | 29.253 |
| **Total CBA** | | **72.239** |

Table V.6: Natural increase 2000 – 2009 in the CBA

Although five German NUTS3 units of the CBA have a natural increase in population, all German NUTS3 units show a negative trend over the period 2000-2009[7] (see Figure V.5). The increase of the Swiss NUTS3 units of the CBA is in contrast to their fertility rates, which are only slightly higher than the German rates. Here a negative trend can bee seen (see Figure V. 6) –due to the mentioned low fertility rates, and it can be assumed that a negative natural growth will take place in the next years.

---

[7] Besides DE131 Freiburg im Breisgau, investing in high-density dwellings for young families in the last decades

Figure V.5: Trend of natural increase of growing German NUTS3 units in the CBA
(besides DE131 Freiburg)



| | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
|---|---|---|---|---|---|---|---|---|---|
| Breisgau-Hochschwarzwald | 534 | 292 | 117 | 200 | 200 | 80 | 129 | 50 | -31 |
| Emmendingen | 210 | 143 | 80 | 0 | 0 | 70 | -38 | -104 | -32 |
| Ortenaukreis | 515 | 207 | 166 | -200 | 100 | -100 | -144 | -42 | -306 |
| Germersheim | 114 | 62 | 49 | -100 | 0 | -10 | -9 | 21 | -26 |
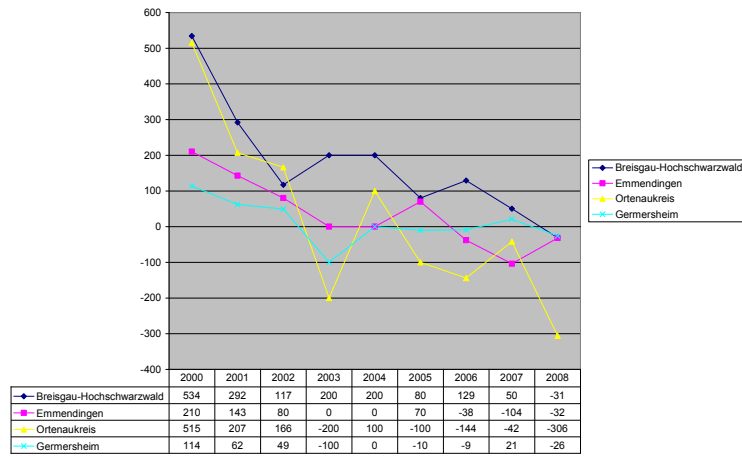
Figure V. 6: Trend of natural increase of selected Swiss NUTS3 units in the CBA
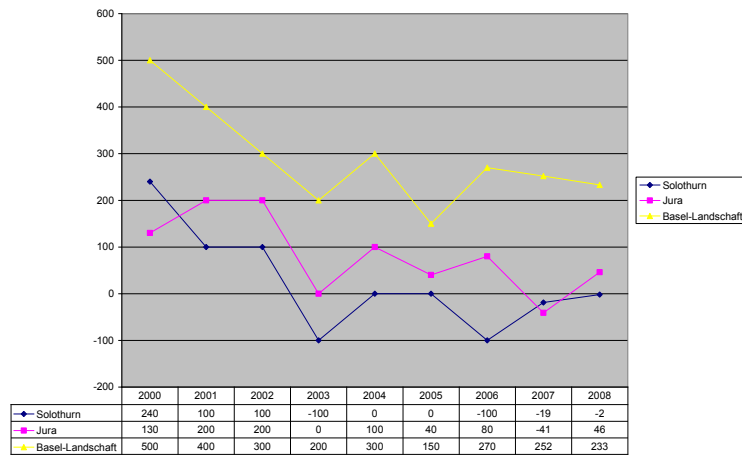


| | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
|---|---|---|---|---|---|---|---|---|---|
| Solothurn | 240 | 100 | 100 | -100 | 0 | 0 | -100 | -19 | -2 |
| Jura | 130 | 200 | 200 | 0 | 100 | 40 | 80 | -41 | 46 |
| Basel-Landschaft | 500 | 400 | 300 | 200 | 300 | 150 | 270 | 252 | 233 |

| NUTS name | Crude rate of natural increase | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
| EU27 | 0,6 | 0,5 | 0,3 | 0,2 | 0,8 | 0,6 | 1,0 | 1,0 | 1,3 |
| Total CBA | 1,9 | 1,6 | 1,3 | 1,0 | 1,5 | 1,2 | 1,3 | 1,3 | 1,1 |
| Switzerland | 2,2 | 1,5 | 1,5 | 1,2 | 1,8 | 1,6 | 1,7 | 1,8 | 2,0 |
| Germany | -0,9 | -1,1 | -1,5 | -1,8 | -1,4 | -1,8 | -1,8 | -1,7 | -2,0 |
| France | 4,4 | 4,3 | 4,0 | 3,7 | 4,5 | 4,3 | 4,8 | 4,5 | 4,5 |
| Solothurn | 1,0 | 0,4 | 0,4 | -0,4 | 0,0 | 0,0 | -0,4 | -0,1 | 0,0 |
| Jura | 1,9 | 2,9 | 2,9 | 0,0 | 1,4 | 0,6 | 1,2 | -0,6 | 0,7 |
| Basel-Stadt | -3,8 | -3,7 | -4,3 | -4,3 | -3,2 | -2,9 | -3,0 | -2,0 | -2,6 |
| Basel-Landschaft | 1,9 | 1,5 | 1,1 | 0,8 | 1,1 | 0,6 | 1,0 | 0,9 | 0,9 |
| Aargau | 3,1 | 2,4 | 2,3 | 2,5 | 3,0 | 2,6 | 2,6 | 2,5 | 3,2 |
| Baden-Baden, Stadtkreis | -5,8 | -6,7 | -6,2 | -5,6 | -5,6 | -5,6 | -4,4 | -5,5 | -6,3 |
| Karlsruhe, Stadtkreis | -1,7 | -1,6 | -1,9 | -1,8 | -0,7 | -0,5 | -0,7 | -0,3 | -0,3 |
| Karlsruhe, Landkreis | 0,9 | 0,6 | 0,1 | -0,2 | 0,2 | -0,4 | -0,4 | -1,0 | -1,1 |
| Rastatt | -0,4 | -0,5 | -1,1 | -1,3 | -0,9 | -1,3 | -1,4 | -1,2 | -1,9 |
| Freiburg im Breisgau, Stadtkreis | 0,8 | 0,3 | 1,0 | 0,5 | 0,9 | 1,6 | 1,1 | 1,5 | 1,3 |
| Breisgau-Hochschwarzwald | 2,2 | 1,2 | 0,5 | 0,8 | 0,8 | 0,3 | 0,5 | 0,2 | -0,1 |
| Emmendingen | 1,4 | 0,9 | 0,5 | 0,0 | 0,0 | 0,4 | -0,2 | -0,7 | -0,2 |
| Ortenaukreis | 1,3 | 0,5 | 0,4 | -0,5 | 0,2 | -0,2 | -0,3 | -0,1 | -0,7 |
| Loerrach | 0,6 | 0,3 | -0,4 | -0,5 | -0,9 | -1,2 | -0,9 | -0,4 | -0,7 |
| Waldshut | 0,6 | 0,7 | 0,3 | -0,6 | 0,6 | -0,9 | -1,0 | -0,5 | -1,2 |
| Landau in der Pfalz, Kreisfreie Stadt | -0,7 | -1,2 | -2,0 | -2,4 | 0,0 | -1,7 | -2,0 | -1,6 | -1,5 |
| Pirmasens, Kreisfreie Stadt | -7,0 | -7,6 | -8,5 | -6,8 | -6,8 | -9,3 | -7,3 | -7,4 | -7,9 |
| Germersheim | 0,9 | 0,5 | 0,4 | -0,8 | 0,0 | -0,1 | -0,1 | 0,2 | -0,2 |
| Suedliche Weinstraße | -1,2 | -1,1 | -0,9 | -2,7 | -1,8 | -3,0 | -2,8 | -2,9 | -2,5 |
| Suedwestpfalz | -2,7 | -2,2 | -3,3 | -3,8 | -3,8 | -4,6 | -3,5 | -3,9 | -5,0 |
| Bas-Rhin | 5,3 | 5,0 | 4,6 | 4,3 | 4,7 | 4,8 | 4,8 | 4,8 | 4,6 |
| Haut-Rhin | 4,3 | 4,5 | 4,1 | 4,4 | 4,6 | 4,4 | 5,0 | 4,5 | 4,3 |

Table V.7: Crude rate natural increase 2000 - 2008

In contrast to this, most of the NUTS3 units of the CBA have a gain of population due to migration. This corresponds to the overall crude rates of net migration for Switzerland and France, only Germany had a slight loss in migration in 2008 (see Table V.7). A steady negative crude rate of net migration within the CBA is only true for DEB37 Pirmasens and DEB3K Suedwestpfalz, both peripheral to the Rhine Valley. Other NUTS3 units have about an even development or high rates of net migration, which is especially true for the Swiss units (i.e. CH032 Basel-Landschaft, CH033 Aargau). But also German NUTS3 units like DE121 Baden-Baden and DE123 Karlsruhe, Stadtkreis have a high migration gain of the period analysed, which is due to their economic potential (Karlsruhe) or attractiveness for retired people (Baden-Baden).

| NUTS name | Crude rate of net migration | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
| EU27 | 1,5 | 1,3 | 3,8 | 4,2 | 4,0 | 3,6 | 3,2 | 3,9 | 3,3 |
| Total CBA | 3,1 | 5,4 | 5,0 | 3,8 | 3,1 | 2,8 | 2,5 | 3,2 | 2,7 |
| Switzerland | 3,3 | 5,6 | 6,5 | 5,7 | 5,2 | 4,3 | 4,9 | 9,4 | 12,1 |
| Germany | 2,0 | 3,3 | 2,7 | 1,7 | 1,0 | 1,0 | 0,3 | 0,5 | -0,7 |
| France | 2,7 | 3,0 | 3,1 | 3,2 | 3,2 | 3,0 | 1,8 | 1,2 | 1,2 |
| Solothurn | -1,8 | 5,7 | 4,1 | 3,2 | 3,2 | 2,3 | 3,1 | 6,6 | 6,3 |
| Jura | -2,1 | 0,0 | -1,4 | 1,4 | -1,4 | -0,3 | 1,5 | 4,4 | 3,2 |
| Basel-Stadt | -2,3 | 0,5 | 4,3 | 7,5 | 2,1 | -3,3 | -1,2 | 4,2 | 10,4 |
| Basel-Landschaft | 3,5 | 3,1 | 5,7 | 5,3 | 3,0 | 2,4 | 3,0 | 6,4 | 6,8 |
| Aargau | 4,4 | 7,1 | 8,1 | 4,8 | 5,2 | 4,9 | 6,9 | 9,2 | 14,0 |
| Baden-Baden, Stadtkreis | 7,6 | 14,3 | 15,7 | 11,1 | 11,1 | 10,7 | 9,3 | 5,5 | 5,0 |
| Karlsruhe, Stadtkreis | 4,2 | 7,7 | 8,0 | 6,0 | 5,3 | 4,4 | 4,4 | 9,3 | 6,6 |
| Karlsruhe, Landkreis | 5,8 | 7,9 | 7,0 | 3,3 | 2,6 | 3,4 | 2,1 | 3,7 | 0,7 |
| Rastatt | 1,3 | 5,4 | 7,4 | 4,9 | 4,4 | 5,1 | -0,4 | 0,9 | -1,6 |
| Freiburg im Breisgau, Stadtkreis | 9,6 | 14,3 | 11,5 | 9,0 | 7,5 | 7,6 | 6,1 | 7,1 | -0,2 |
| Breisgau-Hochschwarzwald | 5,7 | 10,0 | 7,7 | 5,3 | 4,8 | 4,2 | 1,4 | 0,5 | -0,1 |
| Emmendingen | 5,9 | 9,6 | 7,9 | 5,8 | 5,1 | 3,8 | 3,7 | 3,0 | 0,4 |
| Ortenaukreis | 4,6 | 7,3 | 4,0 | 3,4 | 2,2 | 2,7 | 1,7 | 2,0 | 0,4 |
| Loerrach | 4,9 | 8,4 | 6,3 | 2,3 | 1,4 | 4,2 | 2,8 | 3,7 | 1,0 |
| Waldshut | 1,2 | 5,3 | 3,9 | 1,8 | 0,0 | 0,9 | 0,3 | 0,7 | -0,8 |
| Landau in der Pfalz, Kreisfreie Stadt | 0,7 | 6,1 | 6,9 | 7,3 | 7,1 | 6,6 | 25,7 | 1,9 | 0,3 |
| Pirmasens, Kreisfreie Stadt | -6,4 | -1,3 | -0,4 | -2,3 | -2,3 | -2,3 | -9,2 | -5,8 | -4,5 |
| Germersheim | 3,1 | 6,8 | 3,6 | 2,4 | 2,4 | -0,6 | 1,3 | 3,0 | -1,5 |
| Suedliche Weinstraße | 4,0 | 6,6 | 4,5 | 5,5 | 3,6 | 0,3 | -1,1 | 0,6 | -0,5 |
| Suedwestpfalz | -1,1 | 2,2 | 1,4 | -1,0 | -1,9 | -2,2 | -4,2 | -5,1 | -5,8 |
| Bas-Rhin | 2,4 | 2,5 | 2,6 | 2,6 | 2,7 | 2,5 | 0,5 | 0,9 | 0,9 |
| Haut-Rhin | 1,4 | 1,4 | 1,4 | 1,4 | 1,4 | 1,4 | 3,0 | 0,4 | 0,7 |

Table V.8: Crude rate net migration 2000 – 2008

Figure V.7: Category map of annual population growth of NUTS3 level units

## Annual population growth rate
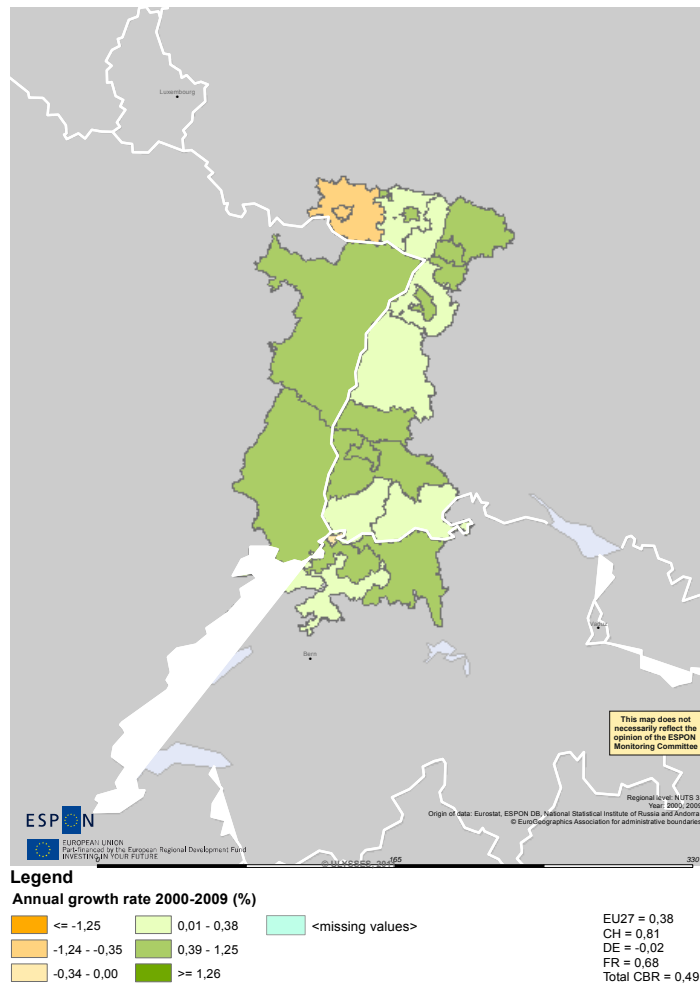


**Legend**

**Annual growth rate 2000-2009 (%)**

| | | |
|---|---|---|
| <= -1,25 | 0,01 - 0,38 | <missing values> |
| -1,24 - -0,35 | 0,39 - 1,25 | |
| -0,34 - 0,00 | >= 1,26 | |

EU27 = 0,38
CH = 0,81
DE = -0,02
FR = 0,68
Total CBR = 0,49

Altogether, most of the CBA could gain population from 2000 – 2009 as positive migration outranged the negative natural development (see Table V.8, Figure V.7, and Figure V.8). Exceptions are Basel-Landschaft, where the positive migration could not compensate the natural losses, as well as DEB37 and DEB3K Pirmasens and Suedwestpfalz with a negative natural increase as well as negative migration (see Figure V.8 and Figure V.9). As mentioned before, the latter two are not part of the Rhine Valley and mainly within the Palatine Forest.

Figure V.8: Category map of population growth of NUTS3 level units

## Population growth



**Legend**

| Total increase | Natural increase | Net migration | 2000-2008 |
|---|---|---|---|
| positive growth | positive natural increase | positive migration | |
| positive growth | negative natural increase | positive migration | |
| negative growth | positive natural increase | negative migration | <missing values> |
| negative growth | negative natural increase | positive migration | |
| negative growth | negative natural increase | negative migration | |

Figure V.9: Development of the population in each NUTS3 unit of the CBA 2000 - 2009
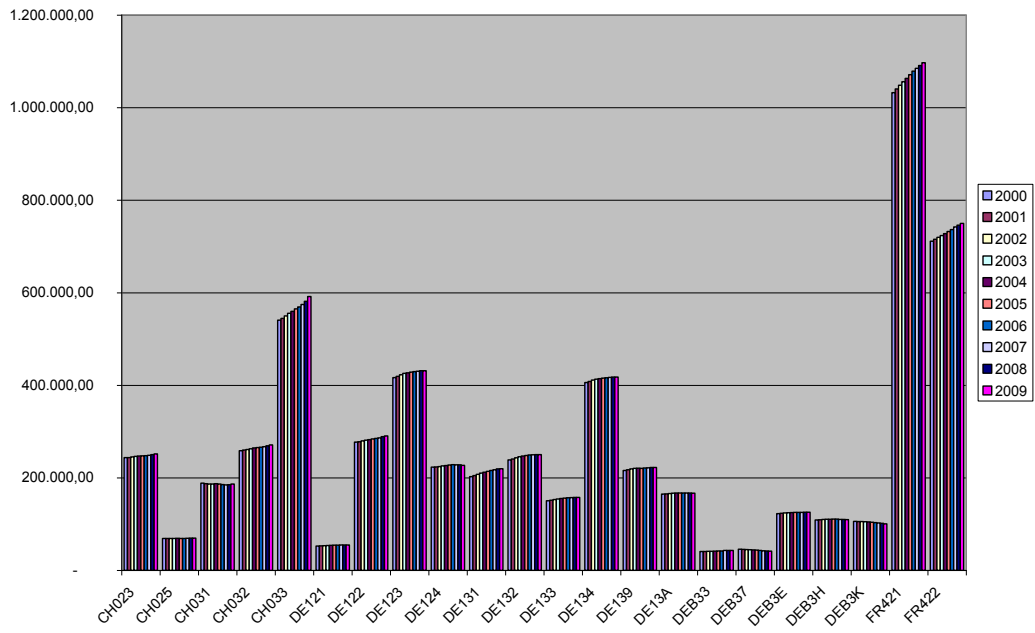
| | | Years 2000 - 2009 | | | Categor-ization | Change natural increase 00-08 | Change net migration 00-08 | Impact on total population change | Annual growth rate 2000-2009 |
|---|---|---|---|---|---|---|---|---|---|
| | | Natural increase | Net migration | Sum | | | | | |
| EU27 | EU27* | 3.048.671 | 13.896.020 | 16.944.691 | + + | positive natural increase | positive migration | positive growth | 0,38 |
| CH | Switzerland | 128.821 | 492.541 | 621.362 | + + | positive natural increase | positive migration | positive growth | 0,81 |
| DE | Germany | -1.335.145 | 973.927 | - 361.218 | - + | negative natural increase | positive migration | negative growth | -0,02 |
| FR | France | 2.715.222 | 1.456.066 | 4.171.288 | + + | positive natural increase | positive migration | positive growth | 0,68 |
| CH023 | Solothurn | 219 | 8.124 | 8.343 | + + | positive natural increase | positive migration | positive growth | 0,36 |
| CH025 | Jura | 755 | 358 | 1.113 | + + | positive natural increase | positive migration | positive growth | 0,16 |
| CH031 | Basel-Stadt | -5.579 | 4.140 | -1.439 | - + | negative natural increase | positive migration | negative growth | -0,11 |
| CH032 | Basel-Landschaft | 2.605 | 10.402 | 13.007 | + + | positive natural increase | positive migration | positive growth | 0,53 |
| CH033 | Aargau | 13.655 | 36.616 | 50.271 | + + | positive natural increase | positive migration | positive growth | 1,01 |
| DE121 | Baden-Baden | -2.784 | 4.860 | 2.076 | - + | negative natural increase | positive migration | positive growth | 0,43 |
| DE122 | Karlsruhe, Stadtkreis | -2.651 | 15.824 | 13.173 | - + | negative natural increase | positive migration | positive growth | 0,52 |
| DE123 | Karlsruhe, Landkreis | -581 | 15.550 | 14.969 | - + | negative natural increase | positive migration | positive growth | 0,39 |
| DE124 | Rastatt | -2.299 | 6.161 | 3.862 | - + | negative natural increase | positive migration | positive growth | 0,19 |
| DE131 | Freiburg im Breisgau | 1.923 | 15.244 | 17.167 | + + | positive natural increase | positive migration | positive growth | 0,90 |
| DE132 | Breisgau-Hochschwarz-wald | 1.571 | 9.661 | 11.232 | + + | positive natural increase | positive migration | positive growth | 0,51 |
| DE133 | Emmendingen | 329 | 6.969 | 7.298 | + + | positive natural increase | positive migration | positive growth | 0,53 |
| DE134 | Ortenaukreis | 196 | 11.612 | 11.808 | + + | positive natural increase | positive migration | positive growth | 0,32 |
| DE139 | Loerrach | -891 | 7.698 | 6.807 | - + | negative natural increase | positive migration | positive growth | 0,33 |
| DE13A | Waldshut | -346 | 2.243 | 1.897 | - + | negative natural increase | positive migration | positive growth | 0,13 |
| DEB33 | Landau in der Pfalz | -553 | 2.640 | 2.087 | - + | negative natural increase | positive migration | positive growth | 0,56 |
| DEB37 | Pirmasens | -2.994 | -1.485 | -4.479 | - - | negative natural increase | negative migration | negative growth | -1,13 |
| DEB3E | Germersheim | 101 | 2.554 | 2.655 | + + | positive natural increase | positive migration | positive growth | 0,25 |
| DEB3H | Suedliche Weinstraße | -2.085 | 2.572 | 487 | - + | negative natural increase | positive migration | positive growth | 0,06 |
| DEB3K | Suedwestpfalz | -3.403 | -1.807 | -5.210 | - - | negative natural increase | negative migration | negative growth | -0,56 |
| FR421 | Bas-Rhin | 45.798 | 18.749 | 64.547 | + + | positive natural increase | positive migration | positive growth | 0,68 |
| FR422 | Haut-Rhin | 29.253 | 9.110 | 38.363 | + + | positive natural increase | positive migration | positive growth | 0,59 |
| Total CBA | | 72.239 | 187.795 | 260.034 | + + | positive natural increase | positive migration | positive growth | 0,49 |

Table V.9: Summarized development of population and trends in the CBA

It can be summarized, that although the River Rhine is a natural border, dividing the CBA politically and also lingual, the population figures show a high attractiveness of the Rhine Valley, which can be seen by the NUTS3 units not belonging to the Rhine valley performing worse than those within. This outperformance can also be seen looking at the expected population development compared the actual. The development of the regions' natural population growth and net migration is compared to the expected behaviour if they would have followed the patterns of the countries of which they are part of. For this the national averages where weighted according to the proportion of the regions' population belonging to the different countries in the Cross border areas and afterwards compared to their actual data.

## 2.6 Total Fertility Rates

Total Fertility Rate represents the number of children that would be born to a woman if she were to live to the end of her childbearing years and bear children in accordance with current age-specific fertility rates.

Figure V.10: Fertility rate on NUTS2 level and national level 2008
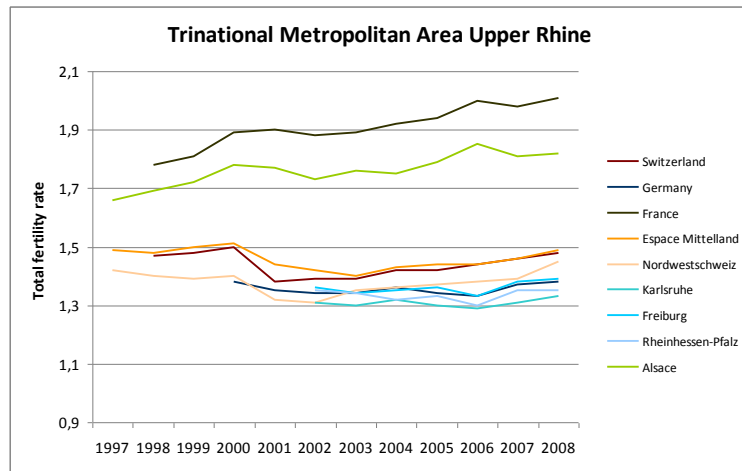


For the CBA, fertility rates are reported only at NUTS2 level units. The fertility rates in the year 2008 range from 1,33 (DE12 Karlsruhe) to 1,82 (FR42 Alsace) and follow the mean fertility rates of the national country each and show a slightly increase on national and also CBA level from 2000 - 2009 (see Figure V.10)

Figure V.11: Map of total fertility rates of the NUTS2 level units (year 2008) of the CBA
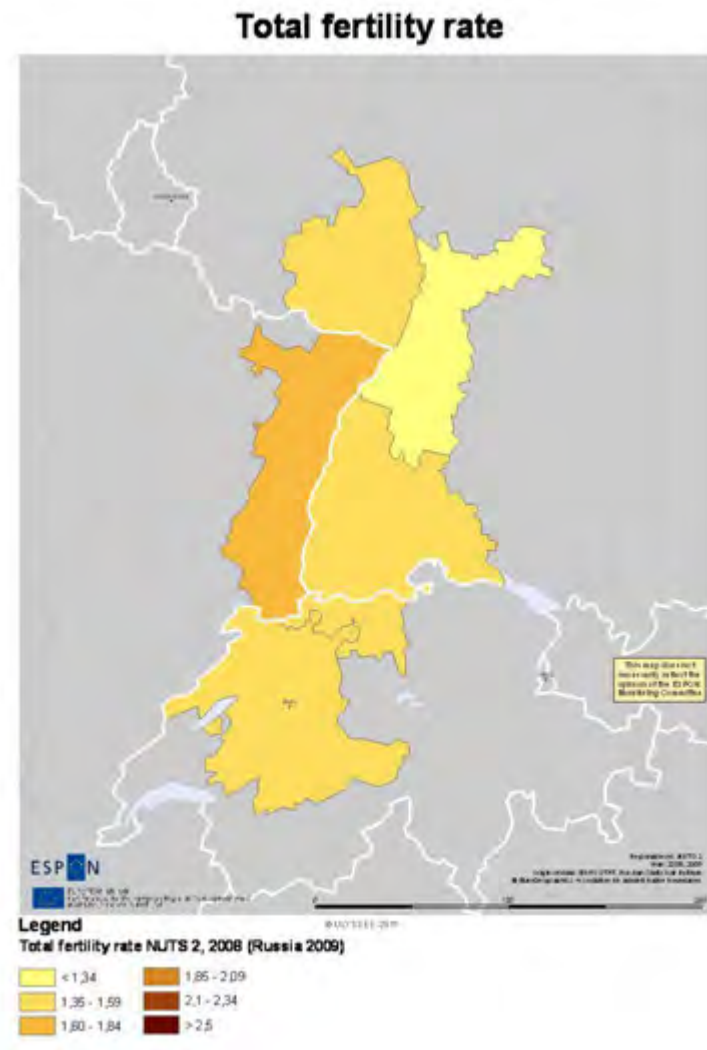
## 2.7 Population Density

Population density is a key geographic parameter expressing the total population per unit area, usually per sq km.

For the CBA, population density is reported at NUTS1, 2 and 3 level units. The mean population density of the CBA shows steady increase, reaching is 273,52 inhabitants per sq km for the year 2009 (see Figure V.12), compared to 101,4 inhabitants per sq km in France, 230 in Germany, and 191,2 in Switzerland, the latter both already significant higher than the EU27 average of 116 inhabitants per sq km (see Figure V.13). The CBA is hence rather dense area, even compared to the national level of for instance Germany, which is one of the densest population countries in Europe. On NUTS4 level, on which no data is available, this figures would show an even more extreme tendency, as the edges of the CBA a significant less dense populated, especially along the Rhine valley, as it is flanked by the Vosges and Black Forest with rather small settlements.

Figure V.12: Mean population density evolution for the CBA
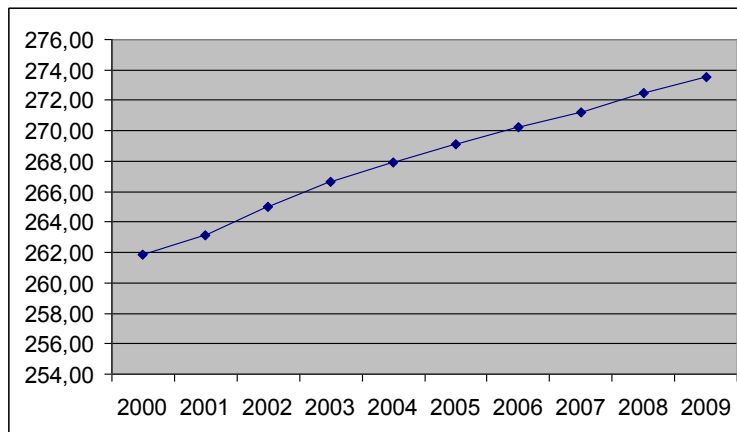


Figure V.13: Mean density of CBA in comparison to EU27 and national levels (2008)



| | EU27 | DE | FR | CH | CBR |
|---|---|---|---|---|---|
| inh./sq km | 116,0 | 229,9 | 101,4 | 191,2 | 272,46 |
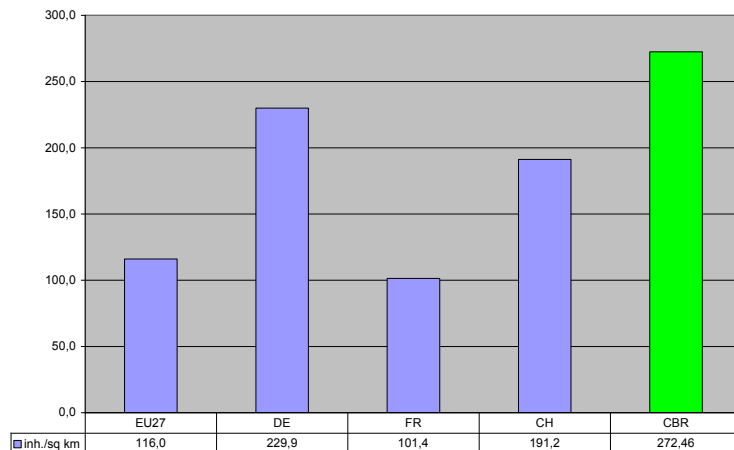
On the NUTS3 level units, the population density is mostly affected by the urban centres and the uneven size of the NUTS3 units in France compared to Switzerland and Germany.

Figure V.14 shows the spatial distribution at NUTS3 level throughout the CBA, for the year 2008.

Figure V.14: Category map of population density in the CBA 2009

## Population density



**Legend**

**Population density 2009\* (inhabitants per km2)**

| | | |
|---|---|---|
| ☐ <= 20,42 | ☐ 65,05 - 116,00 | ☐ <missing values> |
| ☐ 20,43 - 39,63 | ☐ 116,01 - 224,43 | |
| ☐ 39,64 - 51,36 | ☐ 224,44 - 518,17 | |
| ☐ 51,37 - 65,04 | ☐ >= 518,18 | |

EU27 = 116,00
CH = 186,56
DE = 229,63
FR = 101,72

\*EU27 year is 2008

Figure V.15: Total Population increase
Source: SIGRS/GISOR – Conférence du Rhin Supérieur / Oberrheinkonferenz 2011



Population growth 2000-2006:
Total increase

Figure V.16: Population increase by migration
Source: SIGRS/GISOR – Conférence du Rhin Supérieur / Oberrheinkonferenz 2011



## V.4. Urban Rural relationship

To evaluate the interaction between rural and urban areas (meaning flows of people, goods, and services) no data is available on EUROSTAT or ESPON. Regarding the structural indicators such as employment and economical patterns are only available at a NUTS3 level. The urban/rural typologies established by ESPON and EUROSTAT are also only available on a broad scale, limiting the ability to link the indicators with rural or urban areas at a significant dimension. Therefore the focus was on taking these typologies on a NUTS3 and highlighting some of the differences between them, regarding socioeconomic indicators as well as the land use patterns.

Besides the ESPON typology of urban and rural regions, data for land types has been included. Some of this data is available from the ESPON DB, although there are some inconsistencies between the ESPON DB and the data from the CLC country files Germany for artificial surfaces. As the data, e.g. for agricultural areas, varies only in an acceptable margin of error, the analysis was focused on the land use changes of the CLC 2000-2006 which was processed for all relevant NUTS3 regions and the ESPON countries.

| Variable name | Geographical scale | Source | Time frame |
|---|---|---|---|
| Change urban fabric | NUTS 3 | Corine Land Cover | 2000-2006 |
| Agricultural areas | NUTS 3 | ESPON DB | 1990; 2000; 2006 |
| Urban-rural typology | NUTS 3 | ESPON DB/ Eurostat | |
| Urbanization of natural areas | NUTS 3 | Corine Land Cover | 2000-2006 |
| Gross value added in forestry and fishing | NUTS 3 | Eurostat | 1997-2008 |
| Employment in forestry and fishing | NUTS 3 | Eurostat, Russian Federal State Statistics Service | 1997-2008 |

Table V.10: Sources for data mining


## 4.1 Urban – Rural Typology

There are two alternative typologies available for the ULYSSES project. One is the ESPON 1.1.2 typology, which is based on the idea of two main dimensions, that is, degree of urban influence on the one hand, and degree of human intervention on the other hand.

In determining degree of urban influence, two factors were taken into account: population density and status of the leading urban centre of the region. High urban influence includes all NUTS3 areas with a population density more than the European average (107 persons per square km) and/or the areas where the leading urban centre of the NUTS3 area has been labelled "Metropolitan European Growth Area" (MEGA). The rest of the NUTS3 regions were classified as being under low urban influence.

The degree of human intervention is determined by the relative share of land cover according to the main land cover classes of the CLC data set. The main classes are artificial surfaces, agricultural areas, and residual land cover. High urban intervention corresponds to a situation where the share of artificial surfaces (and possibly one of the two other land cover categories) is above European average. Medium human intervention equals the cases where the share of agricultural land (and possibly the share of residual land cover) is above European average. Low human intervention concerns all cases where only the share of residual land cover is above European average.

The ESPON 1.1.2 typology has been included for illustrative purposes, but has not been used to cross with other data, as indicators have not been updated for NUTS3 changes and due to that are outdated.


The urban rural typology that was used was a revision by the EUROSTAT of the OECD typology. The typology is established in three steps:

Clusters of urban grid cells with a minimum population density of 300 inhabitants per km² and a minimum population of 5.000 were created. All the cells outside these urban clusters are considered as rural.

NUTS3 units of less than 500 km² are grouped with one or more of its neighbours solely for classification purposes, i.e. all the NUTS 3 regions in a grouping are classified in the same way.

It classifies NUTS3 units based on the share of population in rural grid cells. More than 50 % of the total population in rural grid cells = predominantly rural, between 20 % and 50 % in rural grid cells = intermediate and less than 20 % = predominantly urban" (Eurostat 2010: 249).

Further, some regions that are predominantly rural are considered intermediate in the presence of a city with more than 200.000 inhabitants and intermediate regions with cities of over 500.000 inhabitants are considered as urban.

In the CBA Upper Rhine Trinational Metropolitan Region nearly all NUTS3 units are classified as intermediate regions. The only predominantly urban regions are DE122 Karlsruhe Stadtkreis and DE123 Karlsruhe Landkreis. That means less than 20% of the population in these two regions lives in rural grid cells and the population density is above 300 inhabitants per km² (DE 122 Karlsruhe Stadtkreis: 1.675, DE123 Karlsruhe Landkreis: 397). The only predominantly rural NUTS 3 unit found also on the German side is

DE13A Waldshut (147 inhabitants per km²). The two French NUTS 3 units both are classified as intermediate, although the region FR421 Bas-Rhin includes Strasbourg with its nearly 280.000 inhabitants (DE122 Karlsruhe Stadtkreis 290.736). The classification here results from the great areal size of the NUTS3 region. Unfortunate is the missing of Swiss data. The city of Basel has about 170.000 inhabitants, the Trinational Agglomeration Basel (TAB) about 830.000. Basel is the most densely populated area in Switzerland with 5.174 inhabitants per km² (3 times higher than Karlsruhe).

What becomes clearly visible in this context is the problematic of classification and formation of the spatial unit on which the classes are applied. Looking at Figure V.17, one could get the idea the only important urban centre in the CBA is the German city of Karlsruhe, whereas there are other urban centres like Freiburg (DE), Baden-Baden (DE), Mulhouse (FR) or Strasbourg (FR), which is nearly the same size as Karlsruhe and even more dense populated within the city borders (3.500 inhabitants per km²).


Nor is it visible in the maps that the landscape's influence is a great deal higher than the borders one. Infrastructure has to be orientated along the axis from north to south using the Rhine valley, often being "back to back" in duplicate on the German an French side of the river (see also Chapter 5). Due to these topographical circumstances the border is an agglomeration area, rather than because of the border itself. Departing from the border the structures become less urban, what is an important fact, but not visible to a non-local person looking at the maps. It is obvious using NUTS3 level is not detailed enough for the sufficient illustration of these matters of fact.

Figure V.17: ESPON 1.1.2 & Eurostat urban rural typologies



ESPON 1.1.2 &Eurostat urban rural typologies

## 4.2 Economy

An indicator for a region being more urban or rural is the share of agriculture and fishing in regards of total employment and share of Gross Development Production (GDP) or Gross Added Value (GVA).[8] The assumption is: The higher the share of agriculture and fishing in a certain area, the more rural the area is, while in urban areas agriculture and fishing plays a minor role in the economy. In this analysis the indicator of Gross Added Value (GVA) is used.[9] In general agriculture and fishing is only a small economic sector compared to other economic activities in the CBA Upper Rhine Trinational Metropolitan Region.[10] It can be assumed (although data is not available) fishing takes only a minor share of the whole sector of agriculture and fishing, as freshwater fishing is not very productive compared to sea fishing and the topography in connection with climate condition of the Upper Rhine promote winery and arable crops.

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[8] Although the GVA of agriculture and fishing ha only a small share of the total added value, it will be used here as an indicator.
[9] GVA is related to GDP as follows: GVA + taxes – subsidies = GDP. I.e. in the GVA's share of case agriculture and fishing of the total GVA is higher than compared to the common used GDP's share as a high amount of subsidies is paid in this sector.
[10] Nevertheless the biggest amount in the EU financing is related to agriculture and fishing.

Figure V.18: Gross value added by agriculture and fishing



## Gross value added by agriculture and fishing
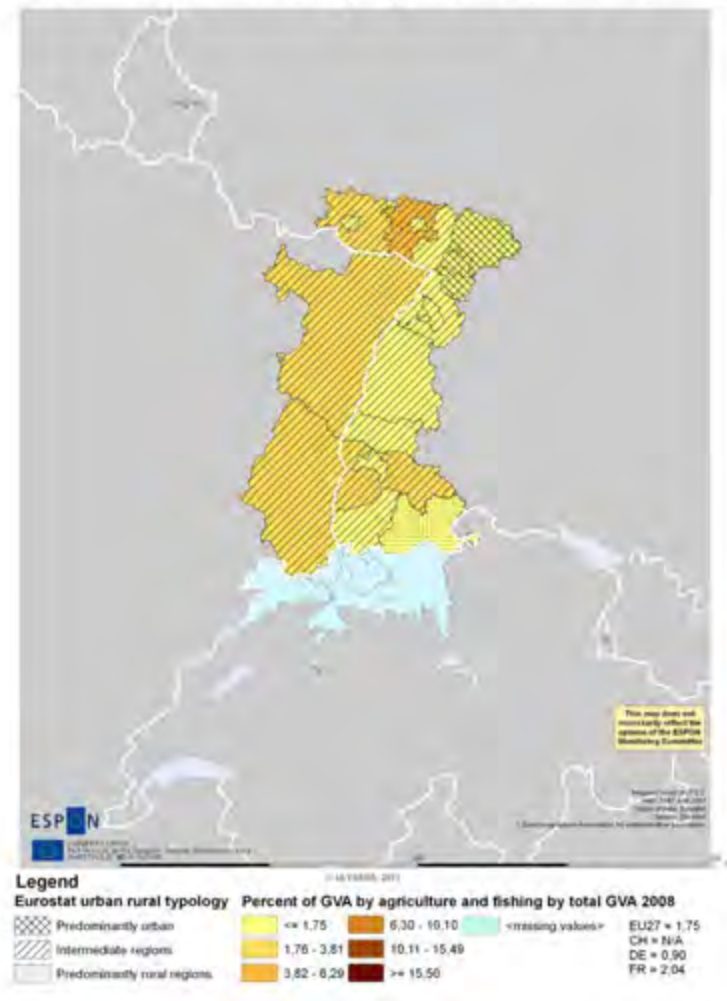
The GVA's share of agriculture and fishing in France is about 2.3 times higher compared to Germany (2,04% (FR) to 0,90% (DE)). The average shares of the CBA´s French NUTS3 units meet the French average while most of the German rural regions within the CBA show higher percentages than the German average and also the total is higher (1,26%/0,90%). This is caused by arable (specialised) crops, especially winery and to some extend orcharding, which account a higher Added Value compared to agriculture based on i.e. wheat or corn. This can be seen exemplarily in the NUTS3 unit DEB3H "Suedliche Weinstraße", belonging to the largest winery areas in Germany, with a GVA share of 5% of the total GVA.

Similar figures occur concerning the employment in this sector. The economy in France and Germany both shows a relatively small employment in agriculture and fishing (about half (FR) respectively a third (DE) of the EU27 average), dropping by between 1,0% (DE) and 1,7% (FR) per year. Employment in two German NUTS3 units (DEB3E Germersheim, DEB3H Suedliche Weinstraße), and one French NUTS3 unit (FR421 Bas-Rhin) grew slightly and four NUTS3 units staid the same (DEB33 Landau, DEB37 Pirmasens, DEB3K Suedwestpfalz, FR422 Haut-Rhin), while the GVA of all CBS's NUTS3 units fell or remained constant from 2000-2008 – except in DEB3H Suedliche Weinstraße and FR421 Bas-Rhin with an increase of 1,51 and 2,42%. Nevertheless, in all CBA's NUTS3 units the share of GVA for agriculture and fishing fell related to the total GVA. That means the economic sector was not able to keep up with the overall economic development within the CBA.

Figure V.19: Annual change GVA by agriculture and fishing
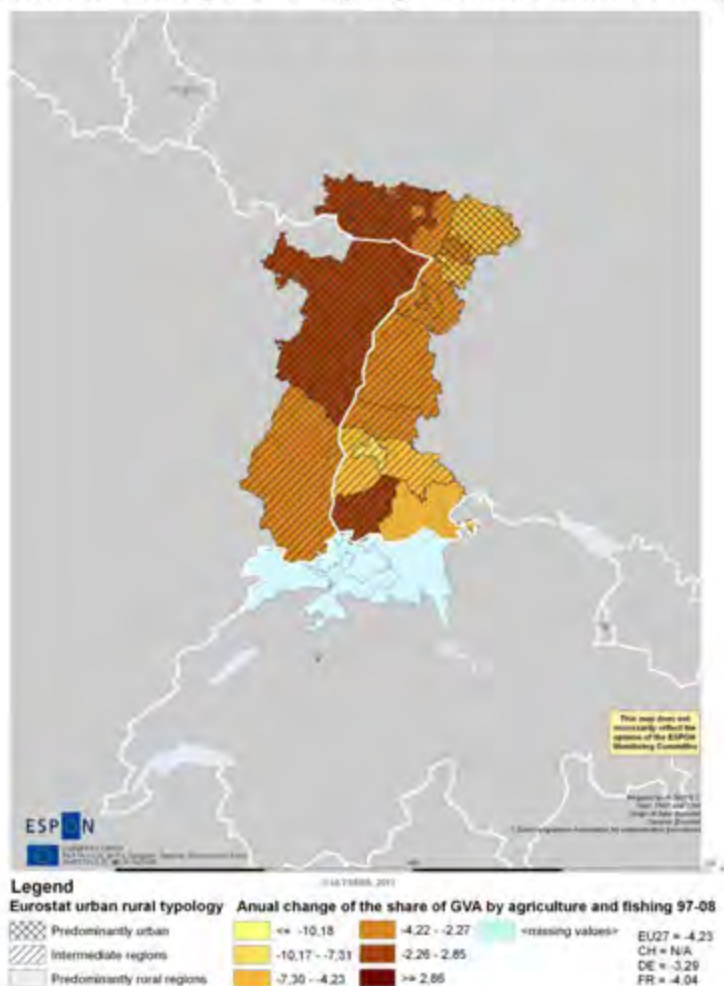


## 4.3 Land Use

### 4.3.1 Agricultural areas

In Germany and France more than a half of the overall soil is in agricultural use (59,47% (DE), 51,42% (FR)). The data for CBA Upper Rhine Trinational Metropolitan Region differs slightly from the national average in France (47,45%) and more clearly in the German part (38,99%).

The difference is more visible in Germany due to more agrarian used soil in the North of the country where there are regions with 70% to over 80% of agricultural used land. Not even one NUTS3 region in the CBA meets or exceeds the respective national average. The annual growth rate is in all NUTS3 regions negative, the average loss of agricultural used soil from 1990 to 2006 on the German side was 630 ha (2,2% (1,59% Germany)), on the French side 2.300 ha (1,15% (0,55% France)) per NUTS3 unit.

Figure V.20: Share of agricultural areas

## Share of agricultural areas
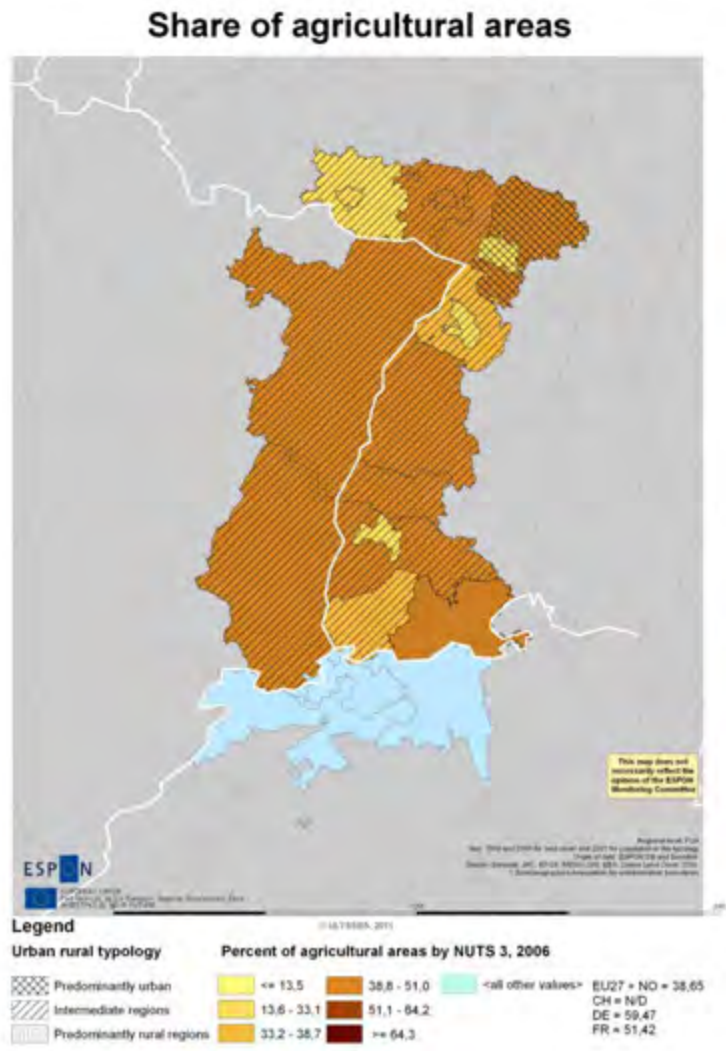
| | NUTS name | Agricultural areas (ha) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Total 1990 | Total 2000 | Total 2006 | Share of total area 06 (%) | Net formation of land cover 90-06 | Net formation of land cover by total area 90-06 (per 10000) | Annual growth rate 90-06 (per 1000) |
| EU27 + CH + NO | | 182.685.050,0 | 205.227.723,0 | 184.577.384,0 | 38,65 | 1.892.334,0 | 39,621 | 6,44 |
| CH | Switzerland | 74.906,0 | 74.824,0 | 75.658,0 | - | 752,0 | 1,82 | 6,25 |
| DE | Germany | 21.604.012,0 | 21.397.990,0 | 21.263.899,0 | 59,47 | -340.113,0 | -95,12 | -9,91 |
| FR | France | 33.006.580,0 | 32.903.514,0 | 32.826.621,0 | 51,42 | -179.959,0 | -28,19 | -3,42 |
| CH023 | Solothurn | 1.865,0 | 1.857,0 | 1.865,0 | 2,36 | 0,0 | 0,00 | 0,00 |
| CH025 | Jura | 24.291,0 | 24.278,0 | 24.350,0 | 29,04 | 59,0 | 7,04 | 1,52 |
| CH031 | Basel-Stadt | 583,0 | 583,0 | 370,0 | 9,94 | -213,0 | -572,45 | -280,18 |
| CH032 | Basel-Landschaft | 3.636,0 | 3.628,0 | 3.557,0 | 6,88 | -79,0 | -15,28 | -13,72 |
| CH033 | Aargau | 600,0 | 600,0 | 600,0 | 0,43 | 0,0 | 0,00 | 0,00 |
| DE121 | Baden-Baden, Stadtkreis | 3.283,0 | 3.156,0 | 3.116,0 | 21,99 | -167,0 | -117,85 | -32,58 |
| DE122 | Karlsruhe, Stadtkreis | 5.301,0 | 5.086,0 | 4.963,0 | 28,41 | -338,0 | -193,47 | -41,09 |
| DE123 | Karlsruhe, Landkreis | 57.222,0 | 55.839,0 | 55.278,0 | 51,01 | -1.944,0 | -179,38 | -21,58 |
| DE124 | Rastatt | 26.621,0 | 26.265,0 | 25.937,0 | 35,11 | -684,0 | -92,60 | -16,26 |
| DE131 | Freiburg im Breisgau, Stadtkreis | 4.733,0 | 4.493,0 | 4.439,0 | 28,81 | -294,0 | -190,81 | -40,00 |
| DE132 | Breisgau-Hochschwarzwald | 61.997,0 | 61.491,0 | 61.209,0 | 44,48 | -788,0 | -57,26 | -7,99 |
| DE133 | Emmendingen | 32.308,0 | 31.967,0 | 31.850,0 | 46,83 | -458,0 | -67,34 | -8,92 |
| DE134 | Ortenaukreis | 81.045,0 | 79.993,0 | 79.218,0 | 42,64 | -1.827,0 | -98,33 | -14,24 |
| DE139 | Loerrach | 31.071,0 | 30.676,0 | 30.488,0 | 37,77 | -583,0 | -72,23 | -11,83 |
| DE13A | Waldshut | 49.838,0 | 49.433,0 | 49.319,0 | 43,61 | -519,0 | -45,90 | -6,54 |
| DEB33 | Landau in der Pfalz, Kreisfreie Stadt | 4.224,0 | 4.147,0 | 4.115,0 | 50,29 | -109,0 | -133,22 | -16,33 |
| DEB37 | Pirmasens, Kreisfreie Stadt | 1.929,0 | 1.860,0 | 1.854,0 | 30,03 | -75,0 | -121,49 | -24,75 |
| DEB3E | Germersheim | 22.164,0 | 21.711,0 | 21.454,0 | 46,48 | -710,0 | -153,81 | -20,33 |
| DEB3H | Suedliche Weinstraße | 31.270,0 | 30.991,0 | 30.691,0 | 47,71 | -579,0 | -90,01 | -11,67 |
| DEB3K | Suedwestpfalz | 28.760,0 | 28.643,0 | 28.399,0 | 29,75 | -361,0 | -37,82 | -7,89 |
| FR421 | Bas-Rhin | 240.862,0 | 239.631,0 | 238.985,0 | 49,84 | -1.877,0 | -39,14 | -4,89 |
| FR422 | Haut-Rhin | 161.922,0 | 160.556,0 | 159.196,0 | 45,06 | -2.726,0 | -77,15 | -10,61 |

Table V.11: Agricultural areas

### 4.3.2 Artificial surfaces

The amount of artificial surfaces varies depending on how "urban" or "rural" a region really is. Again the limited possibility of sophistication on the NUTS3 level hinders the data to be as significant as it could be. As an example the cities of Karlsruhe (DE) and Strasbourg (FR) will be compared. Karlsruhe Stadtkreis, which is less dense populated than Strasbourg (see above) has the highest share of artificial surface on the total land cover (40,34 m² per ha). Strasbourg is here considered only as part of the NUTS3 region FR421 Bas-Rhin, which exhibits only a share of less than one third of Karlsruhe Stadtkreis (FR421: 12,24 m² per ha).

Concerning land-use change there is data available for agricultural land which was transformed into artificial surfaces. Corresponding with the loss of agricultural used soil in all NUTS3 units (see above) it is a "one-

way" land use change to artificial surfaces. The relative changes are higher the more urban a region is classified and the less agricultural used soil it had before. The land use change is with 58,5 m² per ha highest in DE122 Karlsruhe Stadtkreis and with 0,5 m² per ha lowest in DE13A Waldshut, which is the only predominantly rural NUTS3 unit in the CBA. The two French NUTS3 units are according to relative figures on the average, but absolute land use change in German and French NUTS3 regions is summed up nearly the same (1.077 ha (DE) to 1.177 ha (FR)).

Figure V.21: Land use change from agricultural to artificial



**Land use change from agricultural to artificial**
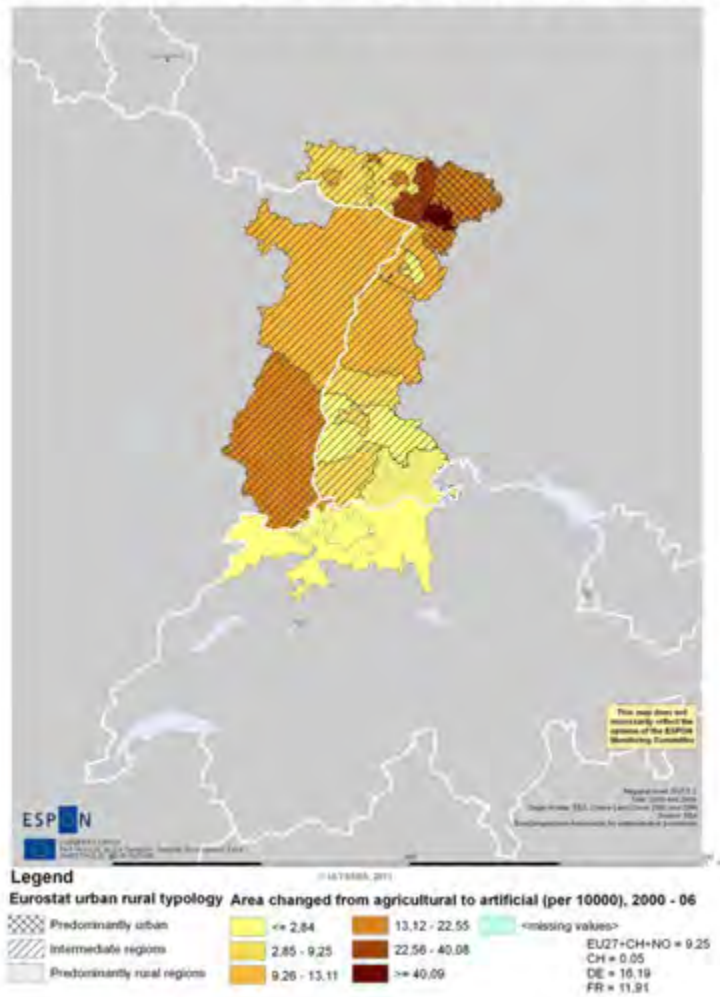
## V.5 Accessibility and connectivity

### 5.1 Aims, Indicators and Methods

#### 5.1.1 Data
Most of the data for accessibility available at the ESPON database is very outdated and available mostly for the 1999 NUTS version. The use of NUTS 1999 delimitations is specially limiting since changes in the coding systems and the actual boundaries of the regions have occurred in almost all of the countries in Europe. Nonetheless, the potential accessibility by different modes of transportation has been updated in 2006 and re-calculated for fitting the then ruling NUTS 3 delimitation retroactively for 2001 and is therefore available for two different and comparable years. This is particularly useful as this indicator does not limit itself to measuring the transport network, but synthesizes the overall accessibility of the regions by relating the travel time (impedance function) with the population that can be reached (activity function).

| Variable name | Geographical scale | Source | Time frame |
|---|---|---|---|
| Potential accessibility road, rail, air and multimodal indexed to ESPON average | NUTS 3 | ESPON DB | 2001;2006 |
| Potential accessibility road, rail, air and multimodal indexed to CBA average | NUTS 3 | ESPON DB | 2001;2006 |
| Potential accessibility road, rail, air and multimodal index change 2001-2006 | NUTS 3 | ESPON DB | 2001;2006 |
| Households with broadband connection, 2009 | NUTS 2 | European Commission 5th Cohesion Report, Regional Innovation Scoreboard | 2009 (2004 NO, PL) |

Table V.12: Data applied

As for connectivity data, the ESPON database has only very few indicators on a NUTS 2 level and for 2003. Given the advancements in this area, data from the 5th Cohesion Report and from the European Innovation Scoreboard has been used regarding households' broadband internet access.

### 5.1.2 Indicators explained

The potential accessibility is a similar indicator as the demographic potential, meaning that is relates the activities to be reached with the travel time it takes to reach them. "Potential accessibility is a construct of two functions, the *activity function* representing the activities or opportunities to be reached and the *impedance function* representing the effort, time, distance or cost needed to reach them (impedance function) (Wegener et al., 2002). For potential accessibility the two functions are combined multiplicatively." (ESPON 1.2.1, p. 277) According to the ESPON 1.2.1 Final Report the potential accessibility is define as follows:

$$A_i = \sum_j W_j \exp\left(-\beta c_{ij}\right)$$

"where $A_i$ is the accessibility of area i, $W_j$ is the activity W to be reached in area j, and $c_{ij}$ is the generalised cost of reaching area j from area i. $A_i$ is the total of the activities reachable at j weighted by the ease of getting from i to j. The interpretation is that the greater the number of attractive destinations in areas j is and the more accessible areas j are from area i, the greater is the accessibility of area i." (pp: 276)

For each NUTS 3 of the ESPON space the potential accessibility was obtained by relating the travel time between the centroids through different modes of transportation with the population. The multimodal accessibility synthesizes all the other modes.

By applying this method the potential accessibility in regards of the average of the CBA and the average of Europe can be identified. Nonetheless it leads to results not reflecting reality: for instance the North of Alsace seems to be more accessible than the Swiss NUTS3 units, which might be true by calculation, but not in real life. Same to the air accessibility, in which NUTS3 units having an airport can perform less than those without due to their proximity to big hubs. In the latter case an extended area, exceeding the borders of the CBA, should be taken into account.

### 5.1.3 Index change

As the potential accessibility was produced for two different years, it is possible to see the evolution of the infrastructure in this period. Here, the index change of accessibility was used. For these indicators, "the accessibility values of 2001 are standardised to the ESPON average of that year and those of 2006 to the average of that year, each ESPON average is set to 100 and the regional values are transformed accordingly. The map then shows the differences of the index values, i.e. the change of the position of the regions relative to other regions. Positive values express an improvement of the relative locational quality, while negative values express a loss in relative locational quality." (Spiekermann & Wegener (2007), "Update of Selected Potential Accessibility Indicators Final Report", pp. 9)

Figure V.22: Crossings of the border and/or the river Rhine
Source: SIGRS/GISOR – Conférence du Rhin Supérieur / Oberrheinkonferenz 2011
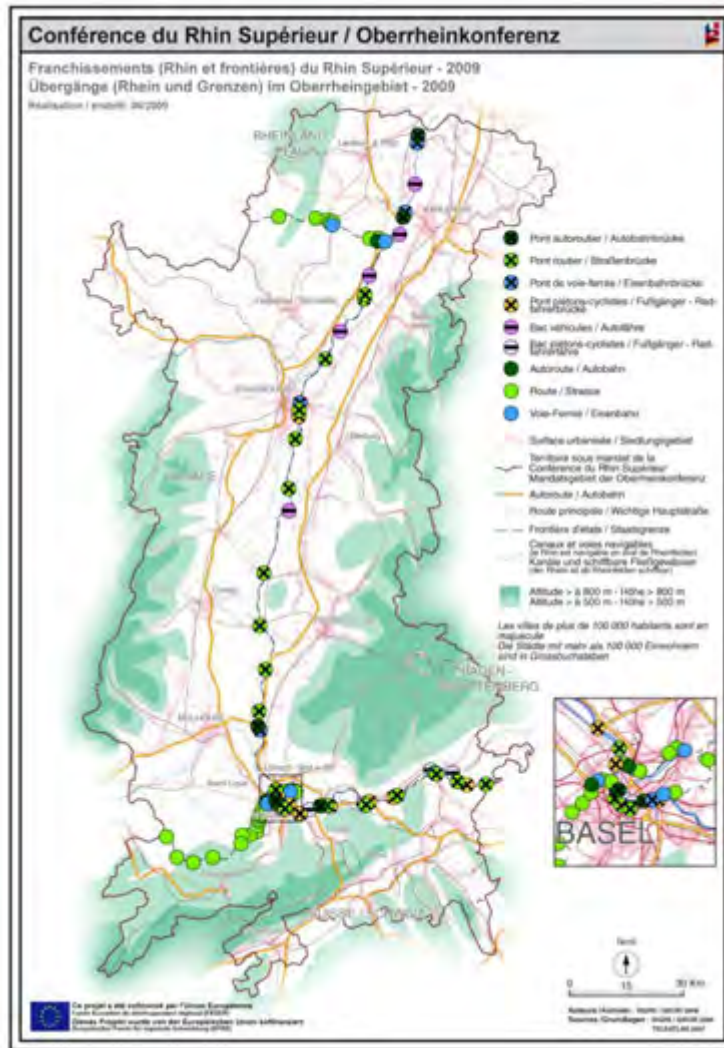


## V.6 Gothenburg and Lisbon/Europe 2020 strategy Analysis

### 6.1 Aims, Indicators and Methods

The Lisbon Strategy, formulated in 2000, aimed to develop the EU as the most competitive and dynamic knowledge-based economy in the world, combined with the creation of growth and jobs embedded in a sustainable context. The Gothenburg strategy (2001), representing the environmental pillar of the Lisbon strategy, was more concerned with sustainable development and the environmental dimension of the topics employment, economic reform and social cohesion. To define and achieve specific objectives, different measures have been approved, like the improvement of transport systems, implementation of ESPON, and production of integrated development strategies for urban and environmentally-sensitive areas.

The methodology used is explained in each sub-chapter. Table V.12 shows the indicators and sources used for the analysis in this Chapter.

| Variable name | Geographical scale | Source | Time frame |
|---|---|---|---|
| GDP | MUTS 3 | EUROSTAT | 1997-2009 |
| Share of Natura 2000 areas | NUTS 3 | European Commission's 5th Cohesion Report | 2009 |
| Solar energy resources | NUTS 3 | | 1981-1990 |
| Wind energy potential | NUTS 3 | | 2000-2005 |
| Ozone concentration exceedances | NUTS 3 | | 2008 |
| Urban waste water treatment | NUTS 2 | | 2007 |
| Soil sealed area | NUTS 3 | | 2006 |
| Long term unemployment | NUTS 2 | Eurostat | 2009 |
| Unemployment rate | NUTS 3 | | 2010 |
| Youth unemployment rate | NUTS 3 | | 2010 |
| Population at risk of poverty after social transfer | NUTS 3 | | 2008 |
| Gross value added by NACE | NUTS 3 | Eurostat | 1997-2008 |
| Employment by NACE | NUTS 3 | Eurostat | 2000-2008 |
| R&D expenditures in the government sector (GERD), R&D expenditures the higher education sector (HERD), Business R&D expenditures (BERD) | NUTS 2 | Eurostat | 2007 |
| Employment in medium and high tech manufacturing | NUTS 2 | ESPON DB (Regional Innovation Scoreboard) | 2004 |
| EPO Patents by per million of inhabitants | NUTS 2 | Eurostat | 2007 |

Table V.13: Scale, source and time frame of key data for the analysis

## 6.1.1 Employment by NACE

Employment figures were analysed for the years 2000 and 2008. For the Swiss NUTS3 units no data was available so the analysis is based on the French and German NUTS3 units only.

While most of the NUTS3 units of the CBA have about similar shares of employment by NACE, some NUTS3 units show some peculiarities: DE124 Rastatt and DEB3E Germersheim show a significant higher proportion of employees in industry (more than double to the German average of 19,94% of this sector), due to the two production plants of Daimler, dominating the labour market. Same to the high share of agriculture and fishing in the NUTS3 units DE132 Breisgau-Hochschwarzwald (5,32%), DE133 Emmendingen (4,54%), and DEB3H Suedliche Weinstraße (8,54%) compared to 2,14% in Germany due to the winery and orchading (see Table V.13).

Besides the –as already mentioned– economic not very attractive NUTS3 units of DEB37 Pirmasens (-0,19%) and DEB3K Suedwestpfalz (-0,69%) only FR421 Bas-Rhin (-0,20%) lost employees from 2000-2009 (see Table V.14).

| | | Share of employment by NACE 2008 (%) | | | | | |
|---|---|---|---|---|---|---|---|
| | | Agriculture; fishing | Industry (except construction) | Construction | Wholesale and retail trade; hotels and restaurants; transport | Financial intermediation; real estate | Public administration and community services; activities of households |
| EU27 | | 1,75 | 19,61 | 6,48 | 21,08 | 28,27 | 22,80 |
| CH | | - | - | - | - | - | - |
| DE | | 2,14 | 19,94 | 5,44 | 24,94 | 17,40 | 30,14 |
| FR | | 3,05 | 14,67 | 6,93 | 23,92 | 16,09 | 35,35 |
| CH023 | Solothurn | - | - | - | - | - | - |
| CH025 | Jura | - | - | - | - | - | - |
| CH031 | Basel-Stadt | - | - | - | - | - | - |
| CH032 | Basel-Landschaft | - | - | - | - | - | - |
| CH033 | Aargau | - | - | - | - | - | - |
| DE121 | Baden-Baden, Stadtkreis | 1,40 | 15,62 | 4,20 | 23,31 | 14,22 | 41,26 |
| DE122 | Karlsruhe, Stadtkreis | 0,23 | 12,25 | 3,22 | 25,93 | 24,69 | 33,67 |
| DE123 | Karlsruhe, Landkreis | 1,36 | 26,15 | 5,48 | 22,49 | 22,39 | 22,08 |
| DE124 | Rastatt | 1,60 | 41,94 | 5,25 | 20,21 | 11,13 | 19,86 |
| DE131 | Freiburg im Breisgau, Stadtkreis | 0,41 | 10,52 | 2,72 | 25,05 | 16,70 | 44,67 |
| DE132 | Breisgau-Hochschwarzwald | 5,32 | 21,86 | 7,45 | 27,56 | 11,12 | 26,69 |
| DE133 | Emmendingen | 4,54 | 28,95 | 7,04 | 21,75 | 10,80 | 26,92 |
| DE134 | Ortenaukreis | 3,22 | 28,22 | 5,98 | 26,00 | 11,59 | 25,05 |
| DE139 | Loerrach | 2,27 | 28,43 | 5,33 | 24,48 | 12,34 | 27,15 |
| DE13A | Waldshut | 3,07 | 27,79 | 6,70 | 24,58 | 10,61 | 27,09 |
| DEB33 | Landau in der Pfalz, Kreisfreie Stadt | 1,38 | 10,38 | 3,11 | 26,99 | 16,96 | 41,18 |
| DEB37 | Pirmasens, Kreisfreie Stadt | 0,38 | 22,69 | 4,62 | 25,38 | 14,62 | 32,31 |
| DEB3E | Germersheim | 2,66 | 40,78 | 4,96 | 18,62 | 9,93 | 23,05 |
| DEB3H | Suedliche Weinstraße | 8,54 | 16,58 | 7,79 | 26,88 | 8,29 | 31,66 |
| DEB3K | Suedwestpfalz | 4,05 | 19,84 | 9,72 | 29,96 | 7,69 | 28,34 |
| FR421 | Bas-Rhin | 1,64 | 18,61 | 6,64 | 24,50 | 15,24 | 33,37 |
| FR422 | Haut-Rhin | 2,19 | 21,74 | 7,07 | 23,65 | 10,91 | 34,41 |

Table V.14: Share of employment by NACE 2008 (%)

| | | Annual growth rate of employment by NACE 2000-2008 (%) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | All NACE | Agriculture; fishing | Industry (except construction) | Construction | Wholesale and retail trade; hotels and restaurants; transport | Financial intermediation; real estate | Public administration and community services; activities of households |
| EU27 | | 3,12 | 1,26 | -1,48 | -4,33 | -2,96 | 4,36 | 3,37 |
| CH | | - | - | - | - | - | - | - |
| DE | | 0,36 | -1,03 | -0,76 | -2,87 | 0,28 | 2,39 | 0,92 |
| FR | | 0,63 | -1,73 | -1,74 | 2,50 | 0,70 | 1,73 | 1,11 |
| CH023 | Solothurn | - | - | - | - | - | - | - |
| CH025 | Jura | - | - | - | - | - | - | - |
| CH031 | Basel-Stadt | - | - | - | - | - | - | - |
| CH032 | Basel-Landschaft | - | - | - | - | - | - | - |
| CH033 | Aargau | - | - | - | - | - | - | - |
| DE121 | Baden-Baden, Stadtkreis | 1,43 | 0,00 | -1,40 | -2,48 | 2,51 | 3,59 | 1,92 |
| DE122 | Karlsruhe, Stadtkreis | 0,46 | -2,25 | -1,33 | -2,54 | 0,04 | 1,28 | 1,30 |
| DE123 | Karlsruhe, Landkreis | 1,28 | -0,92 | -0,27 | -1,76 | 1,55 | 3,49 | 1,97 |
| DE124 | Rastatt | 0,58 | -1,31 | 0,43 | -3,43 | 0,86 | 2,96 | 0,94 |
| DE131 | Freiburg im Breisgau, Stadtkreis | 1,19 | -1,91 | -1,00 | -2,25 | 0,63 | 1,64 | 2,27 |
| DE132 | Breisgau-Hochschwarzwald | 0,56 | -1,29 | 0,00 | -2,07 | 1,50 | 1,02 | 1,14 |
| DE133 | Emmendingen | 0,36 | -1,60 | 0,14 | -1,55 | 0,46 | 1,55 | 1,07 |
| DE134 | Ortenaukreis | 0,53 | -1,01 | -0,30 | -0,46 | 0,40 | 2,57 | 1,27 |
| DE139 | Loerrach | 0,56 | -0,53 | -0,55 | -1,91 | 1,00 | 1,96 | 1,45 |
| DE13A | Waldshut | 0,46 | -2,97 | -0,25 | -1,46 | 0,96 | 2,17 | 1,08 |
| DEB33 | Landau in der Pfalz, Kreisfreie Stadt | 1,28 | 0,00 | -1,18 | -1,31 | -0,47 | 3,93 | 2,46 |
| DEB37 | Pirmasens, Kreisfreie Stadt | -0,19 | 0,00 | -3,12 | 0,00 | -1,25 | 3,44 | 1,95 |
| DEB3E | Germersheim | 1,62 | 1,80 | 2,62 | -1,66 | 1,00 | 1,95 | 1,22 |
| DEB3H | Suedliche Weinstraße | 0,92 | 1,16 | -0,37 | -1,15 | 0,98 | 0,78 | 2,06 |
| DEB3K | Suedwestpfalz | -0,69 | 0,00 | -4,19 | -2,34 | 0,52 | 2,17 | 0,93 |
| FR421 | Bas-Rhin | 0,53 | 0,17 | -1,87 | 1,40 | 0,56 | 0,99 | 1,71 |
| FR422 | Haut-Rhin | -0,20 | 0,00 | -2,76 | 0,65 | 0,10 | -1,02 | 1,64 |

Table V.15: Annual growth rate of employment by NACE 2000-2008 (%)

### 6.1.2 Gross value added

The gross value added, serves to evaluate the overall contribution of the different sectors to the total output of the regions.

| Nuts name | | Share of GVA by NACE 2008 (%) | | | | | |
|---|---|---|---|---|---|---|---|
| | | Agriculture; fishing (A_B ) | Industry (except construction) (C-E) | Construction (F) | Wholesale and retail trade; hotels and restaurants; transport (G-I) | Financial intermediation; real estate (J_K) | Public administration and community services; activities of households (L-P) |
| EU27 | | 1,75 | 19,61 | 6,48 | 21,08 | 28,27 | 22,80 |
| CH | | - | - | - | - | - | - |
| DE | | 0,90 | 25,58 | 4,25 | 17,75 | 29,44 | 22,08 |
| FR | | 2,04 | 13,63 | 6,66 | 18,85 | 33,38 | 25,44 |
| CH023 | Solothurn | - | - | - | - | - | - |
| CH025 | Jura | - | - | - | - | - | - |
| CH031 | Basel-Stadt | - | - | - | - | - | - |
| CH032 | Basel-Landschaft | - | - | - | - | - | - |
| CH033 | Aargau | - | - | - | - | - | - |
| DE121 | Baden-Baden, Stadtkreis | 0,82 | 20,36 | 4,73 | 16,91 | 23,68 | 33,49 |
| DE122 | Karlsruhe, Stadtkreis | 0,11 | 20,32 | 3,17 | 19,53 | 32,91 | 23,95 |
| DE123 | Karlsruhe, Landkreis | 0,56 | 33,20 | 4,67 | 16,16 | 30,23 | 15,18 |
| DE124 | Rastatt | 0,66 | 48,27 | 4,95 | 13,89 | 18,71 | 13,51 |
| DE131 | Freiburg im Breisgau, Stadtkreis | 0,21 | 18,57 | 2,75 | 18,37 | 25,16 | 34,94 |
| DE132 | Breisgau-Hochschwarzwald | 1,93 | 25,01 | 7,78 | 18,40 | 25,24 | 21,64 |
| DE133 | Emmendingen | 1,44 | 31,81 | 6,80 | 15,26 | 22,71 | 21,97 |
| DE134 | Ortenaukreis | 1,12 | 35,18 | 5,43 | 18,40 | 21,49 | 18,38 |
| DE139 | Loerrach | 0,85 | 35,81 | 5,59 | 14,91 | 22,54 | 20,31 |
| DE13A | Waldshut | 0,91 | 33,11 | 6,69 | 15,92 | 22,48 | 20,89 |
| DEB33 | Landau in der Pfalz, Kreisfreie Stadt | 0,95 | 13,88 | 3,10 | 18,42 | 30,75 | 32,91 |
| DEB37 | Pirmasens, Kreisfreie Stadt | 0,15 | 18,82 | 3,95 | 26,59 | 23,85 | 26,64 |
| DEB3E | Germersheim | 1,37 | 50,23 | 3,43 | 11,08 | 19,36 | 14,52 |
| DEB3H | Suedliche Weinstraße | 5,00 | 20,36 | 6,60 | 18,70 | 23,83 | 25,51 |
| DEB3K | Suedwestpfalz | 2,78 | 17,34 | 7,58 | 20,13 | 29,61 | 22,55 |
| FR421 | Bas-Rhin | 1,89 | 19,03 | 6,61 | 18,11 | 30,57 | 23,80 |
| FR422 | Haut-Rhin | 2,20 | 20,44 | 6,99 | 17,85 | 28,35 | 24,18 |

Table V.16: Share of GVA by NACE in the CBA, 2008

Simultaneous to chapter 6.1.2 catching-up analysis all NUTS3 units of the CBA had an increase of Gross Value Added from 1997 to 2008. The highest are in the already relatively strong German NUTS3 units DE123 Karlsruhe, Landkreis and DEB3E Germersheim, the lowest in DEB37 Pirmasens and the two French NUTS3 units.

| | | Annual growth rate of the GVA by NACE 1997-2008 (%) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | All NACE | Agriculture; fishing (A_B ) | Industry (except construction) (C-E ) | Construction (F) | Wholesale and retail trade; hotels and restaurants; transport (G-I ) | Financial intermediation; real estate (J_K) | Public administration and community services; activities of households (L-P) |
| EU27 | | 3,12 | 1,26 | -1,48 | -4,33 | -2,96 | 4,36 | 3,37 |
| CH | | - | - | - | - | - | - | - |
| DE | | 2,39 | -0,98 | 2,58 | -0,69 | 2,37 | 3,08 | 2,19 |
| FR | | 4,13 | -0,08 | 1,28 | 6,67 | 4,04 | 5,5 | 4,19 |
| CH023 | Solothurn | - | - | - | - | - | - | - |
| CH025 | Jura | - | - | - | - | - | - | - |
| CH031 | Basel-Stadt | - | - | - | - | - | - | - |
| CH032 | Basel-Landschaft | - | - | - | - | - | - | - |
| CH033 | Aargau | - | - | - | - | - | - | - |
| DE121 | Baden-Baden, Stadtkreis | 3,04 | 0,68 | 4,28 | 0,82 | 4,22 | 1,93 | 3,05 |
| DE122 | Karlsruhe, Stadtkreis | 1,42 | -1,96 | -0,41 | -0,02 | 1,75 | 2,08 | 2,29 |
| DE123 | Karlsruhe, Landkreis | 3,66 | -2,24 | 4,42 | 2,19 | 4,89 | 3,06 | 2,93 |
| DE124 | Rastatt | 2,74 | -0,73 | 2,98 | 1,41 | 4,45 | 1,76 | 2,53 |
| DE131 | Freiburg im Breisgau, Stadtkreis | 2,7 | -5,09 | 4,08 | 0,2 | 2,05 | 2,28 | 3,01 |
| DE132 | Breisgau-Hochschwarzwald | 2,76 | -1,87 | 2,47 | 2,39 | 4,25 | 2,68 | 2,72 |
| DE133 | Emmendingen | 2,89 | -0,96 | 3,13 | 2,2 | 4,09 | 2,28 | 2,98 |
| DE134 | Ortenaukreis | 3,04 | 0,06 | 3,71 | 1,75 | 3,01 | 2,66 | 2,93 |
| DE139 | Loerrach | 2,48 | 2 | 1,76 | 3,29 | 3,24 | 2,96 | 2,57 |
| DE13A | Waldshut | 2,39 | -2,82 | 1,86 | 2,29 | 4,01 | 2,35 | 2,56 |
| DEB33 | Landau in der Pfalz, Kreisfreie Stadt | 2,83 | -0,96 | 1,86 | 1,48 | 1,37 | 5,24 | 2,47 |
| DEB37 | Pirmasens, Kreisfreie Stadt | 0,16 | -0,95 | -3,16 | 1,66 | -0,53 | 2,07 | 2,29 |
| DEB3E | Germersheim | 3,14 | 0,36 | 3,29 | 1,46 | 2,94 | 4,24 | 2,23 |
| DEB3H | Suedliche Weinstraße | 2,45 | 1,51 | 4,38 | 2,28 | 1,54 | 2,2 | 2,21 |
| DEB3K | Suedwestpfalz | 1,55 | 0,03 | -0,62 | 1,74 | 2,42 | 2,51 | 1,7 |
| FR421 | Bas-Rhin | 1,24 | 2,43 | 0,59 | 3,19 | 0,8 | 1,33 | 1,47 |
| FR422 | Haut-Rhin | 1,17 | -0,53 | -0,73 | 2,43 | 1,12 | 1,61 | 2,57 |

Table V.17: Annual growth rate of the GVA by NACE in the CBA 1997-2008

## 6.2 Innovation & research

The analysis of the potential Innovation and Research is meant to measure the competitiveness of the CBA for future economic wealth and growth. An in-depth analysis will be done in Chapter 7.

Here, only some of the indicators for all of these three areas have been included, as the NUTS 2 coverage is very poor for most of the indicators:

- Total intramural R&D expenditures (R&D expenditures in the government sector (GERD) and the higher education sector (HERD), and Business R&D expenditures (BERD) and as a percentage of GDP)

- EPO patents

- Employed persons in high and medium tech manufacturing activities

| NUTS-ID(N2) | NUTS 2 name | Total intramural R&D expenditure 2007 | | | | EPO patents per million of inhabitants 2007 | Employed persons in high and medium tech manufacturing activities (% total workforce) 2004 * |
| | | Total | Business enterprise sector | Government sector | Higher education sector | | |
|---|---|---|---|---|---|---|---|
| EU27 | EU27 | 2,01 | 1,18 | 0,24 | 0,42 | - | - |
| CH | Switzerland | 2,9 | 2,14 | 0,03 | 0,66 | - | - |
| DE | Germany | 2,53 | 1,77 | 0,35 | 0,41 | 186,35 | 16,22 |
| FR | France | 2,07 | 1,31 | 0,34 | 0,4 | 79,68 | 9,26 |
| CH02 | Espace Mittelland | : | : | : | : | : | : |
| CH03 | Nordwestschweiz | : | : | : | : | : | : |
| DE12 | Karlsruhe | 3,75 | 2,32 | 0,9 | 0,53 | 322,92 | 18,17 |
| DE13 | Freiburg | 2,49 | 1,73 | 0,3 | 0,46 | 323,47 | 22,11 |
| DEB3 | Rheinhessen-Pfalz | 2,85 | 2,09 | 0,25 | 0,52 | 223,84 | 24,95 |
| FR42 | Alsace | 1,54 | 0,85 | 0,06 | 0,63 | 119,63 | 22,17 |

Table V.18: Indicators for innovation and research: R&D expenditure in percentage of GDP, patents and employed persons in the CBA 2004

The total intramural R&D expenditures of the involved national countries are all higher than the EU average, only Switzerland spends less on the governmental sector. Compared to national averages, the NUTS2 unit FR42 Alsace is –besides the higher education sector- relatively weak on R&D expenditure, while the German NUTS2 units spend about the same or more than the national averages, especially in the NUTS2 unit DE12 Karlsruhe with about 50% more expenditure on R&D in total (for Innovation and Research see also Chapter 7).

Regarding EPO patents, a common German prejudice comes true of the people of the state of Baden-Wuerttemberg being "Tueftler" (tinkerers – like Walt Disney's Gyro Gearloose) and hence having the highest amount of patents per inhabitants. This can be seen even within the German NUTS2 areas, with the two belonging to the State of Baden-Wuerttemberg having about 50% more than the NUTS2 unit of Rheinhessen-Pfalz, nearly the double compared to the German average and more than three times compared to France.

Also the employed persons in high and medium tech manufacturing activities are quite a lot: the average for France is at 9,26% of the total workforce in 2004, in Germany 75% higher at 16,22% of the total workforce. Within the CBA, the highest share got DEB3 Rheinhessen-Pfalz with nearly a quarter of high and medium tech employed, which may be related to the chemical trust of BASF, residing in Ludwigshafen, the by far largest employer in the region. The other NUTS2 units DE12 Karlsruhe, DE13 Freiburg and FR42 Alsace also show higher shares compared to the national averages, especially in Alsace, where high and medium tech employed share is more than two times higher than the French average.

## 6.3 Social cohesion

The indicators for evaluating the social cohesion of the regions are: youth unemployment rate, long term unemployment rate, infant mortality rate, and population at risk of poverty after social transfers. Population at risk of poverty is defined as "having equivalised disposable income (i.e. adjusted for household si e and composition) of less than 60% of national median" (European

Commission's 5th Cohesion Report database).

| NUTS id | NUTS 2 name | Unemployment rate, 2010 | Long-term unemployment rate, 2009 (>=12 months) | Youth unemployment rate, 2010 (% of labour force aged 15-24) | Population at risk of poverty after social transfers 2008 (% total pop) | Infant mortality rate 2008 | Population aged 25-64 with tertiary education, 2010 |
|---|---|---|---|---|---|---|---|
| | EU27 | 9,6 | 3,0 | 20,9 | 17,0 | 4,3 | 25,9 |
| CH | Switzerland | 4,5 | 1,1 | 7,9 | 16,2* | 4,0 | 35,3 |
| DE | Germany | 7,1 | 3,5 | 9,9 | 15,2* | 3,5 | 26,6 |
| FR | France | 9,7 | 3,5 | 23,4 | 12,7* | 3,8 | 29,0 |
| CH02 | Espace Mittelland | 4,2 | 0,8 | 7,7 | - | 4,6 | 32,6 |
| CH03 | Nordwestschweiz | 4,5 | 1,3 | 8,1 | - | 3,4 | 35,6 |
| DE12 | Karlsruhe | 5,3 | 2,1 | 8,9 | 11,1 | 3,0 | 29,1 |
| DE13 | Freiburg | 4 | 1,3 | 5,4 | 10,3 | 3,2 | 26,7 |
| DEB3 | Rheinhessen-Pfalz | 6,1 | 2,5 | 12,6 | 13,7 | 2,5 | 26,1 |
| FR42 | Alsace | 8,3 | 2,7 | 18,3 | 10,7 | 4,2 | 30,7 |

Table V.19: Cohesion indicators for the CBA
(Source: Eurostat and European Commission's 5th Cohesion Report)

Compared to the EU and national averages, social cohesion is quite strong in the CBA: France as a total shows higher figures according unemployment, long-term unemployment and youth unemployment, but the NUTS2 unit Alsace is significant lower than the EU and national average. Same is true to the Swiss and German NUTS2 units of the CBA, having a quite low unemployment rate, belonging to the lowest rates within Europe. Not having the data for 'population at risk of poverty' for the Swiss NUTS2 areas, the high figure of Switzerland as total, only slightly lower than the EU average is astonishing and might be explained by the overall high expenses for daily life in Switzerland and a wide gap between income of skilled and/or academic workers to the unskilled.

## 6.4 Environment

For the environmental analysis, two sets of indicators are available. On one hand, the indicators from the European Commission's 5th Cohesion Report, and on the other hand, indicators from the ESPON Climate Project regarding the region's sensitivity for climate change.

Six indicators from the 5th Cohesion Report were considered: soil sealed area, ozone exceedances, waste water treatment, Natura 2000 areas, solar energy, and wind potential. While the first four show some concrete elements on environmental issues in the region, the last two are a hint at what could be the region's capacity in exploiting alternative energy sources in an energy source transition scenario and not its actual production.

The data for environmental issues are available for the French and German NUTS units only.

### 6.4.1 Soil sealed area
Not only soil sealed areas but also land claims in general are a concern in spatial planning and a lot of efforts of how to reduce land claims had been down in recent years, especially in Germany with high funding within the REFINA Programme (the Germany abbreviation for Research for the reduction of land claims and sustainable development) by the German Ministry for Education and Research.

It is not the much the soil sealed area per inhabitant per se, but the daily or annual new claims which are important for the performance of a country or region. This data is unfortunately not available for the ESPON countries and NUTS units, so the soil sealed area per total area and per inhabitant has to serve here.

| | | Soil sealed area, 2006 (% total area) | Soil sealing per inhabitant (m2 per inhabitant), 2006 |
|---|---|---|---|
| EU27 | | 6,72 | 214 |
| CH | | - | - |
| DE | | 9,11 | 231,93 |
| FR | | 4,85 | 249,45 |
| CH023 | Solothurn | - | - |
| CH025 | Jura | - | - |
| CH031 | Basel-Stadt | - | - |
| CH032 | Basel-Landschaft | - | - |
| CH033 | Aargau | - | - |
| DE121 | Baden-Baden, Stadtkreis | 6 | 164 |
| DE122 | Karlsruhe, Stadtkreis | 23 | 149 |
| DE123 | Karlsruhe, Landkreis | 8 | 184 |
| DE124 | Rastatt | 6 | 209 |
| DE131 | Freiburg im Breisgau, Stadtkreis | 18 | 127 |
| DE132 | Breisgau-Hochschwarzwald | 3 | 195 |
| DE133 | Emmendingen | 4 | 163 |
| DE134 | Ortenaukreis | 5 | 204 |
| DE139 | Loerrach | 5 | 193 |
| DE13A | Waldshut | 3 | 229 |
| DEB33 | Landau in der Pfalz, Kreisfreie Stadt | 12 | 200 |
| DEB37 | Pirmasens, Kreisfreie Stadt | 10 | 173 |
| DEB3E | Germersheim | 7 | 244 |
| DEB3H | Suedliche Weinstraße | 3 | 196 |
| DEB3K | Suedwestpfalz | 2 | 173 |
| FR421 | Bas-Rhin | 5 | 211 |
| FR422 | Haut-Rhin | 6 | 281 |

Table V.20: Soil sealed area in relation to total area and soil sealing per capita in the CBA in 2006

The CBA's NUTS3 units are nearly all below the national averages of 231,93 sqm per inhabitant (DE) and 249,45 sqm per inhabitant (FR), only DEB3E Germersheim and FR422 Haut-Rhin show higher figures.

Most of the urbanised areas of the CBA (like DE131 Freiburg im Breisgau, Stadtkreis, DE122 Karlsruhe, DE121 Baden-Baden, DEB37 Pirmasens) have the lowest figures of soil sealing per inhabitant (and a high proportion of soil sealed of the total area), while the more rural areas are significant higher (see Table V.20 and Figure V.23). This can be explained by the higher densities if settlement realised in these areas, while the area for settlement and traffic purposes per capita is higher in rural areas.

Figure V.23: Soil sealed area in relation to total area and soil sealing per capita, ranked by size
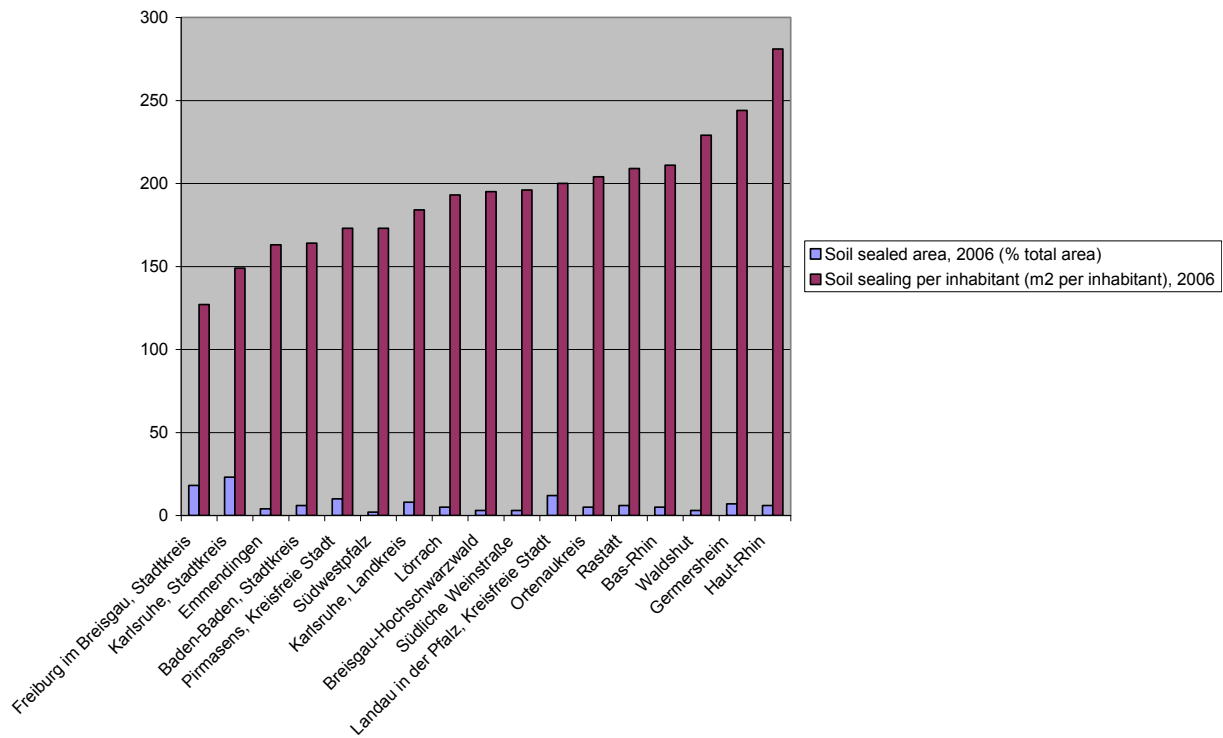


The soil sealed area in relation to the total area of course show higher values for the urbanised areas (see Figure V.23), but on NUTS3 level cannot reflect the uneven distribution of population and settlement in the CBA with an concentration along the Rhine Valley and lower densities in the Vosges and Black Forest.

Figure V.24: Category map of soil sealed area in the CBA



**Soil sealed area**

Legend
**Soil sealed area, 2006 (% total area)**

| | | |
|---|---|---|
| <= 2,00 | 8,01 - 13,00 | |
| 2,01 - 4,00 | 13,01 - 23,00 | <missing value> |
| 4,01 - 8,00 | >= 23,01 | |

NUTS 3 average
EU27 = 6,72
DE = 9,11
FR = 4,85
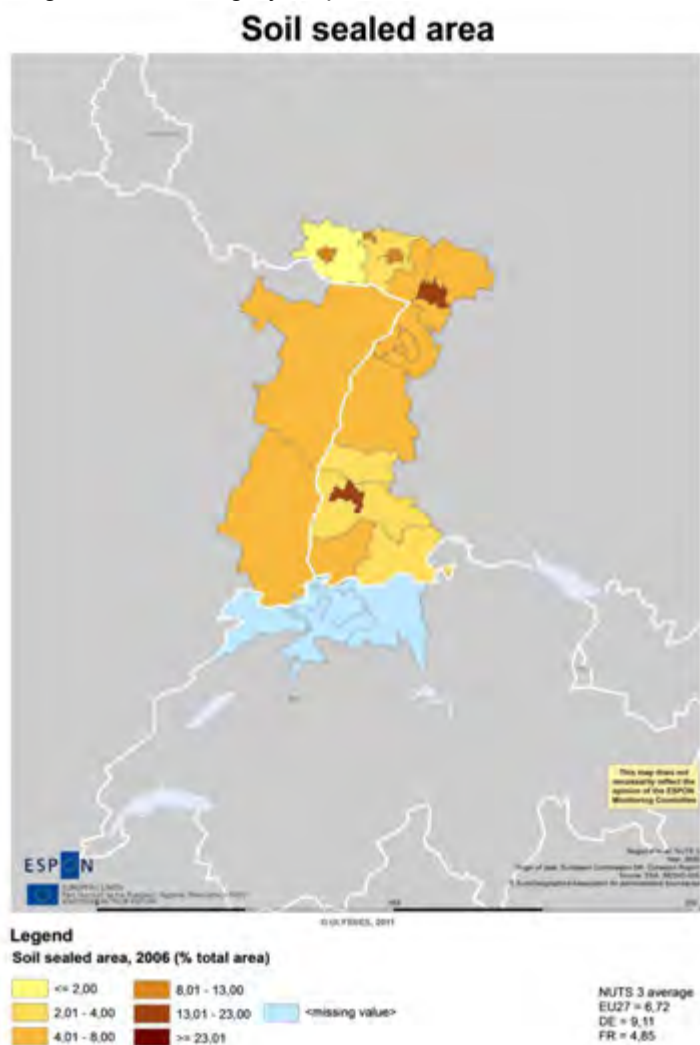
## 6.4.2 Ozone

The amounts of days with ground-level o o ne concentration above 120 µg/m³ reflect emissions of fossil fuels, especially from the transport sector as $NO_X$-emissions from vehicles react with oxygen ($O_2$) to ozone ($O_3$). This reaction does not only take place in the areas of high $NO_X$-emissions (for instance city centres) buts also in the surrounding suburbs and areas. Due to catalysts for vehicles, the overall stress by ground-level ozone fell in the last decade, while particular matter (fine dust particles) PM10 remains a problem in agglomerations.

Germany (7,77 days/year) and France (7,82 days/year) have about the same amount of days with ground-level ozone concentration above 120 µg/m³, both below the EU average of 9,99 days/year. The o o ne concentration exceedances in the CBA have a small range from 6 to 9 days/year with an average of 7,30 days/year in 2008. As described above, the NUTS3 units having the highest values are not those being highly urbanised but on the contrary DE139 Loerrach and DE13A Waldshut (see Table V.21).

| NUTS CODE | NUTS NAME | Ozone concentration exceedances in NUTS3 regions (days), 2008 |
| --- | --- | --- |
| EU27 NUTS 2 average | | 9,99 |
| CH | | - |
| DE | | 7,77 |
| FR | | 7,82 |
| DE121 | Baden-Baden, Stadtkreis | 8 |
| DE122 | Karlsruhe, Stadtkreis | 6 |
| DE123 | Karlsruhe, Landkreis | 6 |
| DE124 | Rastatt | 7 |
| DE131 | Freiburg im Breisgau, Stadtkreis | 8 |
| DE132 | Breisgau-Hochschwarzwald | 8 |
| DE133 | Emmendingen | 8 |
| DE134 | Ortenaukreis | 6 |
| DE139 | Loerrach | 9 |
| DE13A | Waldshut | 9 |
| DEB37 | Pirmasens, Kreisfreie Stadt | 7 |
| DEB3E | Germersheim | 6 |
| DEB3H | Suedliche Weinstraße | 7 |
| DEB3K | Suedwestpfalz | 7 |
| FR421 | Bas-Rhin | 6 |
| FR422 | Haut-Rhin | 8 |
| CBA Total | | 7,30 |

Table V.21: Days with ground-level ozone concentration above 120 µg/m³

Figure V.25: Ozone concentration exceedances in the CBA, 2008

## Ozone concentration exceedances



**Legend**

**Ozone concentration exceedances in NUTS 3 regions (days), 2008**
Days with ground-level ozone concentration above 120 µg/m³

| | |
|---|---|
| <= 2,22 | 10,00 - 16,23 |
| 2,23 - 5,02 | 16,24 - 26,07 |
| 5,03 - 9,99 | >= 26,08 |

<missing value>

NUTS 3 average
EU 27 = 10
DE = 7,77
FR = 7,82

### 6.4.3 Urban waste water treatment capacity

The urban waste water treatment capacity indicates how effective waste water can be treated before it is reverted into the natural circle, usually receiving streams like the River Rhine.

Both, France and Germany have averages higher than the EU average, especially in the NUTS2 units of the CBA, reaching nearly 100% of urban waste water treatment capacity.

| NUTS CODE | NUTS NAME | Urban waste water treatment capacity, 2007 |
|---|---|---|
| EU27 NUTS 2 average | | 92,53 |
| CH | | - |
| DE | | 98,48 |
| FR | | 96,24 |
| DE12 | Karlsruhe | 99 |
| DE13 | Freiburg | 99 |
| DE14 | Tuebingen | 99 |
| FR42 | Alsace | 100 |

Table V.22: Urban waste water treatment capacity in the CBA 2007

Figure V.26: Category map of urban waste water treatment capacity in the CBA 2007
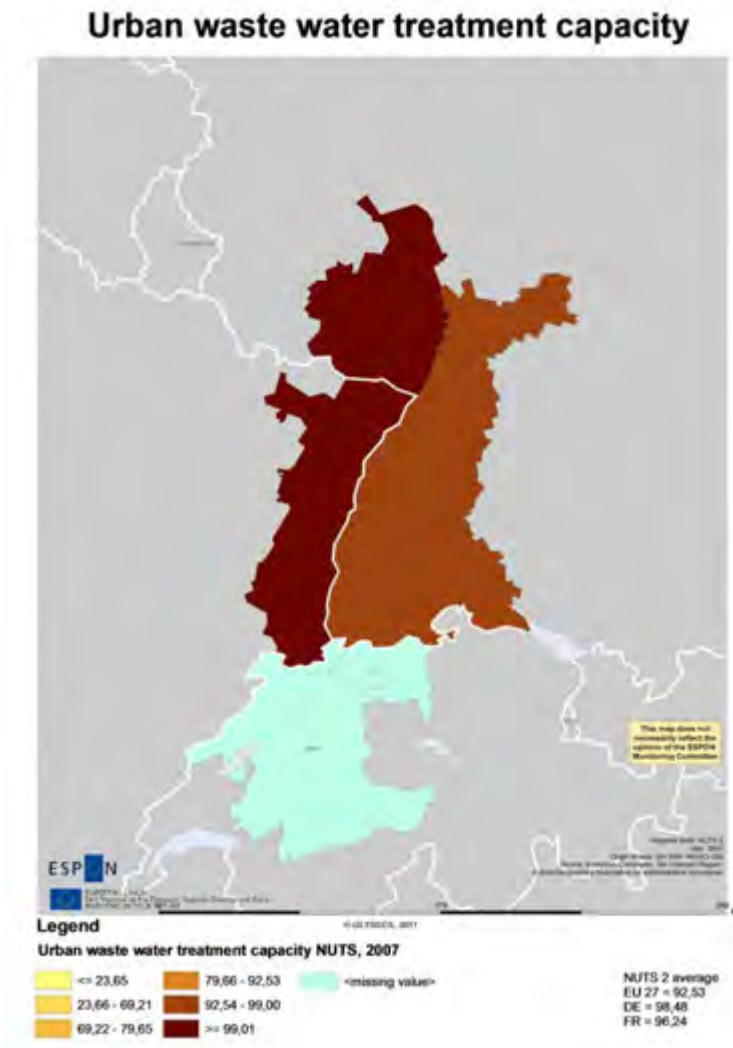
**6.4.4 Natura 2000**

Natura 2000 is „an EU wide network of nature protection areas established under the 1992 Habitats Directive. The aim of the network is to assure the long-term survival of Europe's most valuable and threatened species and habitats. It is comprised of Special Areas of Conservation (SAC) designated by Member States under the Habitats Directive, and also incorporates Special Protection Areas (SPAs) which they designate under the 1979 Birds Directive. Natura 2000 is not a system of strict nature reserves where all human activities are excluded. Whereas the network will certainly include nature reserves most of the land is likely to continue to be privately owned and the emphasis will be on ensuring that future management is sustainable, both ecologically and economically. The establishment of this network of protected areas also fulfils a Community obligation under the UN Convention on Biological Diversity. " (European Commission's DG Environment 2011)

The existence of Natura 200 areas does not reflect whether a region is more or less urbanised, as landscapes economically used for forestry are usually not part of the Natura 200 network, although potentially a habitat for a lot of species. This is a reason why for instance the NUTS3 unit FR421 Bas-Rhin has a relatively small share of Natura 2000 areas, though having the large woods of the Vosges du Nord in its borders.

Overall the CBA has vast Natura 2000 areas, besides DE121 Baden-Baden, DEB37 Pirmasens, and FR421 Bas-Rhine all NUTS3 units of the CBA are above the EU and national averages of France and Germany, more than double of the respective national averages (and DEB3E Germersheim belonging to the Top 20 of all European NUTS3 units regarding the share of Natura 2000 areas).

| NUTS CODE | NUTS NAME | NATURA 2000 areas, 2009 (% of total) |
|---|---|---|
| EU27 NUTS 2 average | | 14,24 |
| CH | | - |
| DE | | 13,16 |
| FR | | 11,81 |
| DE121 | Baden-Baden, Stadtkreis | 11 |
| DE122 | Karlsruhe, Stadtkreis | 24 |
| DE123 | Karlsruhe, Landkreis | 26 |
| DE124 | Rastatt | 28 |
| DE131 | Freiburg im Breisgau, Stadtkreis | 23 |
| DE132 | Breisgau-Hochschwarzwald | 25 |
| DE133 | Emmendingen | 25 |
| DE134 | Ortenaukreis | 18 |
| DE139 | Loerrach | 24 |
| DE13A | Waldshut | 26 |
| DEB37 | Pirmasens, Kreisfreie Stadt | 8 |
| DEB3E | Germersheim | 52 |
| DEB3H | Suedliche Weinstraße | 21 |
| DEB3K | Suedwestpfalz | 34 |
| FR421 | Bas-Rhin | 14 |
| FR422 | Haut-Rhin | 20 |

Table V.23: Natura 2000 areas in relation to total area in the CBA, 2009

Figure V.27: Category map of Natura 2000 areas in relation to total area in the CBA, 2009



## Share of Natura 2000 area

**Legend**
**Natura 2000 areas, 2009 (% of total area)**

| | | |
|---|---|---|
| <= 8,00 | 27,01 - 35,00 | <missing value> |
| 8,01 - 14,24 | 35,01 - 45,00 | |
| 14,25 - 27,00 | >= 45,01 | |

NUTS 3 average
EU27 = 14,24
DE = 13,16
FR = 11,81
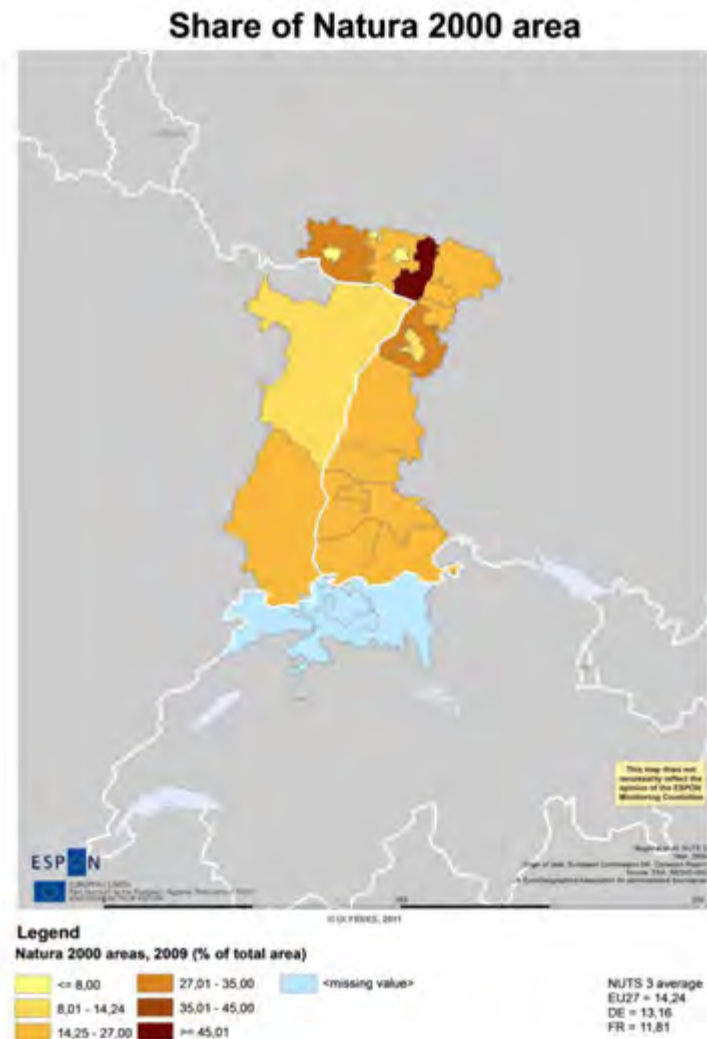
## V.7 Chapter 7 - Factor Analysis

### 7.1 Aims, Indicators and Methods

For the factor analysis two sets of indicators were established: one for territorial profile variables and one for performance variables.

The first set considered variables linked to overall characteristics of the different regions on the themes that where considered (accessibility, rural-urban relationship and demography). On the other hand, indicators that are normally associated with the Lisbon/Europe 2020 and Gothenburg objectives at the input level (such as R&D investment, active population with tertiary education and so forth) have also been included, since the differentiation was made between dependent and independent variables and not merely based on thematic categories. Unlike most studies on innovation, the EPO patent applications have also been included at this level. This is because, although they can be understood as an output of innovation, innovation in itself is an input of economic performance.

| Indicator | UNITS | Year | Geographical unit |
|---|---|---|---|
| Population density | inhabitant/km2 | 2009 | NUTS 3 |
| Crude rate of pop increase | per 1000 | 2008 | NUTS 3 |
| Crude rate net migration | per 1000 | 2008 | NUTS 3 |
| Crude rate of natural increase | per 1000 | 2008 | NUTS 3 |
| Young age dependency | % | 2008 | NUTS 3 |
| Old age dependency | % | 2008 | NUTS 3 |
| Total fertility rate | | 2008 | NUTS 2 |
| Commuters to other region | per 1000 | 2009 | NUTS 2 |
| Rural typology | nominal | 2008 | NUTS 3 |
| Percent_agric_area | % | 2006 | NUTS 3 |
| Annual growth rate 90-06 agricultural areas | per 10000 | 1900-2006 | NUTS 3 |
| Net formation of urban fabric by total area 00-06 | per 10000 | 1900-2006 | NUTS 3 |
| Potential accessibility by air index | % | 2006 | NUTS 3 |
| Potential accessibility by rail index | % | 2006 | NUTS 3 |
| Potential accessibility by road index | % | 2006 | NUTS 3 |
| Change of the standardized rail index | % | 2001-2006 | NUTS 3 |
| Change of the standardized road index | % | 2001-2006 | NUTS 3 |
| Change of the standardized air index | % | 2001-2006 | NUTS 3 |
| Share of employment in agriculture and fishing (A_B ) | % | 2008 | NUTS 3 |
| Share of employment in industry (except construction) (C-E ) | % | 2008 | NUTS 3 |
| % employment in construction (F) | % | 2008 | NUTS 3 |
| % employment in wholesale and retail trade; hotels and restaurants; transport (G-I ) | % | 2008 | NUTS 3 |
| % employment financial intermediation; real estate (J_K) | % | 2008 | NUTS 3 |
| % employment in public administration and community services; activities of households (L-P) | % | 2008 | NUTS 3 |
| Agriculture; fishing (A_B ) | % | 2008 | NUTS 3 |
| Industry (except construction) (C-E ) | % | 2008 | NUTS 3 |
| Construction (F) | % | 2008 | NUTS 3 |
| Wholesale and retail trade; hotels and restaurants; transport (G-I ) | % | 2008 | NUTS 3 |
| Financial intermediation; real estate (J_K) | % | 2008 | NUTS 3 |
| Public administration and community services; activities of households (L-P) | % | 2008 | NUTS 2 |
| Total intramural R&D expenditure by GDP | % | 2007 | NUTS 2 |
| Intramural R&D expenditure of business enterprise sector by GDP | % | 2007 | NUTS 2 |
| intramural R&D expenditure government sector by GDP | % | 2007 | NUTS 2 |
| intramural R&D expenditure higher education sector by GDP | % | 2007 | NUTS 2 |
| EPO patents per million of inhabitants by GDP | % | 2007 | NUTS 2 |
| Employed persons in high and medium tech manufacturing activities by total workforce (EU 25 = 100) | % | 2004 | NUTS 2 |
| Population aged 25-64 with tertiary education | % | 2010 | NUTS 2 |
| Physical sensitivity to climate change | rate | n/a | NUTS 3 |
| Social sensitivity to climate change | rate | n/a | NUTS 3 |
| Environmental sensitivity to climate change | rate | n/a | NUTS 3 |
| Cultural sensitivity to climate change | rate | n/a | NUTS 3 |
| Economic sensitivity to climate change | rate | n/a | NUTS 3 |

Table V.24: Indicator set of factor analysis linked to overall characteristics

The second set considered variables linked to the performance of the regions concerning indicators related to the Lisbon/Europe 2020 and Gothenburg indicators at the output level.

| Indicator | UNITS | Year | Geographical unit |
|---|---|---|---|
| Unemployment rate | % | 2008 | NUTS 3 |
| Long-term unemployment rate (>=12 months) | % | 2009 | NUTS 2 |
| Youth unemployment rate, per labour force aged 15-24 | % | 2008 | NUTS 3 |
| Infant mortality rate | % | 2008 | NUTS 2 |
| GDP per capita indexed EU average | % | 2008 | NUTS 3 |
| Catching-up | nominal | 1997-2008 | NUTS 3 |
| Natura 2000 area | % | 2006 | NUTS 3 |
| Ozone concentration exceedance, per year | % | 2008 | NUTS 3 |
| Waste water treatment capacity | % | 2007 | NUTS 2 |
| Soil sealed area | % | 2006 | NUTS 3 |

Table V.25: Indicator set of factor analysis linked to Lisbon/Gothenburg and Europe 2020

The scores of the factors was also analysed for the NUTS 3 of the CBA. For this analysis the countries' NUTS 3 average was obtained, weighted by the NUTS 3's proportion of population, and afterwards the difference between the individual NUTS 3 and the country it belongs to, as well as the weighted average of all the involved countries was calculated. The "+" and "-" signali e whether the regions' scores are above or inferior to the national and the CBA country levels. Basically, it provides a fast overview without the need to evaluate all the scores individually. The overall position of the NUTS 3 in the European context is expressed by the percentile bellow which it falls (5%, 20%, 50%, 80%, and 95%).

## 7.2 Centrality (FAC1_1)

The first factor essentially expresses central location and has an explained variance of 14,83. It has high positive correlations with all the indicators regarding potential accessibility and, to a lesser extent, with the share of employment in financial intermediation and real estate, employment in high and medium tech manufacturing activities and with commuting to other regions. It also has a strong negative correlation with the share of employment and GVA in agriculture and fishing.

This factor has its highest values in central European countries, especially in the Ruhr, Belgium and Southern England, in a pattern that clearly lines out the „Blue Banana". In the less central region, the higher values tend to be concentrated around capitals and other major urban agglomerations. The CBA can be seen as part of the Blue Banana with slightly less centrality indices than the highest scores of Rhine-Ruhr or Belgium. This could also derive from excluding Switzerland as the data is missing here, which could in the analysis lower the centrality index for South-West, Germany and North-West Italy.

All NUTS3 units of the CBA fall into the two highest percentiles of all European NUTS3 units, expressing the high centrality of this region.

Figure V.28: Category map of the factor centrality for Europe
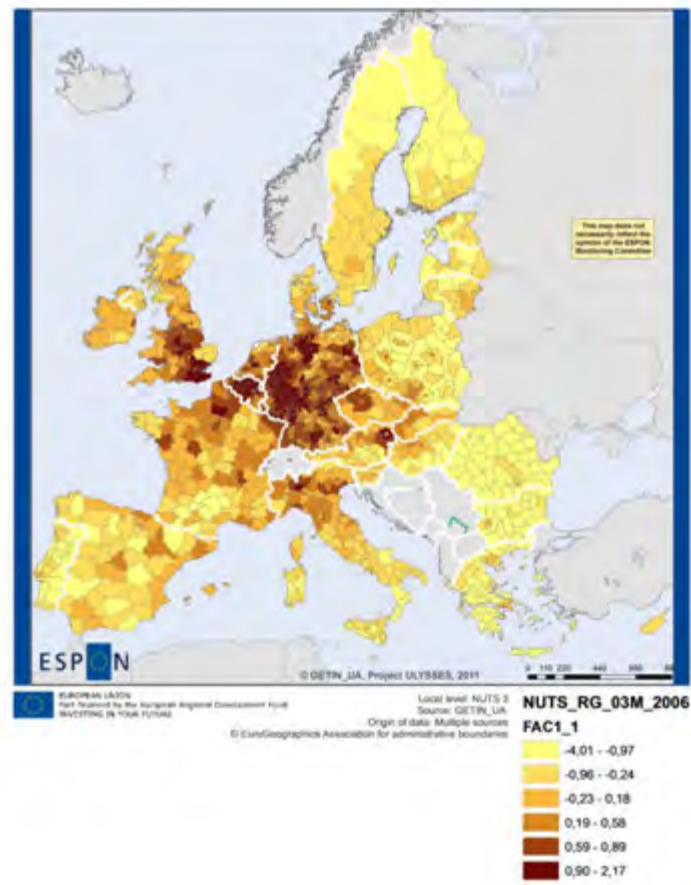
| NUTS code | NUTS name | FAC1 | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Scores | Country comparison (weighted NUTS 3 average) | | | | Country /CBA country level (+ -) | Percentile all NUTS 3 |
| | CS1 | | Ch | DE | FR | All CBA countries | | |
| All | Weighted average of CBA countries | 0,53 | | | | | | 80 |
| CH | Switzerland | | | | | | | |
| DE | Germany | 0,80 | | | | 0,27 | | 80 |
| FR | France | 0,18 | | | | -0,35 | | 50 |
| CH023 | Solothurn | | | | | | | |
| CH025 | Jura | | | | | | | |
| CH031 | Basel-Stadt | | | | | | | |
| CH032 | Basel-Landschaft | | | | | | | |
| CH033 | Aargau | | | | | | | |
| DE121 | Baden-Baden, Stadtkreis | 0,58 | | -0,23 | | 0,04 | + - | 80 |
| DE122 | Karlsruhe, Stadtkreis | 0,85 | | 0,05 | | 0,32 | + + | 95 |
| DE123 | Karlsruhe, Landkreis | 0,92 | | 0,12 | | 0,39 | + + | 95 |
| DE124 | Rastatt | 0,66 | | -0,14 | | 0,13 | + - | 80 |
| DE131 | Freiburg im Breisgau, Stadtkreis | 0,59 | | -0,21 | | 0,06 | + - | 80 |
| DE132 | Breisgau-Hochschwarzwald | 0,63 | | -0,17 | | 0,10 | + - | 80 |
| DE133 | Emmendingen | 0,60 | | -0,20 | | 0,07 | + - | 80 |
| DE134 | Ortenaukreis | 0,81 | | 0,01 | | 0,28 | + + | 80 |
| DE139 | Loerrach | 0,89 | | 0,09 | | 0,36 | + + | 95 |
| DE13A | Waldshut | 0,70 | | -0,10 | | 0,17 | + - | 80 |
| DEB33 | Landau in der Pfalz, Kreisfreie Stadt | 1,00 | | 0,20 | | 0,46 | + + | 95 |
| DEB37 | Pirmasens, Kreisfreie Stadt | 0,92 | | 0,12 | | 0,39 | + + | 95 |
| DEB3E | Germersheim | 1,01 | | 0,21 | | 0,48 | + + | 95 |
| DEB3H | Suedliche Weinstraße | 0,57 | | -0,23 | | 0,03 | + - | 80 |
| DEB3K | Suedwestpfalz | 0,90 | | 0,10 | | 0,37 | + + | 95 |
| FR421 | Bas-Rhin | 0,62 | | | 0,45 | 0,09 | + + | 80 |
| FR422 | Haut-Rhin | 0,40 | | | 0,23 | -0,13 | - + | 80 |

Table V.26: Centrality indices of the NUTS3 units of the CBA

## 7.3 Research and Development (FAC2_1)

The explained variance of this factor is 8,04 and it mainly relates variables that are linked to innovation and scientific development such as R&D investment of different sectors and, to a lesser extent, EPO patent application and tertiary educated active population. The indicators in this factor are mostly available on a NUTS 2 level, meaning that a very high score in a specific NUTS 3 can lead to a whole cluster with high values.

It is interesting to note that, besides the capital cities, it is possible to identify specific innovation strongholds such as important university towns or high tech industries (Airbus in the Toulouse area, Volkswagen around Wolfsburg, Cambridge or the Silicon Glen). The Scandinavian countries also have a very favourable position in this factor.

The CBA shows high values of the R&D indices, all but the two French NUTS3 units above the national averages and within the highest percentiles in Europe (see also Chapter 6 for that) showing the high capacity of R&D of this region within Europe and in comparison to the German average.

Figure V.29: Category map of the factor research and development for Europe

| NUTS code | NUTS name | Scores | Country comparison (weighted NUTS 3 average) | | | | Country /CBA country level | Percentile all NUTS 3 |
|---|---|---|---|---|---|---|---|---|
| | | | Ch | DE | FR | All CBA countries | | |
| | CS1 | | | | | | | |
| All | Weighted average of CBA countries | 0,37 | | | | | | 80 |
| CH | Switzerland | | | | | | | |
| DE | Germany | 0,45 | | | | 0,09 | | 80 |
| FR | France | 0,25 | | | | -0,12 | | 80 |
| CH023 | Solothurn | | | | | | | |
| CH025 | Jura | | | | | | | |
| CH031 | Basel-Stadt | | | | | | | |
| CH032 | Basel-Landschaft | | | | | | | |
| CH033 | Aargau | | | | | | | |
| DE121 | Baden-Baden, Stadtkreis | 1,70 | | 1,24 | | 1,33 | + + | 95 |
| DE122 | Karlsruhe, Stadtkreis | 1,76 | | 1,31 | | 1,40 | + + | 95 |
| DE123 | Karlsruhe, Landkreis | 1,89 | | 1,43 | | 1,52 | + + | 95 |
| DE124 | Rastatt | 1,82 | | 1,37 | | 1,46 | + + | 95 |
| DE131 | Freiburg im Breisgau, Stadtkreis | 0,63 | | 0,18 | | 0,27 | + + | 80 |
| DE132 | Breisgau-Hochschwarzwald | 0,89 | | 0,44 | | 0,52 | + + | 95 |
| DE133 | Emmendingen | 0,76 | | 0,31 | | 0,40 | + + | 95 |
| DE134 | Ortenaukreis | 0,72 | | 0,26 | | 0,35 | + + | 95 |
| DE139 | Loerrach | 0,67 | | 0,22 | | 0,31 | + + | 80 |
| DE13A | Waldshut | 0,89 | | 0,44 | | 0,53 | + + | 95 |
| DEB33 | Landau in der Pfalz, Kreisfreie Stadt | 0,46 | | 0,00 | | 0,09 | + + | 80 |
| DEB37 | Pirmasens, Kreisfreie Stadt | 0,48 | | 0,02 | | 0,11 | + + | 80 |
| DEB3E | Germersheim | 0,49 | | 0,03 | | 0,12 | + + | 80 |
| DEB3H | Suedliche Weinstraße | 0,73 | | 0,28 | | 0,37 | + + | 95 |
| DEB3K | Suedwestpfalz | 0,79 | | 0,33 | | 0,42 | + + | 95 |
| FR421 | Bas-Rhin | 0,13 | | | -0,12 | -0,23 | - - | 80 |
| FR422 | Haut-Rhin | 0,14 | | | -0,11 | -0,23 | - - | 80 |

Table V.27: Research and development indices of the NUTS3 units of the CBA

## 7.4 Administrative centres (FAC3_1)

The indicators with the highest coefficients of correlation of this factor are the share employment and GVA in public administration, community services and activities of household and the share of employment and GVA in industry. It's explained variance is 8,36.

The regions with the highest scores of this factor are mostly depressed regions in which, because of their poor economic performance, the public sector assumes an important position. Most of the border NUTS 3 units in Spain and Portugal have very high scores in this factor, as well as Karelia. The other cross-border regions seem to be closer to the national patterns.

On a different note, this indicator also relates to the different levels of state interventionism, with the Scandinavian countries and France revealing overall high scores.

Within the CBA only the urban centres show high scores, like DE121 Baden-Baden and DE131 Freiburg, while the two French NUTS3 units are on an intermediate scale, partly due to the size of these units: especially Strasbourg with the European Parliament should have very high scores but is only part of a big NUTS3 unit.

Figure V.30: Category map of the factor administrative centres for Europe



ESPON

EUROPEAN UNION
Part-financed by the European Regional Development Fund
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Local level: NUTS 3
Source: GETIN_UA
Origin of data: Multiple sources
© EuroGeographics Association for administrative boundaries

© GETIN_UA, Project ULYSSES, 2011

**NUTS_RG_03M_2006**

**FAC3_1**

- -3,27 - -0,98
- -0,97 - -0,43
- -0,42 - 0,05
- 0,06 - 0,48
- 0,49 - 0,97
- 0,98 - 2,89
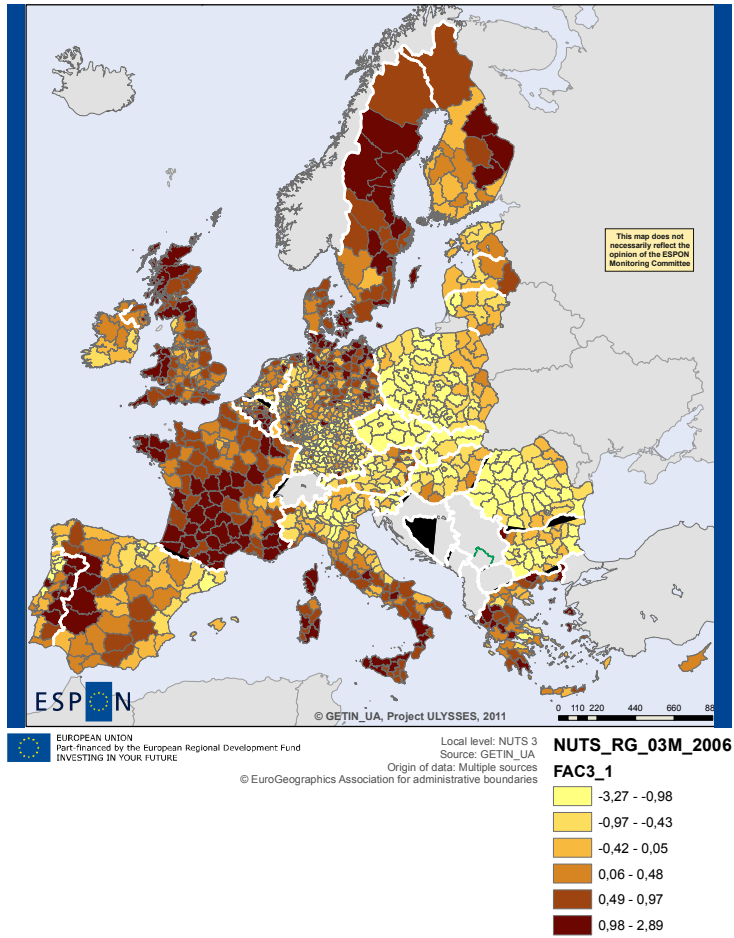
| NUTS code | NUTS name | FAC3 | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Scores | Country comparison (weighted NUTS 3 average) | | | | Country /CBA country level | Percentile all NUTS 3 |
| | CS1 | | Ch | DE | FR | All CBA countries | | |
| All | Weighted average of CBA countries | 0,20 | | | | | | 80 |
| CH | Switzerland | | | | | | | |
| DE | Germany | -0,17 | | | | -0,37 | | 50 |
| FR | France | 0,68 | | | | 0,49 | | 80 |
| CH023 | Solothurn | | | | | | | |
| CH025 | Jura | | | | | | | |
| CH031 | Basel-Stadt | | | | | | | |
| CH032 | Basel-Landschaft | | | | | | | |
| CH033 | Aargau | | | | | | | |
| DE121 | Baden-Baden, Stadtkreis | 1,15 | | 1,32 | | 0,95 | + + | 95 |
| DE122 | Karlsruhe, Stadtkreis | 0,05 | | 0,22 | | -0,15 | - + | 80 |
| DE123 | Karlsruhe, Landkreis | -1,26 | | -1,09 | | -1,46 | - - | 20 |
| DE124 | Rastatt | -2,19 | | -2,02 | | -2,39 | - - | 5 |
| DE131 | Freiburg im Breisgau, Stadtkreis | 0,94 | | 1,11 | | 0,74 | + + | 95 |
| DE132 | Breisgau-Hochschwarzwald | -0,53 | | -0,36 | | -0,72 | - - | 50 |
| DE133 | Emmendingen | -0,82 | | -0,65 | | -1,02 | - - | 50 |
| DE134 | Ortenaukreis | -1,19 | | -1,02 | | -1,39 | - - | 20 |
| DE139 | Loerrach | -0,88 | | -0,71 | | -1,08 | - - | 20 |
| DE13A | Waldshut | -0,68 | | -0,51 | | -0,88 | - - | 50 |
| DEB33 | Landau in der Pfalz, Kreisfreie Stadt | 1,25 | | 1,42 | | 1,05 | + + | 95 |
| DEB37 | Pirmasens, Kreisfreie Stadt | 0,50 | | 0,67 | | 0,30 | + + | 80 |
| DEB3E | Germersheim | -1,87 | | -1,70 | | -2,07 | - - | 5 |
| DEB3H | Suedliche Weinstraße | 0,29 | | 0,46 | | 0,09 | + + | 80 |
| DEB3K | Suedwestpfalz | 0,06 | | 0,23 | | -0,14 | - + | 80 |
| FR421 | Bas-Rhin | 0,10 | | | -0,59 | -0,10 | - - | 80 |
| FR422 | Haut-Rhin | 0,22 | | | -0,47 | 0,02 | + - | 80 |

Table V.28: Administrative centres indices of the NUTS3 units of the CBA

## 7.5 Demographic dynamism (FAC4_1)

This factor has an explained variance of 7,22. The variables with the highest coefficient of correlation are young age dependency rate, the crude rate of natural population increase, the total fertility rate and the old age dependency rate (this last one has a negative correlation). The regions with the lowest scores of this factor are in the Mediterranean countries, such as Portugal, Spain and Greece but also Germany. As described in Chapter 2, the factor analysis reflects the different natural population development especially in comparison between France and Germany with a big difference in fertility rates and hence dependency rates.

While the German parts of the CBA still grow due to migration, the natural development of the population is negative, while the French NUTS3 units still have a slight natural increase.

Figure V.31: Category map of the factor demographic dynamism for Europe

| NUTS code | NUTS name | FAC4 | | | | | Country /CBA country level | Percentile all NUTS 3 |
|---|---|---|---|---|---|---|---|---|
| | | Scores | Country comparison (weighted NUTS 3 average) | | | | | |
| | CS1 | | Ch | DE | FR | All CBA countries | | |
| All | Weighted average of CBA countries | 0,11 | | | | | | 80 |
| CH | Switzerland | | | | | | | |
| DE | Germany | -0,65 | | | | -0,77 | | 50 |
| FR | France | 1,12 | | | | 1,01 | | 95 |
| CH023 | Solothurn | | | | | | | |
| CH025 | Jura | | | | | | | |
| CH031 | Basel-Stadt | | | | | | | |
| CH032 | Basel-Landschaft | | | | | | | |
| CH033 | Aargau | | | | | | | |
| DE121 | Baden-Baden, Stadtkreis | -1,64 | | -0,99 | | -1,76 | - - | 5 |
| DE122 | Karlsruhe, Stadtkreis | -1,27 | | -0,62 | | -1,38 | - - | 20 |
| DE123 | Karlsruhe, Landkreis | -0,44 | | 0,21 | | -0,56 | - + | 50 |
| DE124 | Rastatt | -0,25 | | 0,41 | | -0,36 | - + | 50 |
| DE131 | Freiburg im Breisgau, Stadtkreis | -0,61 | | 0,04 | | -0,73 | - + | 50 |
| DE132 | Breisgau-Hochschwarzwald | -0,31 | | 0,34 | | -0,42 | - + | 50 |
| DE133 | Emmendingen | -0,16 | | 0,49 | | -0,28 | - + | 50 |
| DE134 | Ortenaukreis | -0,29 | | 0,36 | | -0,40 | - + | 50 |
| DE139 | Loerrach | -0,08 | | 0,57 | | -0,20 | - + | 80 |
| DE13A | Waldshut | -0,24 | | 0,41 | | -0,35 | - + | 50 |
| DEB33 | Landau in der Pfalz, Kreisfreie Stadt | -0,66 | | -0,01 | | -0,77 | - - | 50 |
| DEB37 | Pirmasens, Kreisfreie Stadt | -1,04 | | -0,39 | | -1,15 | - - | 20 |
| DEB3E | Germersheim | 0,26 | | 0,91 | | 0,14 | + + | 80 |
| DEB3H | Suedliche Weinstraße | -0,56 | | 0,09 | | -0,68 | - + | 50 |
| DEB3K | Suedwestpfalz | -0,90 | | -0,25 | | -1,01 | - - | 20 |
| FR421 | Bas-Rhin | 0,99 | | | -0,13 | 0,88 | + - | 95 |
| FR422 | Haut-Rhin | 1,20 | | | 0,08 | 1,09 | + + | 95 |

Table V.29: Demographic dynamism indices of the NUTS3 units of the CBA

## 7.6 Environmental risk (FAC5_1)

This factor relates mainly to variables linked to the regions' sensitivity to climate change. As can be seen on the map, these regions are essentially located in coastal areas and other flood prone areas, such as areas close to the Danube or the Po.

By the factor analysis no major concerns are to be expected, although climate change will hit the Rhine Valley especially with more stress caused to heat. For agricultural uses in the CBA (i.e. winery and orchading) the impacts are disputed, whether this could lead to advantageous or disadvantageous conditions.

Figure V.32: Category map of the factor environmental risks in Europe
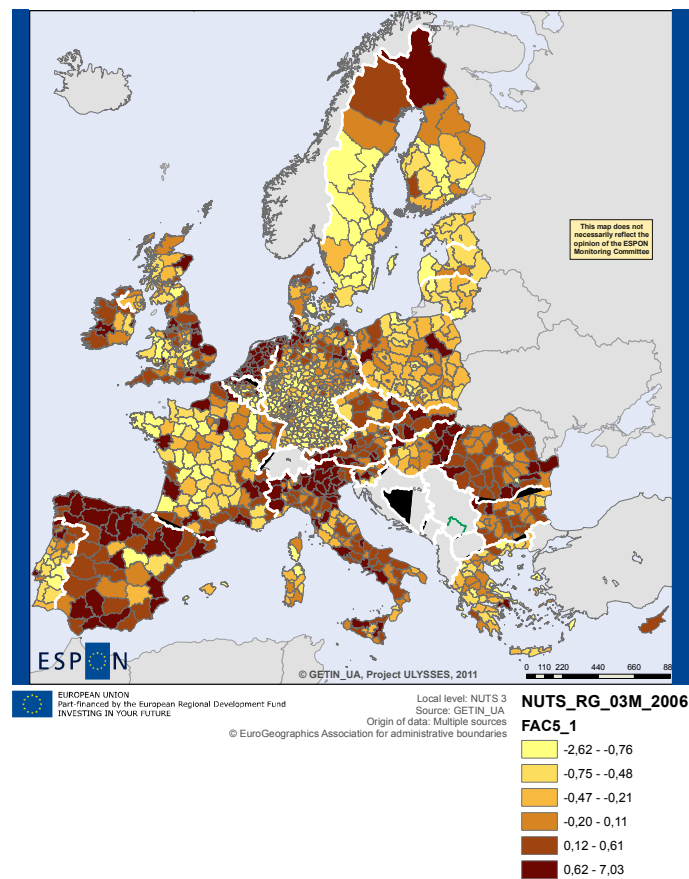
| NUTS code | NUTS name | FAC5 | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Scores | Country comparison (weighted NUTS 3 average) | | | | Country /CBA country level | Percentile all NUTS 3 |
| | CS1 | | Ch | DE | FR | All CBA countries | | |
| All | Weighted average of CBA countries | 0,07 | | | | | | 80 |
| CH | Switzerland | | | | | | | |
| DE | Germany | 0,01 | | | | -0,06 | | 80 |
| FR | France | 0,15 | | | | 0,08 | | 80 |
| CH023 | Solothurn | | | | | | | |
| CH025 | Jura | | | | | | | |
| CH031 | Basel-Stadt | | | | | | | |
| CH032 | Basel-Landschaft | | | | | | | |
| CH033 | Aargau | | | | | | | |
| DE121 | Baden-Baden, Stadtkreis | -0,87 | | -0,89 | | -0,95 | - - | 20 |
| DE122 | Karlsruhe, Stadtkreis | 0,84 | | 0,83 | | 0,77 | + + | 95 |
| DE123 | Karlsruhe, Landkreis | -0,11 | | -0,12 | | -0,18 | - - | 80 |
| DE124 | Rastatt | -0,03 | | -0,04 | | -0,10 | - - | 80 |
| DE131 | Freiburg im Breisgau, Stadtkreis | -0,07 | | -0,09 | | -0,15 | - - | 80 |
| DE132 | Breisgau-Hochschwarzwald | -0,58 | | -0,59 | | -0,65 | - - | 50 |
| DE133 | Emmendingen | -0,26 | | -0,27 | | -0,33 | - - | 50 |
| DE134 | Ortenaukreis | -0,31 | | -0,32 | | -0,38 | - - | 50 |
| DE139 | Loerrach | -0,43 | | -0,44 | | -0,50 | - - | 50 |
| DE13A | Waldshut | -0,80 | | -0,81 | | -0,87 | - - | 20 |
| DEB33 | Landau in der Pfalz, Kreisfreie Stadt | -0,87 | | -0,89 | | -0,94 | - - | 20 |
| DEB37 | Pirmasens, Kreisfreie Stadt | -1,13 | | -1,14 | | -1,20 | - - | 5 |
| DEB3E | Germersheim | 0,29 | | 0,27 | | 0,21 | + + | 80 |
| DEB3H | Suedliche Weinstraße | -0,81 | | -0,82 | | -0,88 | - - | 20 |
| DEB3K | Suedwestpfalz | -0,89 | | -0,90 | | -0,96 | - - | 20 |
| FR421 | Bas-Rhin | 0,52 | | | 0,37 | 0,45 | + + | 95 |
| FR422 | Haut-Rhin | -0,05 | | | -0,20 | -0,13 | - - | 80 |

Table V.30: Environmental risk indices of the NUTS3 units of the CBA

## 7.7 Services and transport (FAC6_1)

This significant indicators of this factor are the share of GVA and employment in wholesale and retail trade, hotels and restaurants and transport (NACE G-I). Many of the regions with the high scores in this factor seem to be linked to tourism (Southern Spain and Portugal, the alpine regions, Paris, Greece, Rome, etc.).

In the CBA it is DEB3K Suedwestpfalz and DE132 Breisgau-Hochschwarzwald showing the highest scores of this factor, both deriving mainly from tourism, too.

Figure V.33: Category map of the factor services and transport in Europe

| NUTS code | NUTS name | FAC6 | | | | | Country /CBA country level | Percentile all NUTS 3 |
|---|---|---|---|---|---|---|---|---|
| | | Scores | Country comparison (weighted NUTS 3 average) | | | | | |
| | CS1 | | Ch | DE | FR | All CBA countries | | |
| All | Weighted average of CBA countries | -0,18 | | | | | | 50 |
| CH | Switzerland | | | | | | | |
| DE | Germany | 0,00 | | | | 0,18 | | 80 |
| FR | France | -0,41 | | | | -0,24 | | 50 |
| CH023 | Solothurn | | | | | | | |
| CH025 | Jura | | | | | | | |
| CH031 | Basel-Stadt | | | | | | | |
| CH032 | Basel-Landschaft | | | | | | | |
| CH033 | Aargau | | | | | | | |
| DE121 | Baden-Baden, Stadtkreis | -0,26 | | -0,26 | | -0,08 | - - | 50 |
| DE122 | Karlsruhe, Stadtkreis | 0,56 | | 0,56 | | 0,74 | + + | 80 |
| DE123 | Karlsruhe, Landkreis | 0,06 | | 0,06 | | 0,24 | + + | 80 |
| DE124 | Rastatt | -0,75 | | -0,76 | | -0,58 | - - | 50 |
| DE131 | Freiburg im Breisgau, Stadtkreis | 0,09 | | 0,08 | | 0,26 | + + | 80 |
| DE132 | Breisgau-Hochschwarzwald | 0,27 | | 0,27 | | 0,45 | + + | 80 |
| DE133 | Emmendingen | -0,71 | | -0,72 | | -0,54 | - - | 50 |
| DE134 | Ortenaukreis | -0,04 | | -0,04 | | 0,14 | + - | 80 |
| DE139 | Loerrach | -0,52 | | -0,52 | | -0,34 | - - | 50 |
| DE13A | Waldshut | -0,79 | | -0,80 | | -0,62 | - - | 20 |
| DEB33 | Landau in der Pfalz, Kreisfreie Stadt | 0,31 | | 0,30 | | 0,48 | + + | 80 |
| DEB37 | Pirmasens, Kreisfreie Stadt | 0,67 | | 0,67 | | 0,85 | + + | 95 |
| DEB3E | Germersheim | -1,34 | | -1,34 | | -1,16 | - - | 5 |
| DEB3H | Suedliche Weinstraße | 0,22 | | 0,22 | | 0,40 | + + | 80 |
| DEB3K | Suedwestpfalz | 0,91 | | 0,90 | | 1,08 | + + | 95 |
| FR421 | Bas-Rhin | -0,24 | | | 0,18 | -0,06 | - + | 50 |
| FR422 | Haut-Rhin | -0,55 | | | -0,13 | -0,37 | - - | 50 |

Table V.31: Services and transport indices of the NUTS3 units of the CBA

## 7.8 Immigration (FAC7_1)

The highly correlated variables of the factor 7 are population growth and the net migration rate. While many regions in Central and Western Europe show high scores in this factor, in the eastern countries the high scores are generally restricted to the capital cities.

Although the CBA has continuous immigration (see Chapter 2), scores compared to the national averages are relatively low, i.e. in the EU average of all NUTS units has higher migration rates than the CBA.

Figure V.34: Category map of the factor immigration in Europe
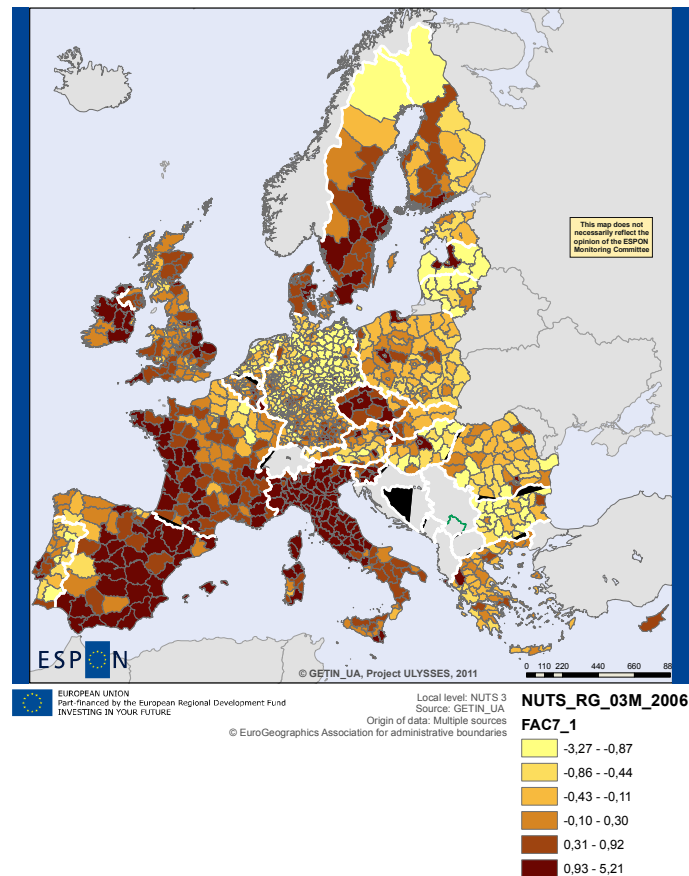
| NUTS code | NUTS name | FAC7 | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Scores | Country comparison (weighted NUTS 3 average) | | | | Country /CBA country level | Percentile all NUTS 3 |
| | CS1 | | Ch | DE | FR | All CBA countries | | |
| All | Weighted average of CBA countries | 0,00 | | | | | | 80 |
| CH | Switzerland | | | | | | | |
| DE | Germany | -0,27 | | | | -0,27 | | 50 |
| FR | France | 0,36 | | | | 0,36 | | 80 |
| CH023 | Solothurn | | | | | | | |
| CH025 | Jura | | | | | | | |
| CH031 | Basel-Stadt | | | | | | | |
| CH032 | Basel-Landschaft | | | | | | | |
| CH033 | Aargau | | | | | | | |
| DE121 | Baden-Baden, Stadtkreis | -0,11 | | 0,16 | | -0,11 | - + | 50 |
| DE122 | Karlsruhe, Stadtkreis | 0,72 | | 0,99 | | 0,71 | + + | 80 |
| DE123 | Karlsruhe, Landkreis | -0,27 | | 0,00 | | -0,27 | - + | 50 |
| DE124 | Rastatt | -0,96 | | -0,68 | | -0,96 | - - | 20 |
| DE131 | Freiburg im Breisgau, Stadtkreis | 0,03 | | 0,30 | | 0,03 | + + | 80 |
| DE132 | Breisgau-Hochschwarzwald | -0,33 | | -0,06 | | -0,34 | - - | 50 |
| DE133 | Emmendingen | -0,25 | | 0,02 | | -0,25 | - + | 50 |
| DE134 | Ortenaukreis | -0,34 | | -0,07 | | -0,34 | - - | 50 |
| DE139 | Loerrach | 0,06 | | 0,34 | | 0,06 | + + | 80 |
| DE13A | Waldshut | -0,12 | | 0,15 | | -0,12 | - + | 50 |
| DEB33 | Landau in der Pfalz, Kreisfreie Stadt | -0,15 | | 0,12 | | -0,15 | - + | 50 |
| DEB37 | Pirmasens, Kreisfreie Stadt | -1,55 | | -1,28 | | -1,55 | - - | 5 |
| DEB3E | Germersheim | -0,65 | | -0,37 | | -0,65 | - - | 50 |
| DEB3H | Suedliche Weinstraße | -0,77 | | -0,50 | | -0,77 | - - | 50 |
| DEB3K | Suedwestpfalz | -1,72 | | -1,45 | | -1,72 | - - | 5 |
| FR421 | Bas-Rhin | 0,14 | | | -0,23 | 0,13 | + - | 80 |
| FR422 | Haut-Rhin | 0,17 | | | -0,19 | 0,17 | + - | 80 |

Table V.32: Immigration indices of the NUTS3 units of the CBA

## 7.9 Construction (FAC8_1)

The highly correlated variables of this factor are GVA and employment in construction. The regions with the highest score in this factor belong to Ireland, Spain (both maybe due to the "Real Estate Bubble"), the Baltic States, and Eastern Germany.

The CBA has intermediate to low scores in the factor construction, i.e. construction only plays a minor role in the economy. On the other hand, a low share in construction can be interpreted as an indicator for a stable and matured economy.

Figure V.35: Category map of the factor construction in Europe

| NUTS code | NUTS name | FAC8 | | | | | Country /CBA country level | Percentile all NUTS 3 |
|---|---|---|---|---|---|---|---|---|
| | | Scores | Country comparison (weighted NUTS 3 average) | | | | | |
| | CS1 | | Ch | DE | FR | All CBA countries | | |
| All | Weighted average of CBA countries | -0,31 | | | | | | 50 |
| CH | Switzerland | | | | | | | |
| DE | Germany | -0,52 | | | | -0,22 | | 50 |
| FR | France | -0,02 | | | | 0,29 | | 80 |
| CH023 | Solothurn | | | | | | | |
| CH025 | Jura | | | | | | | |
| CH031 | Basel-Stadt | | | | | | | |
| CH032 | Basel-Landschaft | | | | | | | |
| CH033 | Aargau | | | | | | | |
| DE121 | Baden-Baden, Stadtkreis | -0,72 | | -0,20 | | -0,42 | - - | 50 |
| DE122 | Karlsruhe, Stadtkreis | -1,45 | | -0,93 | | -1,15 | - - | 20 |
| DE123 | Karlsruhe, Landkreis | -0,54 | | -0,02 | | -0,24 | - - | 50 |
| DE124 | Rastatt | -0,14 | | 0,39 | | 0,17 | + + | 50 |
| DE131 | Freiburg im Breisgau, Stadtkreis | -1,44 | | -0,92 | | -1,13 | - - | 20 |
| DE132 | Breisgau-Hochschwarzwald | 0,45 | | 0,97 | | 0,76 | + + | 80 |
| DE133 | Emmendingen | 0,25 | | 0,77 | | 0,56 | + + | 80 |
| DE134 | Ortenaukreis | -0,11 | | 0,42 | | 0,20 | + + | 50 |
| DE139 | Loerrach | -0,56 | | -0,04 | | -0,26 | - - | 50 |
| DE13A | Waldshut | 0,24 | | 0,76 | | 0,54 | + + | 80 |
| DEB33 | Landau in der Pfalz, Kreisfreie Stadt | -1,18 | | -0,65 | | -0,87 | - - | 20 |
| DEB37 | Pirmasens, Kreisfreie Stadt | -0,79 | | -0,27 | | -0,48 | - - | 20 |
| DEB3E | Germersheim | -0,43 | | 0,09 | | -0,13 | - + | 50 |
| DEB3H | Suedliche Weinstraße | 0,34 | | 0,86 | | 0,64 | + + | 80 |
| DEB3K | Suedwestpfalz | 1,04 | | 1,56 | | 1,34 | + + | 95 |
| FR421 | Bas-Rhin | -0,07 | | | -0,05 | 0,24 | + - | 80 |
| FR422 | Haut-Rhin | -0,01 | | | 0,01 | 0,30 | + + | 80 |

Table V.33: Construction indices of the NUTS3 units of the CBA

## 7.10 Unemployment (FAC1_2)

The first component explains 24,19 of the variance and its highly correlated variables are unemployment, long-term unemployment and youth unemployment. The geographical distribution of this factor's scores shows a concentration of the highest values in the more depressed areas of Europe and countries with a structurally high unemployment such as Southern Italy and Southern Spain, Eastern Germany, Slovakia, and Greece). Regions with used to have a strong industrial base also evidence relatively high scores in this factor, namely some regions in Southern France and Southern Portugal, Wallonia, the Setúbal Peninsula, Liverpool, and Manchester.

Figure V.36: Category map of the factor unemployment in Europe
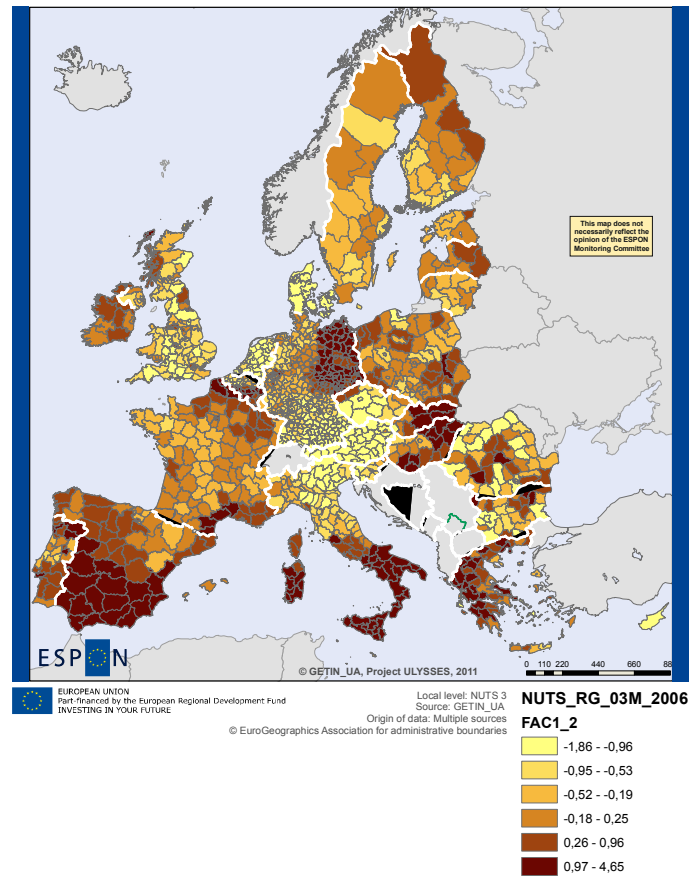


In some borders, the regions seem to have higher scores in this indicator than the more centrally located regions. This is the case in Portugal, on the northern border of France and Bulgaria, Finnish Karelia or the Czech Republic where it borders eastern Germany.

The CBA has quite low scores regarding this factor (see Chapter 6), as unemployment rates are significant lower than the national and EU averages. Exceptions are DEB37 Pirmasens and FR422 Haut-Rhin. Including data from Switzerland would have highlighted to good conditions for workers and employees in the CBA.

| NUTS code | NUTS name | FAC1_2 | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Scores | Country comparison (weighted NUTS 3 average) | | | | Country /CBA country level | Percentile all NUTS 3 |
| | CS1 | | Ch | DE | FR | All CBA countries | | |
| All | Weighted average of CBA countries | 0,14 | | | | | | 80 |
| CH | Switzerland | | | | | | | |
| DE | Germany | 0,06 | | | | -0,08 | | 80 |
| FR | France | 0,25 | | | | 0,11 | | 80 |
| CH023 | Solothurn | | | | | | | |
| CH025 | Jura | | | | | | | |
| CH031 | Basel-Stadt | | | | | | | |
| CH032 | Basel-Landschaft | | | | | | | |
| CH033 | Aargau | | | | | | | |
| DE121 | Baden-Baden, Stadtkreis | -0,39 | | -0,45 | | -0,53 | - - | 50 |
| DE122 | Karlsruhe, Stadtkreis | -0,27 | | -0,33 | | -0,41 | - - | 50 |
| DE123 | Karlsruhe, Landkreis | -0,84 | | -0,90 | | -0,98 | - - | 50 |
| DE124 | Rastatt | -0,91 | | -0,97 | | -1,05 | - - | 20 |
| DE131 | Freiburg im Breisgau, Stadtkreis | -0,50 | | -0,56 | | -0,64 | - - | 50 |
| DE132 | Breisgau-Hochschwarzwald | -1,08 | | -1,14 | | -1,22 | - - | 20 |
| DE133 | Emmendingen | -1,11 | | -1,17 | | -1,25 | - - | 20 |
| DE134 | Ortenaukreis | -1,09 | | -1,15 | | -1,23 | - - | 20 |
| DE139 | Loerrach | -1,00 | | -1,06 | | -1,14 | - - | 20 |
| DE13A | Waldshut | -1,13 | | -1,19 | | -1,28 | - - | 20 |
| DEB33 | Landau in der Pfalz, Kreisfreie Stadt | -0,48 | | -0,54 | | -0,62 | - - | 50 |
| DEB37 | Pirmasens, Kreisfreie Stadt | 0,87 | | 0,81 | | 0,73 | + + | 95 |
| DEB3E | Germersheim | -0,60 | | -0,66 | | -0,74 | - - | 50 |
| DEB3H | Suedliche Weinstraße | -0,75 | | -0,81 | | -0,90 | - - | 50 |
| DEB3K | Suedwestpfalz | -0,52 | | -0,58 | | -0,67 | - - | 50 |
| FR421 | Bas-Rhin | -0,27 | | | -0,52 | -0,41 | - - | 50 |
| FR422 | Haut-Rhin | -0,17 | | | -0,42 | -0,31 | - - | 80 |

Table V.34: Unemployment indices of the NUTS3 units of the CBA

From the regression it is possible to see that, although the overall variation of the factor that is explained by the context factors is small, its relation to most of them is statistically significant. The coefficients indicate that high levels of unemployment have a strong negative relation to a high investment in R&D, demographic dynamism, central locations and high levels of immigration. As expected, the factor referring to administrative centres has a significant and positive impact and unemployment.

| Regression Statistics | |
|---|---|
| Multiple R | 0,59374 |
| R Square | 0,35252 |
| Adjusted R Square | 0,34699 |
| Standard Error | 0,80809 |
| Observations | 1298 |

| | Coefficients | Standard Error | t Stat | P-value | Lower 95% | Upper 95% | Lower | Upper |
|---|---|---|---|---|---|---|---|---|
| Intercept | -3,4E-09 | 0,022430 | -1,5E-07 | 1 | -0,0440 | 0,0440 | -0,0440 | 0,0440 |
| FAC1_1 | -0,13913 | 0,022438 | -6,20045 | 7,57172E-10 | -0,1831 | -0,0951 | -0,1831 | -0,0951 |
| FAC2_1 | -0,17056 | 0,022438 | -7,60142 | 5,62205E-14 | -0,2146 | -0,1265 | -0,2146 | -0,1265 |
| FAC3_1 | 0,35445 | 0,022438 | 15,79682 | 1,64522E-51 | 0,3104 | 0,3985 | 0,3104 | 0,3985 |
| FAC4_1 | -0,17954 | 0,022438 | -8,00162 | 2,72054E-15 | -0,2236 | -0,1355 | -0,2236 | -0,1355 |
| FAC5_1 | -0,01938 | 0,022438 | -0,86369 | 0,387920516 | -0,0634 | 0,0246 | -0,0634 | 0,0246 |
| FAC6_1 | 0,04804 | 0,022438 | 2,140949 | 0,032465709 | 0,0040 | 0,0921 | 0,0040 | 0,0921 |
| FAC7_1 | -0,12934 | 0,022438 | -5,76408 | 1,02676E-08 | -0,1734 | -0,0853 | -0,1734 | -0,0853 |
| FAC8_1 | 0,07384 | 0,022438 | 3,29098 | 0,001025468 | 0,0298 | 0,1179 | 0,0298 | 0,1179 |
| FAC9_1 | -0,16827 | 0,022438 | -7,49914 | 1,19255E-13 | -0,2123 | -0,1242 | -0,2123 | -0,1242 |
| FAC10_1 | -0,29276 | 0,022438 | -13,0475 | 1,24326E-36 | -0,3368 | -0,2487 | -0,3368 | -0,2487 |
| FAC11_1 | -0,08551 | 0,022438 | -3,81081 | 0,000145058 | -0,1295 | -0,0415 | -0,1295 | -0,0415 |

Table V.35: Unemployment regression

## 7.11 Catching-up regions (FAC2_2)

The total explained variance of this factor is 18,71 and its most significant variable is catching-up. This indicator relates the GDP level and growth between 1997 and 2008 of a given region to the pattern evidenced by the leading region. Its correlated variables also include urban waste water treatment capacity and infant mortality.

As can be seen in the map, the correlation between high GDP growth and poor social conditions is essentially a consequence of the very high growth rate witnessed by the eastern European countries throughout the late 1990 and early 2000 (some countries even had occasional double digit growth rates), while the central European countries, although starting from a high initial position, witnessed relatively small growth rates. The overall pattern of the border regions seem to essentially follow the national tendency, which is true also for the CBA.

Figure V.37: Category map of the factor catching-up in Europe
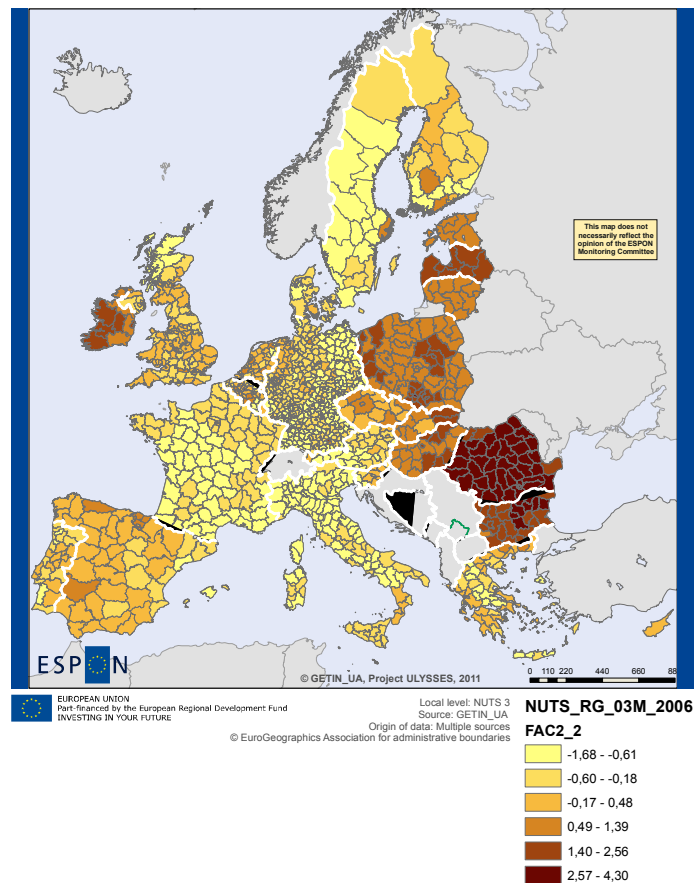
| NUTS code | NUTS name | FAC2_2 | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Scores | Country comparison (weighted NUTS 3 average) | | | | Country /CBA country level | Percentile all NUTS 3 |
| | CS1 | | Ch | DE | FR | All CBA countries | | |
| All | Weighted average of CBA countries | -0,39 | | | | | | 50 |
| CH | Switzerland | | | | | | | |
| DE | Germany | -0,34 | | | | 0,05 | | 80 |
| FR | France | -0,46 | | | -0,07 | | | 50 |
| CH023 | Solothurn | | | | | | | |
| CH025 | Jura | | | | | | | |
| CH031 | Basel-Stadt | | | | | | | |
| CH032 | Basel-Landschaft | | | | | | | |
| CH033 | Aargau | | | | | | | |
| DE121 | Baden-Baden, Stadtkreis | -0,82 | | -0,48 | | -0,43 | - - | 20 |
| DE122 | Karlsruhe, Stadtkreis | -0,67 | | -0,33 | | -0,28 | - - | 50 |
| DE123 | Karlsruhe, Landkreis | -0,71 | | -0,37 | | -0,32 | - - | 20 |
| DE124 | Rastatt | -0,79 | | -0,45 | | -0,40 | - - | 20 |
| DE131 | Freiburg im Breisgau, Stadtkreis | -0,58 | | -0,24 | | -0,19 | - - | 50 |
| DE132 | Breisgau-Hochschwarzwald | -0,65 | | -0,30 | | -0,25 | - - | 50 |
| DE133 | Emmendingen | -0,63 | | -0,29 | | -0,24 | - - | 50 |
| DE134 | Ortenaukreis | -0,65 | | -0,31 | | -0,26 | - - | 50 |
| DE139 | Loerrach | -0,67 | | -0,33 | | -0,28 | - - | 50 |
| DE13A | Waldshut | -0,69 | | -0,35 | | -0,30 | - - | 20 |
| DEB33 | Landau in der Pfalz, Kreisfreie Stadt | -0,74 | | -0,40 | | -0,35 | - - | 20 |
| DEB37 | Pirmasens, Kreisfreie Stadt | -0,78 | | -0,44 | | -0,39 | - - | 20 |
| DEB3E | Germersheim | -1,04 | | -0,69 | | -0,64 | - - | 5 |
| DEB3H | Suedliche Weinstraße | -0,81 | | -0,47 | | -0,42 | - - | 20 |
| DEB3K | Suedwestpfalz | -0,86 | | -0,52 | | -0,47 | - - | 20 |
| FR421 | Bas-Rhin | -0,43 | | | 0,03 | -0,03 | - + | 50 |
| FR422 | Haut-Rhin | -0,43 | | | 0,03 | -0,04 | - + | 50 |

Table V.36: Catching-up indices of the NUTS3 units of the CBA

The negative correlation of the catching-up indicator with other performance indicators in this factor is essentially linked to the high growth rates of the eastern countries in the initial decades of their transition to a market economy. As this is an historic contingency and does not follow a deeper causal nexus, the regression analysis was made only for the catching-up indicators.

The regression of this indictor, which has a slightly higher R square then the previous one, shows that it is statistically related to many components of the territorial profile. Confirming what has previously been said about this indicator, the catching up process is especially strong in eastern countries and therefore the highest negative coefficients occur in Factor 1 (central location) and Factor 3 (administrative centres). On the other hand, in central Europe the regions which perform best in this indicator are the ones located in the "Blue Banana" and, even in Eastern Europe, the top performing regions tend to be the more central ones. This might explain why the catching-up process is also negatively related to rurality (Factor 9 - low density and growth of agricultural areas).
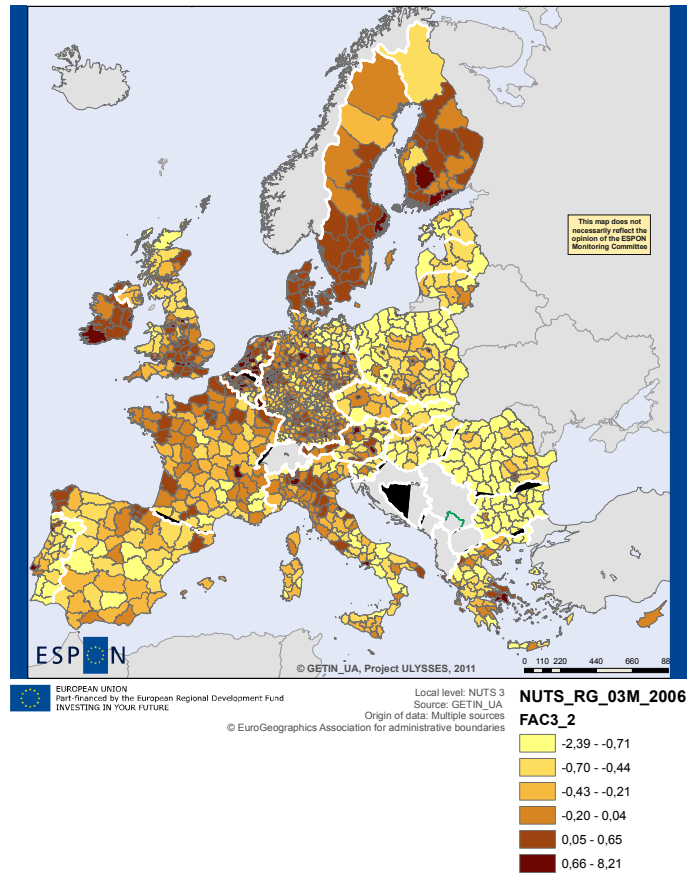
|  | Regression Statistics |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|
| Multiple R | 0,6261119 |  |  |  |  |  |  |  |
| R Square | 0,3920161 |  |  |  |  |  |  |  |
| Adjusted R Square | 0,3868156 |  |  |  |  |  |  |  |
| Standard Error | 0,7830609 |  |  |  |  |  |  |  |
| Observations | 1298 |  |  |  |  |  |  |  |
|  | Coefficients | Standard | t Stat | P-value | Lower 95% | Upper 95% | Lower 95,0% | Upper |
| Intercept | -6,26829E-08 | 0,0217 | -2,884E-06 | 0,9999977 | -0,043 | 0,043 | -0,043 | 0,043 |
| FAC1_1 | -0,352 | 0,0217 | -16,197241 | 7,7102E-54 | -0,395 | -0,310 | -0,395 | -0,310 |
| FAC2_1 | -0,102 | 0,0217 | -4,7047433 | 2,8164E-06 | -0,145 | -0,060 | -0,145 | -0,060 |
| FAC3_1 | -0,326 | 0,0217 | -14,995851 | 5,713E-47 | -0,369 | -0,283 | -0,369 | -0,283 |
| FAC4_1 | 0,053 | 0,0217 | 2,4167366 | 0,01579882 | 0,010 | 0,095 | 0,010 | 0,095 |
| FAC5_1 | 0,140 | 0,0217 | 6,44670648 | 1,6131E-10 | 0,098 | 0,183 | 0,098 | 0,183 |
| FAC6_1 | 0,091 | 0,0217 | 4,18168723 | 3,0895E-05 | 0,048 | 0,134 | 0,048 | 0,134 |
| FAC7_1 | 0,042 | 0,0217 | 1,9210766 | 0,05494291 | -0,001 | 0,084 | -0,001 | 0,084 |
| FAC8_1 | -0,049 | 0,0217 | -2,2370838 | 0,02545166 | -0,091 | -0,006 | -0,091 | -0,006 |
| FAC9_1 | -0,297 | 0,0217 | -13,645679 | 1,0773E-39 | -0,339 | -0,254 | -0,339 | -0,254 |
| FAC10_1 | -0,168 | 0,0217 | -7,7085769 | 2,5325E-14 | -0,210 | -0,125 | -0,210 | -0,125 |
| FAC11_1 | 0,017 | 0,0217 | 0,78598351 | 0,43202194 | -0,026 | 0,060 | -0,026 | 0,060 |

Table V.37: Catching-up regression

## 7.12 Economic development (FAC3_2)

The variables with the highest coefficient of correlation in this factor are GDP per capita, share of Natura 2000 and soil sealed area and its explained variance is 17,57. It can therefore be understood as a factor which expresses high degrees of development and urbanization. As expected, the regions with the highest scores for this factor are concentrated in central Europe and Scandinavia and also include the capital cities of more marginal countries.

Figure V.38: Category map of the factor economic development in Europe



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EUROPEAN UNION
Part-financed by the European Regional Development Fund
INVESTING IN YOUR FUTURE

Local level: NUTS 3
Source: GETIN_UA
Origin of data: Multiple sources
© EuroGeographics Association for administrative boundaries

This map does not
necessarily reflect the
opinion of the ESPON
Monitoring Committee

0   110  220       440         660         88

**NUTS_RG_03M_2006**

**FAC3_2**

- -2,39 - -0,71
- -0,70 - -0,44
- -0,43 - -0,21
- -0,20 - 0,04
- 0,05 - 0,65
- 0,66 - 8,21

| NUTS code | NUTS name | FAC3_2 | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Scores | Country comparison (weighted NUTS 3 average) | | | | Country /CBA country level | Percentile all NUTS 3 |
| | CS1 | | Ch | DE | FR | All CBA countries | | |
| All | Weighted average of CBA countries | 0,54 | | | | | | 95 |
| CH | Switzerland | | | | | | | |
| DE | Germany | 0,61 | | | | 0,06 | | 95 |
| FR | France | 0,46 | | | | -0,08 | | 95 |
| CH023 | Solothurn | | | | | | | |
| CH025 | Jura | | | | | | | |
| CH031 | Basel-Stadt | | | | | | | |
| CH032 | Basel-Landschaft | | | | | | | |
| CH033 | Aargau | | | | | | | |
| DE121 | Baden-Baden, Stadtkreis | 0,66 | | 0,05 | | 0,11 | + + | 95 |
| DE122 | Karlsruhe, Stadtkreis | 1,39 | | 0,78 | | 0,84 | + + | 95 |
| DE123 | Karlsruhe, Landkreis | -0,22 | | -0,83 | | -0,77 | - - | 50 |
| DE124 | Rastatt | -0,28 | | -0,88 | | -0,82 | - - | 50 |
| DE131 | Freiburg im Breisgau, Stadtkreis | 0,79 | | 0,19 | | 0,25 | + + | 95 |
| DE132 | Breisgau-Hochschwarzwald | -0,73 | | -1,34 | | -1,28 | - - | 20 |
| DE133 | Emmendingen | -0,66 | | -1,27 | | -1,21 | - - | 20 |
| DE134 | Ortenaukreis | -0,10 | | -0,70 | | -0,64 | - - | 80 |
| DE139 | Loerrach | -0,40 | | -1,01 | | -0,94 | - - | 50 |
| DE13A | Waldshut | -0,66 | | -1,27 | | -1,20 | - - | 20 |
| DEB33 | Landau in der Pfalz, Kreisfreie Stadt | 0,66 | | 0,06 | | 0,12 | + + | 95 |
| DEB37 | Pirmasens, Kreisfreie Stadt | 0,71 | | 0,10 | | 0,17 | + + | 95 |
| DEB3E | Germersheim | -0,98 | | -1,59 | | -1,53 | - - | 20 |
| DEB3H | Suedliche Weinstraße | -0,74 | | -1,34 | | -1,28 | - - | 20 |
| DEB3K | Suedwestpfalz | -1,27 | | -1,88 | | -1,82 | - - | 5 |
| FR421 | Bas-Rhin | -0,03 | | | -0,49 | -0,57 | - - | 80 |
| FR422 | Haut-Rhin | -0,24 | | | -0,70 | -0,78 | - - | 50 |

Table V.38: Economic development indices of the NUTS3 units of the CBA

The explanatory capacity of this regression is significantly higher than that of the previous factors. The coefficients, once again, show a significant relation with most of the factors of the territorial profile. The overall picture from the coefficients is a positive effect from factors related to location and R&D (Factors 1 and 2). It is also interesting to see that the central location explains much more of different economic development levels than the investment in R&D. Similar conclusions can be drawn from the highly negative coefficient of the indicator related to rurality (Factor 9) meaning that, on themselves, density and central location seem to be more important than research and innovation. The weight of the construction sector is also considerably negative, probably meaning that, at a certain stage, high economic development is more linked to a strong service sector than infrastructural development.

| Regression Statistics | |
|---|---|
| Multiple R | 0,824258 |
| R Square | 0,679401 |
| Adjusted R | 0,676659 |
| Standard Error | 0,568631 |
| Observations | 1298 |

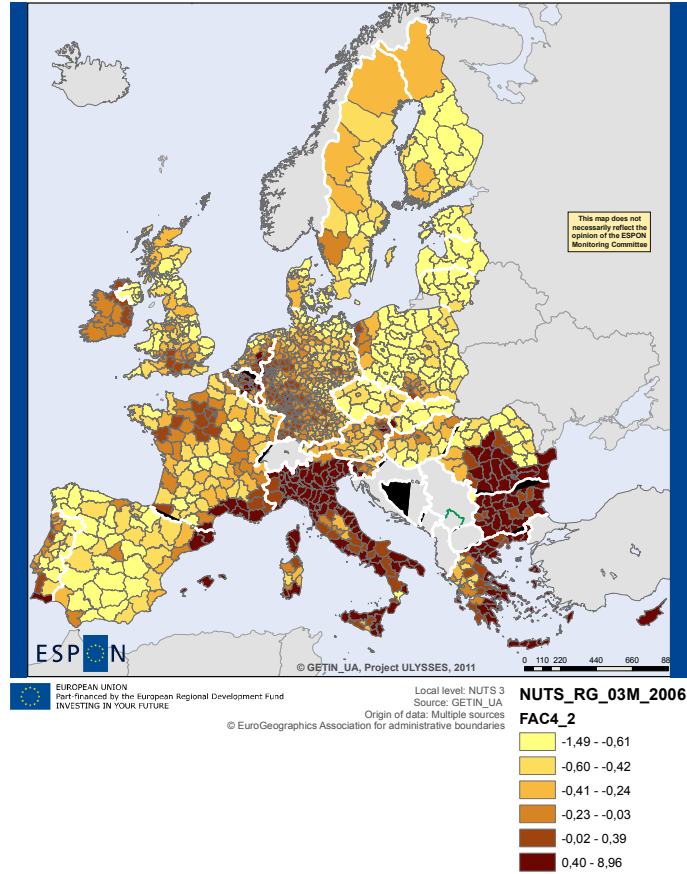| | Coefficients | Standard | t Stat | P-value | Lower | Upper | Lower | Upper |
|---|---|---|---|---|---|---|---|---|
| Intercept | -1E-07 | 0,01578 | -7,1E-06 | 0,999994301 | -0,0310 | 0,0310 | -0,0310 | 0,0310 |
| FAC1_1 | 0,4545 | 0,01579 | 28,78786 | 4,4844E-141 | 0,4236 | 0,4855 | 0,4236 | 0,4855 |
| FAC2_1 | 0,1623 | 0,01579 | 10,27749 | 7,24251E-24 | 0,1313 | 0,1932 | 0,1313 | 0,1932 |
| FAC3_1 | 0,0837 | 0,01579 | 5,303401 | 1,33687E-07 | 0,0528 | 0,1147 | 0,0528 | 0,1147 |
| FAC4_1 | 0,0844 | 0,01579 | 5,348225 | 1,05025E-07 | 0,0535 | 0,1154 | 0,0535 | 0,1154 |
| FAC5_1 | 0,1545 | 0,01579 | 9,785094 | 7,39012E-22 | 0,1235 | 0,1855 | 0,1235 | 0,1855 |
| FAC6_1 | 0,0372 | 0,01579 | 2,356502 | 0,018597296 | 0,0062 | 0,0682 | 0,0062 | 0,0682 |
| FAC7_1 | 0,1029 | 0,01579 | 6,518061 | 1,02027E-10 | 0,0719 | 0,1339 | 0,0719 | 0,1339 |
| FAC8_1 | -0,3541 | 0,01579 | -22,4252 | 2,83549E-94 | -0,3851 | -0,3231 | -0,3851 | -0,3231 |
| FAC9_1 | -0,5195 | 0,01579 | -32,9051 | 8,784E-173 | -0,5505 | -0,4886 | -0,5505 | -0,4886 |
| FAC10_1 | -0,0122 | 0,01579 | -0,7752 | 0,438363708 | -0,0432 | 0,0187 | -0,0432 | 0,0187 |
| FAC11_1 | -0,0321 | 0,01579 | -2,03075 | 0,042485717 | -0,0630 | -0,0011 | -0,0630 | -0,0011 |

Table V.39: Economic development regression

## 7.13 Pollution (FAC4_2)

The significant variable of this factor is ozone concentration exceedance. The ozone concentration is related to a photo chemical reaction of pollutants and depends on the presence/absence of heavy industries, traffic levels, sun exposure but also on wind conditions. This means that emissions in one place can affect neighbouring regions, and that high emission in southern countries will lead to higher ozone levels than in northern countries and that favourable wind conditions can lead to low levels in regions with high emissions and vice-versa. Therefore, a regression analysis of this indicator with the context factors has necessarily a very limited explanatory capacity and can lead to relations that lack any evident logic if the atmospheric conditions are not taken into account. Although the map shows as some overall tendencies, the regression analysis shouldn't be taken into account.

There also seem to be some discrepancies on the way it is measured in different countries, as it is not plausible that there are so clear cuts on some borders, such as can be seen in Ireland.

The CBA shows relatively high scores regarding pollution. This can derive from the high density of this region as well as being a major European corridor for passenger and freight, hence increasing emissions from transport.

Figure V.39: Category map of the factor pollution in Europe

| NUTS code | NUTS name | FAC4_2 | | | | | Country /CBA country level | Percentil e all NUTS 3 |
|---|---|---|---|---|---|---|---|---|
| | | Scores | Country comparison (weighted NUTS 3 average) | | | | | |
| | CS1 | | Ch | DE | FR | All CBA countries | | |
| All | Weighted average of CBA countries | -0,08 | | | | | | 80 |
| CH | Switzerland | | | | | | | |
| DE | Germany | -0,12 | | | | -0,03 | | 80 |
| FR | France | -0,04 | | | | 0,04 | | 80 |
| CH023 | Solothurn | | | | | | | |
| CH025 | Jura | | | | | | | |
| CH031 | Basel-Stadt | | | | | | | |
| CH032 | Basel-Landschaft | | | | | | | |
| CH033 | Aargau | | | | | | | |
| DE121 | Baden-Baden, Stadtkreis | 0,01 | | 0,12 | | 0,09 | + + | 80 |
| DE122 | Karlsruhe, Stadtkreis | 0,23 | | 0,34 | | 0,31 | + + | 80 |
| DE123 | Karlsruhe, Landkreis | 0,00 | | 0,11 | | 0,08 | + + | 80 |
| DE124 | Rastatt | 0,11 | | 0,23 | | 0,19 | + + | 80 |
| DE131 | Freiburg im Breisgau, Stadtkreis | 0,21 | | 0,33 | | 0,29 | + + | 80 |
| DE132 | Breisgau-Hochschwarzwald | 0,02 | | 0,14 | | 0,11 | + + | 80 |
| DE133 | Emmendingen | 0,04 | | 0,16 | | 0,12 | + + | 80 |
| DE134 | Ortenaukreis | -0,06 | | 0,05 | | 0,02 | + + | 80 |
| DE139 | Loerrach | 0,15 | | 0,27 | | 0,23 | + + | 80 |
| DE13A | Waldshut | 0,13 | | 0,25 | | 0,21 | + + | 80 |
| DEB33 | Landau in der Pfalz, Kreisfreie Stadt | -0,08 | | 0,03 | | 0,00 | - + | 80 |
| DEB37 | Pirmasens, Kreisfreie Stadt | -0,23 | | -0,11 | | -0,14 | - - | 80 |
| DEB3E | Germersheim | 0,35 | | 0,47 | | 0,43 | + + | 95 |
| DEB3H | Suedliche Weinstraße | -0,13 | | -0,01 | | -0,05 | - - | 80 |
| DEB3K | Suedwestpfalz | 0,00 | | 0,11 | | 0,08 | + + | 80 |
| FR421 | Bas-Rhin | -0,31 | | | -0,27 | -0,23 | - - | 50 |
| FR422 | Haut-Rhin | -0,14 | | | -0,11 | -0,06 | - - | 80 |

Table V.40: Pollution indices of the NUTS3 units of the CBA

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