Understanding the potential role of spatial typologies in responding to the RURAGRI Call

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1. Introduction

A critical barrier to mutual learning between areas at EU, national and local scales is the limited consideration of geographic context and, specifically, the identification and classification of similarities and dissimilarities between areas. Spatial typologies are widely used to describe patterns of spatial variance associated with social, economic and environmental or ecological processes. A typology can be defined as a classification of individual units in a set of categories that are useful for a particular purpose (Blunden et al., 1998). In addition, typologies serve as a means of evaluating a number of different indicators in an integrated manner based on the identification of

spatial interlinkages (Andersen et al., 2007). Their power to synthesize information makes them particularly useful in identifying areas confronting similar challanges and opportuities as well as supporting design and evaluation of territorial targeted policies (Andersen, 2007; Copus et al., 2011).

A significant body of literature has developed concerned with the creation of typologies (Ballas et al., 2003; Copus et al., 2008). Much of this research focuses on capturing the variation in the spatial distribution of indicators associated with a single or a limited set of issues. Differences in the degree of accessibility, natural resources and human capital, the socioeconomic structure, networking capacity and land use patterns, among other factors, have been used to identify and describe different 'types' of regions. Much of this literature is associated with the work of European researchers in general and of the European Spatial Planning Observatory Network (ESPON) in particular.

The collation of statistical data by EUROSTAT, the EU statistical agency, facilitated the creation of increasingly complex typologies. This work is complimented by the activities of ESPON which championed the development of internationally comparative spatial datasets. It was the 'territorial turn' within EU policy discourses, however, that propelled typologies from simple descriptions of spatial patterns to their use as tools in policy design and evaluation. The development of ESPON closely parallels the emergence of political concerns associated with patterns of socio-economic development within the EU during the late 1990s. These cantered on the concentration of socio-economic development within a core area known as the pentagon and the underdevelopment of peripheral regions. The territorial turn resulted

in greater emphasis within policy planning processes of the heterogeneous nature of spatial patterns of development. The most obvious example of this is the Territorial Agenda 2020 (TA2020) which was ratified in 2011 and seeks to provide a framework to support enhanced territorial cohesion within the EU. The territorial turn has permeated beyond flagship initiatives, i.e. TA2020, as evidenced by the reflection within the European Research Area (ERA) joint programming initiative of the need to distinguish between place specific results and those that are generic to a number of different places (Reference). To date, relatively little consideration has been given by ERA Networks to this issue yet it is one of fundamental importance. ERA Networks comprise thematic groups of policy stakeholders and researchers that are tasked with the development of a joint research call to be funded from national, as opposed to EU, sources. The rationale underpinning the funding of these networks by the EU stems from the need for enhanced co-ordination and co-operation amongst members leading to reduced duplication and fragmentation of effort and, therefore, increased research capacity.

Spatial typologies are potentially useful to ERA Networks in that they can support the identification of areas across the EU confronting similar challenges. This knowledge can enable research funding agencies in different places to co-ordinate their activities. It also allows researchers to identify other areas across Europe that are similar to those that they are studying. As typologies classify areas in accordance with selected indicators they are also useful in establishing evaluating whether research is being undertaken within similar socio-spatial or environmental contexts. This, of course, has positive implications with regard to the transferability of research findings between places.

In this paper we seek to explore the potential of spatial typologies to support enhanced research co-ordination and co-operation within the EU. We first provide a brief overview of the evolution of spatial typologies before outlining a typology selection framework developed by the European Network for Rural Development (ENRD). By way of example, we apply this framework to the identification and selection of typologies relevant to the work of the RURAGRI ERA Network.

2. Spatial Typologies: An Overview

Spatial typologies, of which there are many, offer the potential to enhance understanding amongst researchers - from across the social and environmental sciences, evaluators and practioners by foregrounding the significance of place within a broader geographic context. A well-constructed typology offers the potential to identify what is particular about a place and, more importantly in terms of research collaboration, highlighting similarities and differences in the spatial context, including the social, economic and environmental systems linking places, within which research is undertaken. The development of typologies can be linked to the very foundation of geography as a discipline whereupon the focus was on the interrelations between physical environments and human activity. The development and adoption of new techniques and their associated enabling technologies, particularly Geographic Information Systems, has resulted in resurgent interest in the development of typologies. Within the European context, this fits within a wider political context, as outlined above, and the construction of comparative, international spatial datasets by EUROSTAT and ESPON.

The development and definition of typologies is primarily driven by the specific objectives and needs of the research project associated with this activity (Öğdül 2010, p. 1522). Whilst this has led to the creation of a multiplicity of typologies, a small number have been widely adopted, e.g. the OECD (1994) typology of rural regions and the more recent updating of this typology by Dijkstra and Poelman (2008). There are however numerous other typologies that have been exclusively applied for the specific purpose for which they were created, i.e. within the ESPON 2006 and 2013 programmes there are more than 40 different typologies of European regions.

Conventionally, typologies drew upon a limited number of indictors to describe and classify regions, most using one or two, at most, criteria applied at the NUTS 3 scale. The OECD typology referred to above uses population density to classify regions. These typologies cover a wide range of issues, e.g. migration, population density, demography, economic performance, vulnerability to climate change, territorial sensitivity to EU policies, etc. In addition to the ESPON, the Institute for Prospective Technological Studies (IPTS) has supported the development of a wide range of typologies of rural areas. These seek to assess and understand the spatial impact of European policies in different types of rural regions. For an extensive review of typologies by other authors and their potentiality of application in the EU see Ballas et al. (2003), Copus et al. (2008) or ENRD (2010). One of the fundamental criticisms of these types of classification systems is their reductionist quality; that is, an overdependence on single indicators to categorise space. This results in a failure to consider the complexity or diversity of interactions between social, economic and environmental drivers of change and their implications. The unsuitability of such

single criteria typologies to reflect the multi-dimensional diversity of Europe was highlighted in the European Spatial Development Perspective (EC 1999). This has given impetus to on-going efforts to combine more than two criteria within a single typology. The objective of these initiatives is to create more nuanced descriptions of space and improve understand of spatial differentiation demanded by contemporary research and policy needs, for which classifications based on a single criteria are insufficient (Politecnico di Milano (1999); Ballas et al. (2003); ESPON (2004) (2010) (2011a); Scholz (2009); Weingarten et al., (2010). Despite significant deployment of resources in this area, a number of thematic issues, particularly those associated with socio-economic development, continue to present challenges to the development of classification systems. This largely explains the current absence of consensus on a single typology for European rural areas (Öğdül 2010, p. 1522). There is however ongoing research that is attempting to overcome this issue, i.e. ESPON (2011b) *Typology Compilation*.

3. The RURAGRI ERA-NET

RURAGRI is an ERA-NET supported by the European Commission under the 7th Framework Programme. It aims, through enhanced cooperation between 20 partner countries and greater coordination of their national research programmes, to better understand the processes shaping interactions between agricultural production, other rural land uses and the broader rural economy. This goal reflects the increasing orientation of agriculture policy towards improving ecological practices and the provision of public goods, supporting the economic viability of rural areas and contributing to sustainable development. The approach adopted by the Network

recognises the diversity of rural areas in Europe in terms of their opportunities, challenges and potential. This perspective also accepts that the economic and social dynamics of rural areas are increasingly influenced by interrelations between places, particularly those linking urban and rural areas.

Currently, research on agriculture and rural development is largely developed and funded at the national level and is, consequently, highly fragmented. The primary objectives of the RURAGRI ERA-NET include; a) the development of a strategic research agenda (SRA) agreeable to the 20 participating partners, and b) to implement the SRA through the funding of selected research priorities identified within the SRA thereby enhancing co-operation between member states and collaboration between research institutes. It is envisaged that the results of this research will support the development of spatially targeted policy initiatives.

The RURAGRI SRA recognises and emphasises the extent and significance of spatial variation in socio-economic and natural conditions throughout Europe. In line with a number of key EU policy documents, most notably the Territorial Agenda 2020, this diversity is considered an important asset for balanced social and economic development. The SRA identifies three priority themes in which trans-disciplinary research is required: ecosystem services and public goods, socio-economic development, and land use management. The research associated with these priority areas takes into consideration a number of crosscutting issues concerned with rural diversity, rural-urban relationships, and governance. Taken together, the priority themes and cross-cutting issues recognise the significance of place and the integration of places through social, ecological and governance systems.

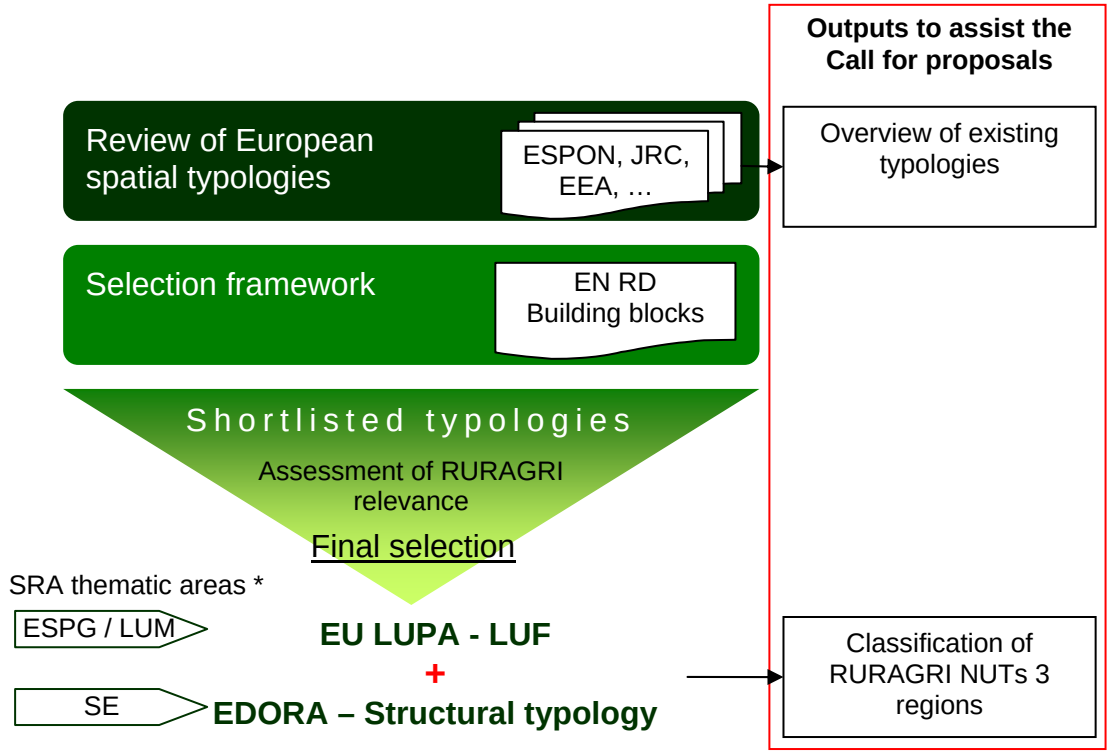
Spatial typologies have traditionally been used to identify regions that face similar challenges. Their use can however be extended to support the pre-selection, that is at the research design phase, of study areas, i.e. these might include places confronting similar challenges in different countries and hence with different governance frameworks or they might be areas that share similar endowments of natural resources but have different levels of socio-economic development. In the next section we explore the identification and selection of two typologies that could inform the development of research associated with the RURAGRI research priorities as set out in the SRA.

4. Selecting an Appropriate Typology

There is no single typology that can be considered perfect. There are however, many typologies that have been developed over the past decade. Several of these could be applied by researchers engaged in international comparative research, such as that envisaged within the RURAGRI Call. Two typologies that could inform the development of research associated with the RURAGRI research priorities have been identified; a typology to assist research on Ecosystem goods and public services and land use management (EU-LUPA's Land Use Functions) and assisting research on Socio-economic development (The EDORA Structural typology). Consortia responding to the Call may conclude that these typologies are insufficient to their needs and choose to use an alternative spatial classification system; this is entirely acceptable.

A two-stage process was applied to the selection of an appropriate typology. An initial identification of typologies was undertaken followed by an evaluation of their relevance to the RURAGRI priorities using a typology development framework designed by the European Network for Rural Development. The focus of this research was on identifying typologies that were developed or applied to European countries. This ensured that the regional classification associated with the selected typology is readily available to each of the RURAGRI partners and, indeed, the wider European community of researchers and research funding bodies.

Figure 1 synopsises the process leading to the selection of two typologies to support RURAGRI call for proposals.



* ESPG: Ecosystem services / public goods; LUM: Land use / management; SE: Socio-economic development.

The first phase consisted of a review of regional typologies that have recently been developed or applied to the European context. We focused on the extensive work

associated with the ESPON 2006 and 2013 programmes that resulted in the production of a spatial typology. Forty six typologies were identified and classified, for the purposes of this research, accordingly to their main topic of interest, e.g. accessibility, population and demography, economic performance etc. Once the 46 typologies were classified, they were screened on the basis of whether they provided a classification of different types of rural region, i.e. reflected rural diversity within Europe. Because these typologies generally limit themselves to addressing one or two topics, they provide easy-to-understand classifications. Whilst most of the 46 typologies have been applied to a large number of EU countries at NUTS 2 or 3 level, many fail to reflect the complex diversity of European regions. Within the 46 typologies there is however a subgroup of spatial classification systems that attempt to go beyond univariate analysis and incorporate a wider range of variables and thereby reflect greater levels of spatial complexity and EU regional diversity. These classifications are, invariably, less straightforward given that they are attempting to summarizes or synthesise complex spatial processes.

The second phase in the selection process involved the application of a framework to assist the identification of suitable typologies that address RURAGRI topics of interest, namely rural economic development, land use management and public good / ecosystem services. The European Network for Rural Development have developed a framework that can guide the development of new typologies. The objective underpinning this 'framework' is to assist define a typology according to need or purpose. Given the ENRD's purpose, to support national rural development networks in each EU member state, it is unsurprising to find that the emphasis is on the national or regional level rather than at the international scale. The purpose of this initiative

and tool is to facilitate improved targeting of rural development supports (ENRD 2010, p. 112-114). The ENRD approach typology development from the perspective of, firstly, defining which areas are rural and subsequently classifying these according to the primary purpose of a rural development programme or initiative, i.e. overcoming physical handicaps, identifying environmentally sensitive areas and supporting socio economic development. These three 'building blocks' or core thematic areas form the focus of the classification system. Associated with each building block are a number of primary indicators or 'key factors' that can inform the initial construction of a typology (Table 1). Additional indicators can be included, where the need arises, in order to ensure the typology reflects the locational, social, economic and environmental characteristics of the country or region in question and it meets the needs of those responsible for the design or delivery of rural development initiatives.

Table 1 Building Blocks for a Revised Typology of Rural Areas

Building Blocks	**Factors**
Rural Definition	Population Density
	Urban Areas (Size / Functions)
	Land Use
Physical / Locational	Physical Handicap
Environmental	Environmental Sensitivity
Socio-economic	Demography
	Socio-economic problems
	Economic structure
	Access to urban services/economies

Source: ENRD 2010: 112.

A critical question arises regarding the use of this framework to develop new typologies given the very large number of generic and topic specific typologies that have been developed in the past decade through the ESPON and IPTS programmes.

Rather than use this framework to develop a new typology, we use it to identify, from the list of 46, typologies appropriate to the needs of RURAGRI, i.e. that reflect the three research priorities outlined in the SRA, i.e. land use, ecosystem good and socio-economic development. Whilst this could conceivably lead to the identification of three individual typologies reflecting each of the priority topics, the close interrelationships between land use and ecosystems necessitates that only two typologies be selected.

There are clear parallels between two of the building blocks outlined in the ENRD framework and the RURAGRI priorities. The incorporation of land use within the basic definition of rural areas speaks to the needs of the priority topics associated with land use and ecosystem goods / public services. It is conceivable that these issues could also be considered from the perspective of 'Environmental Challenges. This however positions environmental sensitivities as being paramount in shaping development initiatives rather than being considered a potential outcome from land use / land management practices. A typology based on land use can assist in the identification of regions, amongst those RURAGRI partners with an interest in this area, with similar characteristics and, potentially, similar ecosystem services and public goods. The third building block, 'socio-economic ', directly associates with the priority topic 'socio-economic development'. Here too, a complementary typology concerned with the economic structure of regions can contribute to the identification of regions that are following similar development trajectories.

From the 46 typologies identified above six were found to match the needs, in terms of their thematic focus, of the RURAGRI SRA. The main characteristics of the

shortlisted land use and economic structure based-typologies, and their suitability in terms of spatial coverage, scale, disaggregation and topic-related are summarised in Table 2.

Within the shortlisted typologies related to land use, EU-LUPA's Land Use Functions typology goes one step further in the land use/cover classification to specifically address ecosystem services and public goods. This typology defines six Land Use Functions (LUFs) that summarize the public goods and services that are provided by a particular combination of land uses and socio-economic factors. There are, however, a number of other typologies that researchers responding to the RURAGRI Call could consider.

Table 2. Shortlisted typologies

		Spatial coverage	Spatial scale	Thematic disaggregation	Topic – related
	Typology / Author (year)	No. RURAGRI countries excluded	NUTs 3 suitability	No. of classes	Relevance to RURAGRI
Land use	Dominant landscape types of Europe / EEA (2005)	2 (IL, TR)	Needs aggregation	5	Medium
	Rural Typology / JRC-IES (2009)	3 (CH, IL, TR)	NUTs 3	2 intermediate / 2 rural	Low
	Land Use Functions / EU-LUPA, ESPON (2012)	1 (IL)	NUTs X	6 LUF	High
Economic structure	Disaggregative typology / FERP, Ballas et al. (2003)	10 (CH, CY, DN, HU, IL, LT, LV, PL, SI, TR)	NUTs 3	25	Medium-Low
	Rural Areas in Europe / RUFUS (2009)	12 (AT, BE, CH, CY, DN, ES, IE, IL, LT, LV, SI, TR)	NUTs 3	4	Medium
	Structural typology / EDORA, ESPON (2011)	1 (IL)	NUTs 3	4	Medium-High

Regarding the economic structure, we have identified three that are highly relevant to RURAGRI. Of these we have selected the structural typology that was developed as part of the EDORA project, which was funded by the ESPON 2013 programme. It is

particularly relevant for RURAGRI because it has an emphasis on the role of the agricultural sector. It distinguishes regions with an agrarian profile and others where agriculture activities are below the EU average but where the environmental public goods play a strong role in the economy (consumption countryside). It also provides two more categories for more diversified rural regions (secondary sector / private services). In addition, its extensive spatial coverage includes almost all RURAGRI countries (with the exception of Israel).

4.2. The selected typologies

The following sub-sections describe the EU LUPA and EDORA typologies and their relevance to RURAGRI.

4.2.1. A typology to assist research on Ecosystem goods and public services and land use management: EU-LUPA's Land Use Functions: Perez-Soba et al. (2008) developed the concept of Land Use Function (LUF) as a means of summarising the private and public goods and services provided by different land uses. This adds a socio-economic dimension to the mostly environmental perspective of dominant land use typologies. They defined a set of LUFs in which both tangible (mainly bio-physical characteristics) and intangible elements of the landscape are combined to provide a particular good or service that mainly (but not strictly) deals with one sustainability pillar (society, economics and environment). A particular combination of land use and socio-economic features may serve different functions, thus LUFs may overlap within a single region. The focus of this approach is on identifying the

dominant LUF/LUFs within a region in order to highlight both opportunities and challenges.

The typology overlays three layers of information (land cover composition, land cover change and social and economic characteristics) and specifically addresses the private and public goods and services available in each region. Multicriteria analysis was used to combine environmental and socioeconomics indicators. The final typology classifies NUTs X[1] regions accordingly to the land use functions described in table 3.

Table 3. The six Land Use Functions in EU-LUPA

Sustainability dimension	LUF	Land use functions	Issues included
Mainly societal	LUF1	Provision of work	Employment provision for all in activities based on natural resources.
	LUF2	Provision of Leisure and recreation	Recreational and cultural services, including cultural landscapes and green spaces in urban areas.
Mainly economical	LUF3	Provision of food and energy	Land-dependent production of food, timber and biofuels.
	LUF4	Provision of housing and transport and energy infrastructure	*Building of artificial surfaces*: settlements (residential areas, offices, industries, etc.), transport infrastructure (roads, railways, airports, harbours) and *Land-independent production*: energy infrastructure (wind and solar energy parks, etc.).
Mainly environmental	LUF5	Provision of abiotic resources	Regulation of the supply and quality of air, water and minerals.
	LUF6	Provision of biotic resources	Factors affecting the capacity of the land to support biodiversity (genetic diversity of organisms and habitats).

Source: (ESPON 2011ca, p. 21-22).

The interest of this typology is twofold. On the one hand, it constitutes an extraordinary input for the objective of RURAGRI of identifying the ecosystem goods

[1] In order to alleviate the Modifiable Areal Unit Problem (MAUP), results of this typology are delivered at NUTS X level. This is a combination of NUTs 2 and NUTs 3 units resulting in a dataset with a reduced variation in the size of the spatial units.

and services in different rural areas. On the other hand, even providing information aggregated at NUTs X level, it reflects the complex intra-regional reality. These refined results allow us to identify similar regions in different countries with similar internal composition rather than average values.

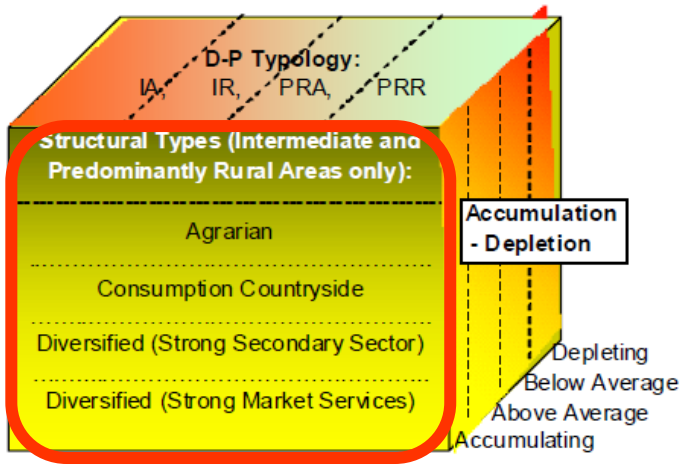
The information that is currently available is the overlay of layers one and two (land use composition and land use change). The description of the clusters provides useful information on the land change processes that these regions are recently facing. The final typology, which is due to be available in June 2012, will provide information of the ecosystem goods and public services available in each type of region.

Further information regarding this typology is available from this website:

http://www.espon.eu/main/Menu_Projects/Menu_AppliedResearch/EU-Lupa.html

4.2.2. Assisting research on Socio-economic development: EDORA's Structural typology: The EDORA project (ESPON 2011ab) consists on an in-depth study of European rural areas and the challenges and opportunities that they are facing. Rural regions are classified accordingly to three dimensions, thus generating three complementary typologies (EDORA Cube, Figure 2).

Figure 2: The EDORA Cube



Note: IA = Intermediate Accessible, IR = Intermediate Remote
PRA= Predominantly Rural Accessible PRR = Predominantly Rural Remote

Source: ESPON, 2011b, p. 16.

Among them, we are interested in the *Structural typology* because it classifies rural regions accordingly to the structure of their economies. It uses a multicriteria disaggregated approach in which rural regions (once separated from the principal urban regions) are progressively classified as *agrarian*, *countryside consumption*, *diversified secondary sector* and diversified *market services* on the basis of 12 indicators. The variables to build these indicators include employment, touristic infrastructure, access to natural areas, farming style, and GVA (Gross Value Added).

The assumption of this disaggregative typology is that regions showing a high agrarian profile have not developed a strong touristic sector nor a diversified economy. Similarly, consumption regions that do not show an agrarian profile and that are too specialized in the touristic sector have not fully incorporated secondary and private market activities. Contrary, areas with strong private services sector do not have a high representation of the previous activities (secondary sector, tourism and agriculture) because they are sufficiently diversified; and regions with strong

secondary sector may have scarce private sector activities but their economy is also diversified.

This typology permits the identification of rural regions with different development potential, which allows the identification of areas where some sectors need to be activated in accordance with the ecosystem good and services available, the relation with urban areas, and the potential competing demands between land uses and intensities as identified with the land use typology.

Further information regarding this typology is available from this website:

http://www.espon.eu/main/Menu_Projects/Menu_AppliedResearch/edora.html

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