



**System for Environmental and Agricultural Modelling;
Linking European Science and Society**

Regional typologies of farming systems contexts

Andersen, E.

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Email: seamless.office@wur.nl
Internet: www.seamless-ip.org

Authors of this report and contact details:

Name: Erling Andersen
Address: Rolighedsvej 23, 1958 Frederiksberg C, Denmark
E-mail: eran@life.ku.dk
Partner acronym: UoC

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Objective within the project

The objective of this report is to develop a typology of the regions of EU-25 that captures the huge variety of farming systems within this territory. The aim of the typology is to provide a context to assess changes in agricultural and environmental policies.

General Information

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Executive summary

This report describes the elaboration of a typology of agricultural regions of EU-25. The work builds upon previous work in SEAMLESS on a typology of farming systems and on the allocation of these systems at sub-regional levels. The regions are in this report typified by analysing the regional distribution of the SEAMLESS farm types. This is done in steps: Firstly the regions are typified based on cluster analysis for each of the three dimension of the farm typology: Farm size, intensity and specialisation/land use. Secondly, the three dimensions are combined into one typology of agricultural regions including all combinations of the three dimensions. The results of the different clusters and the final typology are described and the regional distribution is presented on maps.

1 Introduction

The objective of this report is to develop a typology of the regions of EU-25 that captures the huge variety of farming systems within this territory. The aim of the typology is to provide a context to assess changes in agricultural and environmental policies.

The work presented in this report builds on previous work in SEAMLESS on a typology of farming systems and the allocation of farm types to sub-regional spatial levels.

In the SEAMLESS project a typology of farming systems have been develop to facilitate the integrated assessments within the project. The typology consists of three dimensions:

- Size: Measured as the economic size of farms
- Intensity: Measured as the total output in Euro per ha
- Combined specialisation: Measured as the standard gross margins from different types of crops and livestock, and land use: Measured as the proportion of the agricultural area covered by specific types of crops.

The typology is described in depth in Andersen et al, (2006) and Andersen et al, (2007).

In a second phase of the work the farm types identified in the typology of farming systems were allocated in space. This means that the information provided for administrative regions in FADN were linked to sub-regional homogenous biophysical units. These so called agri-environmental zones are described in detail in Hazeu et al, (2006) and Hazeu et al, (2009). The exact result of the allocation of the farm types to agri-environmental zones is information on the total area a specific farm type manages within a specific agri-environmental zone. The work on the spatial allocation of farm types is described in detail in Elbersen et al, (2006).

Additional information on the structure of the SEAMLESS database used for the analyses in this report can be found in Janssen et al, (2009).

For the work in this report the data on allocation of the farm types in agri-environmental zones have been aggregated to NUT2 regions¹, which is the spatial level for defining the regional typologies in SEAMLESS. This means that the data used for the analysis in this report have been disaggregated from the 123 so called FADN regions in the original data to the 211 NUTS2 regions used in SEAMLESS.

The approach taken in the work presented in this report includes the following steps:

1. The share of the area of the NUTS2 regions managed by the different types of farms is calculated for each of the three dimension of the typology.
2. For each dimension of the typology the regions are clustered according to the results of step 1. It was a precondition of this step to keep the number of cluster relatively low, so it was decided in advance to have 3 clusters for size, 3 clusters for intensity and 5 clusters for specialisation/land use. As the number of cluster were predefined partitionial clustering (K-means, Euclidean distance) were chosen for the analysis.
3. After having defined the cluster statistics (average, minimum and maximum values and standard deviation) were calculated. Also diagrams were constructed to illustrate the differences between the identified clusters.

¹ In United Kingdom NUTS1 level regions are used.

4. Finally, the results for each of the three dimensions of the farming systems typology were combined into the typology of agricultural regions. This was done simple by combining the clusters from the individual dimensions including all occurrences of combinations.

2 The size dimension of the typology

The size of a farm is an important dimension in relation to economic as well as social aspects of farming. Small farms, with or without additional income from other sources than farming, often react differently to policy measures and/or market changes than larger farms and might, in many cases, contribute to the viability of rural areas in other ways than the larger farms.

In the SEAMLESS typology we have chosen the same approach for defining the size of farming as used by EUROSTAT and the EU: The so called European size units that are based on regional standards for the value of the output of agricultural products. The three different size classes used in SEAMLESS are shown in Table 2.1.

Table 2.1: Types in the size dimension and definitions

Size type	Definition
Small scale	< 16 European size units (ESU)
Medium scale	=> 16 ESU and < 40 ESU
Large scale	=> 40 ESU

The cluster analyses of the regional distribution of farming systems of the different size classes results in three distinct clusters:

- A. Regions with mixed farm size patterns (63 regions)
- B. Regions dominated by small scale farms (46 regions)
- C. Regions dominated by large scale farms (102 regions)

The A-Regions have a mixed pattern of farm sizes with average figures for the share of the area managed by small scale farms of 22%, for medium scale farms 33% and for large scale farms of 45%. (see table 2.2). For the B-Regions the small size farms dominate by managing in average 61% of the agricultural area, the medium scale farms manage in average 24% and large scale farms in average only 15% of the area. Finally, the C-Regions are dominated by large scale farms managing in average 84% of the agricultural area. In average 14% of the area in these regions are managed by medium scaled farms and as little as 2% are managed by small scale farms.

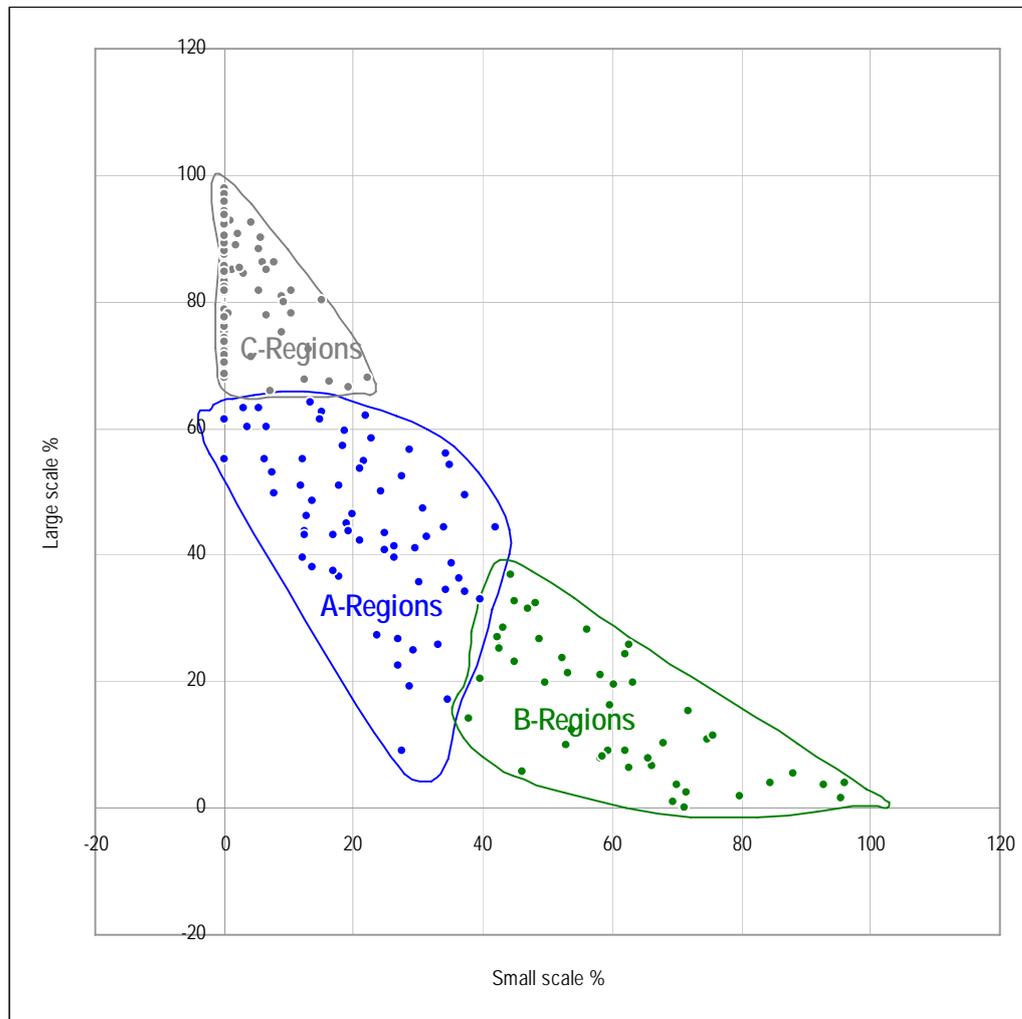
The result of the cluster analysis can also be seen in Figure 2.1, where the clusters are presented for the share of the area managed by small and large scale farms. Also here it is clear that the area managed by small farms is high in the B-Regions and that the share managed by large scale farms is high in the C-Regions. The A-Regions have a mixed pattern with a tendency towards the large scale farms.

Table 2.2: Descriptions of the different clusters of regions according to size dimension

		Share of UUA on small scale farms	Share of UUA on medium scale farms	Share of UUA on large scale farms
A-Regions	Average	22	33	45
	Min	0	10	9
	Max	42	64	64
	SD	10	11	12
B-Regions	Average	61	24	15
	Min	38	0	0
	Max	96	48	37
	SD	15	11	10

C-Regions	Average	2	14	84
	Min	0	2	66
	Max	22	32	98
	SD	4	9	9

Figure 2.1: The clusters of regions according to the size dimension.



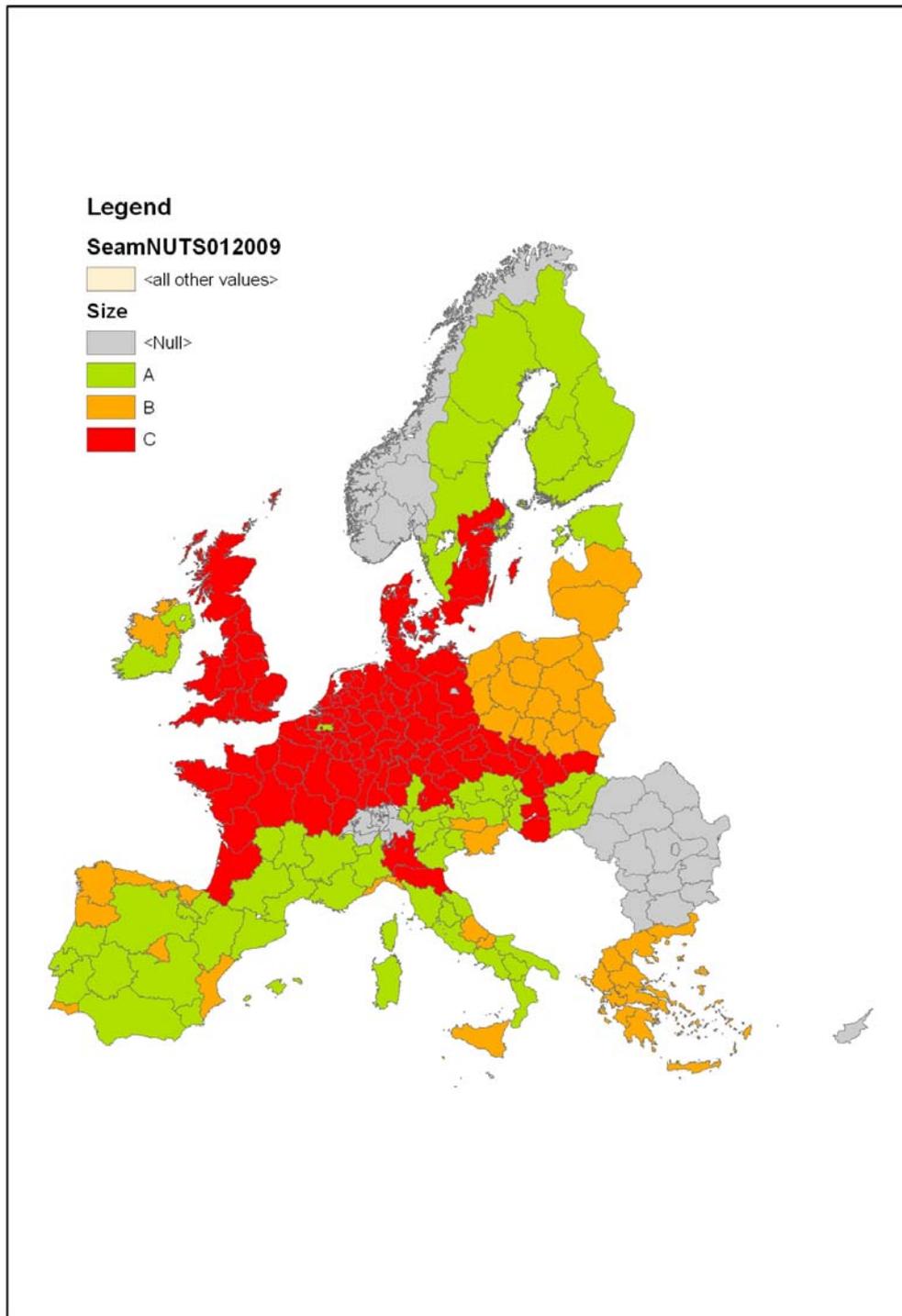
The result of the application of the size dimension of the typology is shown in Figure 2.2.

The A-Regions, the regions with a mixed pattern of farm sizes, dominates in the Southern and Northern parts of the EU-25. To the North all regions in Finland and in Estonia and the Northern regions of Sweden are A-Regions. To the South A-Regions dominate on the Iberian Peninsula, in the Mediterranean part of France, in most regions of Italy, in all of Austria and many regions of Hungary. Finally, the Southern part of Ireland and Northern Ireland are also A-Regions.

The B-Regions, the regions dominated by small scale farms, cover all of Poland, Lithuania and Latvia to the North-East of EU-25 and all of Greece to the South-East. A group of B-Regions are also found in Portugal and Spain on the North-West coast of the Iberian Peninsula. Finally, B-Regions can be found scattered in Slovenia, Italy, Spain, Portugal and Ireland.

The C-Regions, the regions dominated by large scale farms, can be found in the North-Western part of EU-25. All regions of Denmark, the Netherlands and Czech Republic are C-Regions. In Germany, Belgium and United Kingdom all but one regions are C-Regions and the entire North-Western part of France are C-Regions. Finally, C-Regions are found in half of the regions in Hungary, in a few regions in Italy and in the South-Eastern part of Sweden.

Figure 2.2: Map of the type of regions according to the size dimension of the typology



3 The intensity dimension of the typology

The intensity of farming is an important dimension in relation to both the economic output and, especially, the environmental performance of a farm. Farms farming at a low intensity level – low input and normally low yields – are generally likely to have a lower pressure on the environment, than farms farming at a high intensity level.

In SEAMLESS we have chosen to use the economic output per ha as the variable defining the intensity of farming. This enables comparisons across different agricultural sectors (livestock and crops). The thresholds levels between the three classes used in SEAMLESS can be seen in Table 3.1. The threshold values were initially defined for 2003 and have been calculated for other years based on the Producer price index.

Table 3.1: Types in the intensity dimension and definitions per year. The threshold values are adjusted according to PPI (Producer price indices, total agricultural production, deflated)

	Total output per ha, €			PPI 1)
	Low intensity	Medium intensity	High intensity	
1990	< 691	=> 691 and < 4147	=> 4147	134
1991	< 672	=> 672 and < 4031	=> 4031	130
1992	< 618	=> 618 and < 3707	=> 3707	120
1993	< 586	=> 586 and < 3516	=> 3516	114
1994	< 587	=> 587 and < 3521	=> 3521	114
1995	< 590	=> 590 and < 3541	=> 3541	115
1996	< 582	=> 582 and < 3495	=> 3495	113
1997	< 565	=> 565 and < 3393	=> 3393	110
1998	< 539	=> 539 and < 3232	=> 3232	105
1999	< 509	=> 509 and < 3056	=> 3056	99
2000	< 515	=> 515 and < 3093	=> 3093	100
2001	< 528	=> 528 and < 3167	=> 3167	102
2002	< 501	=> 501 and < 3006	=> 3006	97
2003	< 500	=> 500 and < 3000	=> 3000	97
2004	< 487	=> 487 and < 2924	=> 2924	96

Sources: http://europa.eu.int/comm/agriculture/agrista/table_en/agri.htm for 1995 to 2004 and http://epp.eurostat.ec.eu.int/portal/page?_pageid=1996,39140985&_dad=portal&_schema=PORTAL&screen=detailref&language=en&product=Yearlies_new_agriculture&root=Yearlies_new_agriculture/E/E1/E13/eda34064 for 1990 to 1994. The figures for 1990 to 1994 have been slightly adjusted to match for 1995.

The cluster analyses of the regional distribution of farming systems of the different intensity classes results in three distinct clusters:

- A. Regions with a pattern of Medium and High intensity farms (48 regions)
- B. Regions with a pattern of Low and Medium intensity farms (41 regions)
- C. Regions dominated by Medium intensity farms (122 regions)

The A-Regions are characterised by a mixture of medium and high intensity farms. 51% of the agricultural area is managed by medium intensity farms and 45% by high intensity farms. In these regions only 4% of the area is managed by low intensity farms. In the B-Regions a mixture of low and medium intensity farms dominate. 51% of the area is managed by the low intensity farms and 42% by the medium intensity farms. Finally, the C-Regions are dominated by medium intensity farms only. 80% of the agricultural area is managed by medium intensity farms leaving room for low and high intensity farms on respectively 9 and 11% of the area.

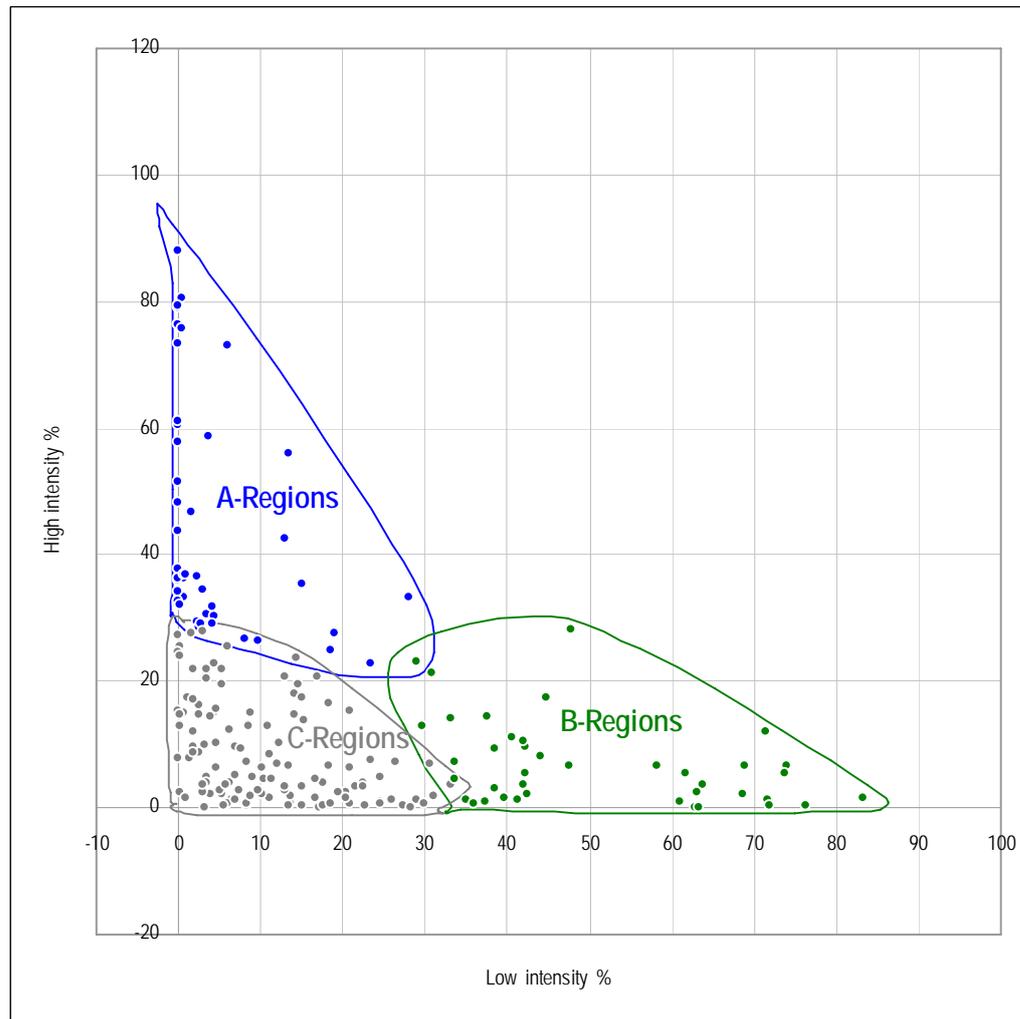
The results of the cluster analyses are also shown in Figure 3.1. The results are in the Figure presented according to the share of the agricultural area managed by low and high intensity farms. As can be seen a high share of the agricultural area in the A-Regions are managed by high intensity farms. In the B-Regions a high percentage of the area is managed by low intensity farms. Finally, the C-Regions are characterised by the fact that neither the high intensity farms nor the low intensity farms in any of these regions manage more than one third of the agricultural area.

Table 3.2: Descriptions of the different clusters of regions according to intensity dimension

		Share of UUA on small scale farms	Share of UUA on medium scale farms	Share of UUA on large scale farms
A-Regions	Average	4	51	45
	Min	0	12	23
	Max	28	69	88
	SD	7	17	18
B-Regions	Average	51	42	7
	Min	29	15	0
	Max	83	64	28
	SD	16	14	7
C-Regions	Average	11	80	9
	Min	0	62	0
	Max	33	98	28
	SD	9	9	8

The result of the application of the intensity dimension of the typology is shown in Figure 3.2. As can be seen the C-Regions, the regions dominated by medium intensity farms, dominates the map with including more than half of the regions. The C-Regions occur in all Member States except in the three Baltic States, Denmark, the Netherlands, Ireland and Portugal. On the other hand Poland and the Czech Republic are the only Member States where all regions are C-Regions.

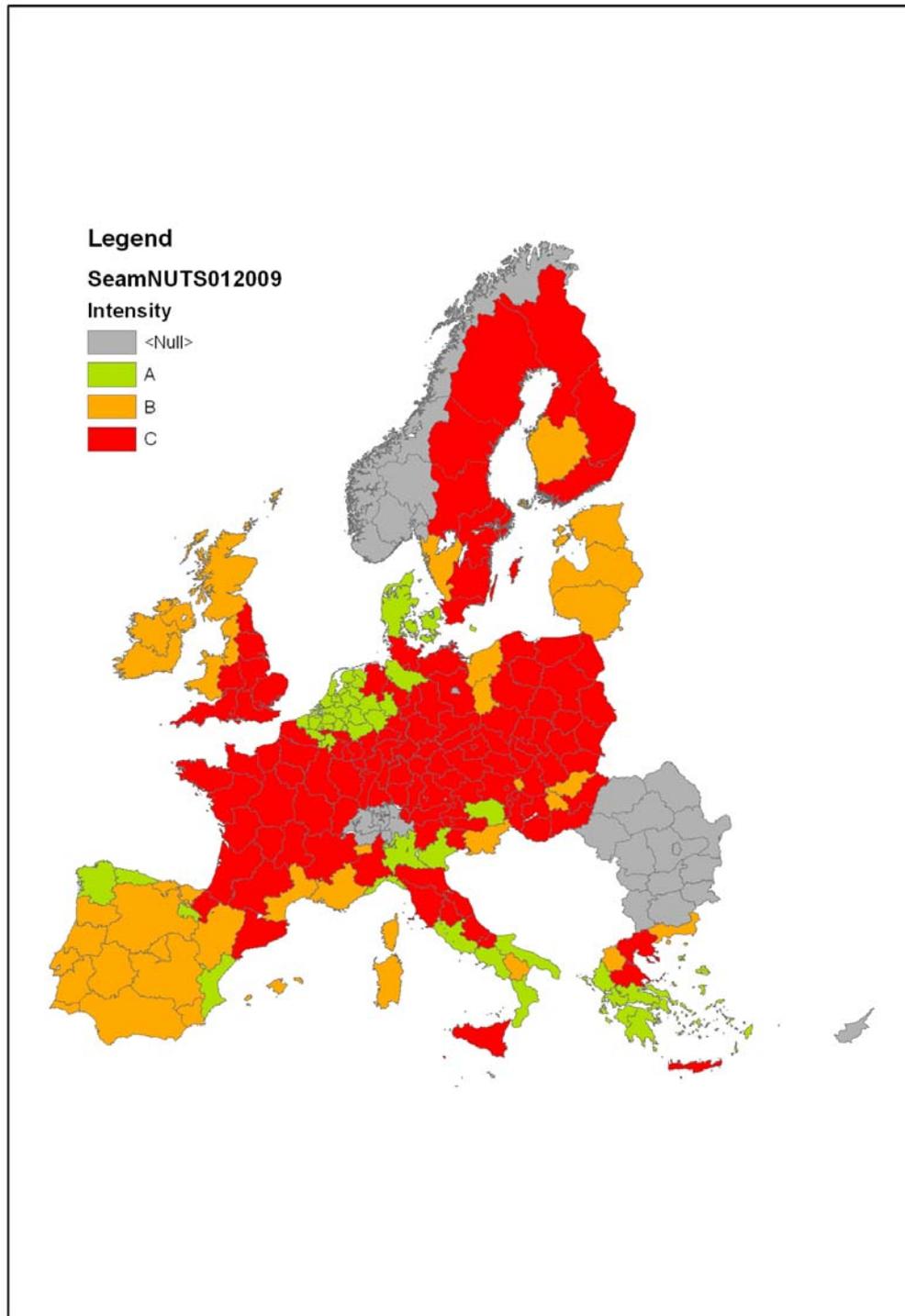
Figure 3.1: The clusters of regions according to the size dimension



The A-Regions, the regions with a mixture of medium and high intensity farms, are found scattered in the EU-25 with the Netherlands and Denmark (only one region) as the only Member States entirely with A-Regions. Other groups of A-Regions can be found in Greece, Southern and Northern Italy and in the North-Western part of Spain. Single regions are found in Slovenia, Germany and Spain.

The B-Regions, the regions where low intensity farms dominate, covers the entire territory of the three Baltic States, Ireland and Portugal. Also the majority of the Spanish regions are B-Regions. Other important groupings of B-Regions can be found in Wales, North-Western England, Scotland and Northern Ireland and along the French coastline to the Mediterranean Sea including Corse. Single B-Regions can also be found in Greece, Italy, Slovenia, Hungary, Slovakia, Poland and Sweden.

Figure 3.2: Map of the type of regions according to the intensity dimension of the typology



4 The specialisation and land use dimension of the typology

The specialisation on agricultural activities is an important characteristic of a farm. The economic performances as well as the likely future choices on management are closely linked to specialisation. To some degree also the environmental impact of farming depends on specialisation – valuable landscapes are more often associated with grazing livestock than with arable farming for example. Also land use is an important issue in relation to especially the environmental impact of farming. For the livestock farms the land use reflects the feeding strategy of the farm ranging from highly intensive arable crops to extensive grasslands. For arable systems it ranges from farms with rotations including fallow as management strategy and mixed farms with a diverse cropping pattern to highly monoculture cereal farms and farms with highly specialised, intensive crops.

In the SEAMLESS typology of farming systems we have chosen to combine these two dimensions into one, where specific differentiations of land use are applied to specific specialisations. For example, for arable farms a differentiation in land use focusing on arable crops is applied, whereas the land use differentiations applied to cattle systems focus on types of grassland.

The 21 different specialisation/land use types in the SEAMLESS typology are shown in Table 4.1. Definitions of the different specialisation types and land use type are included in Appendix 1.

The cluster analyses of the regional distribution of farming systems of the different specialisation/land use classes results in five distinct clusters:

- A. Regions dominated by arable/cereal and mixed farming systems (99 regions)
- B. Regions dominated by permanent crops and arable/specialised crops farming systems (29 regions)
- C. Regions dominated by beef and dairy cattle systems with permanent grassland (24 regions)
- D. Regions dominated by dairy farms (60 regions)
- E. Regions dominated by sheep and goats farms (11 regions)

In the A-Regions cereal and mixed farming are the most important farming systems. Together these two systems manage more than half of the agricultural area in these regions (see Table 3.2). Other important systems in these regions are arable/fallow and arable/other systems each managing 8% of the agricultural area (see also Appendix 2). The characteristics of the A-Regions can also be studied in the diagrams with the results of the cluster analyses in Figures 4.1a-e. As can be seen the A-Regions are quite diverse compared to other types of regions. In Figure 4.1a it can be seen that many, but not all of the A-Regions can be distinguished from other regions by a combination of a high percentage of arable/cereal and a high percentage of mixed farms. In Figure 4.1c it can be seen that the A-Regions score low for both permanent crops and arable specialised crops and therefore easily can be distinguished from B-Regions. Figure 4.1 similarly identifies the A-Regions as clearly different from the C and E-Regions regarding the share of the area managed by beef cattle/permanent grassland and sheep & goats. Finally, as can be seen in Figure 4.1b,e compared to the D-Regions a relatively smaller share of the area is managed by dairy cattle/permanent grassland farms and a relatively higher share by arable/cereal farms, though the distinction is not complete.

Table 4.1: The 21 combined specialisation and land use types in the SEAMLESS typology

Specialisation type	Land use type
Arable	Cereal
Arable	Fallow
Arable	Specialised crops
Arable	Others
Dairy cattle	Permanent grass
Dairy cattle	Temporary grass
Dairy cattle	Land independent
Dairy cattle	Others
Beef and mixed cattle	Permanent grass
Beef and mixed cattle	Temporary grass
Beef and mixed cattle	Land independent
Beef and mixed cattle	Others
Sheep & Goats	Land independent
Sheep & Goats	Others
Pigs	Land independent
Pigs	Others
Poultry and mixed Pigs & Poultry	All
Mixed farms	All
Mixed livestock	All
Horticulture	All
Permanent crops	All

The B-Regions are characterised by a relatively high share of the area managed by permanent crop systems and/or by arable/specialised crop systems. In average these two systems manage half of the agricultural area in these regions. Other important systems are arable/cereal, arable/others and mixed farms managing in average 10, 9 and 8 % of the area of the regions. The B-Regions can clearly be identified in Figure 4.1c combining high shares of permanent crop systems and arable/specialised crop systems.

The C-Regions are beef cattle regions with beef systems managing in average 48% of the area. Of these the beef cattle/permanent grassland systems alone manage 42% of the area. Other important systems are dairy cattle/permanent grassland systems managing 19% of the area and sheep & goats/others managing 10% of the area. The C-Regions are clearly identifiable in Figure 4.1d with high shares of the area managed by beef cattle/permanent grassland and relatively high shares of the area managed by sheep & goats/other systems.

Table 4.2: Descriptions of selected clusters of regions according to specialisation/land use dimension. 8 clusters are shown in the table. All 21 clusters are described in appendix 2.

		The share of the agricultural area managed by the farming systems:							
		Arable/ Cereal	Arable/ Specia- lised crops	Dairy cattle/ Perma- nent grass	Dairy cattle/ Others	Beef and mixed cattle/ Perma- nent grass	Sheep and goats/ Others	Mixed farms	Perma- nent crops
A	Average	33	4	2	4	2	3	19	2
	Min	0	0	0	0	0	0	1	0
	Max	87	26	18	29	31	23	45	18
	SD	16	5	3	6	4	4	11	4
B	Average	10	16	1	0	2	6	8	34
	Min	0	0	0	0	0	0	0	0
	Max	31	74	10	4	21	24	30	82
	SD	9	22	3	1	5	7	6	22
C	Average	3	2	19	1	42	10	5	2
	Min	0	0	1	0	25	0	0	0
	Max	11	12	36	8	62	31	14	14
	SD	3	4	10	3	12	11	4	4
D	Average	9	4	25	10	6	4	14	1
	Min	0	0	0	0	0	0	0	0
	Max	27	27	71	33	21	32	35	9
	SD	7	7	16	9	6	6	9	2
E	Average	7	2	8	0	9	42	8	7
	Min	0	0	0	0	0	29	2	0
	Max	17	10	23	4	35	69	20	20
	SD	5	3	9	1	10	14	5	7

The D-Regions are characterised by a diverse pattern of farming systems with a relatively high share of dairy farms. The two most important systems, dairy cattle/permanent grassland and mixed farms manage respectively 25 and 14% of the agricultural area. Other important systems are dairy cattle/others managing 10% of the area and arable/cereal managing 9% of the area. In Figure 4.1d it can be seen that many, but not all of the D-Regions are identifiable by a combination of a high share of both dairy cattle/permanent grassland and dairy cattle/other. But apart from this the D-Regions are in the figures with the results of the cluster analyses identified in a way similar to the A-Regions: Figure 4.1c and 4.1e distinguish them from B, C and E-Regions and Figure 4.b distinguish them from the A-Regions with a relatively high share of dairy cattle/permanent grassland and a relatively low share of arable/cereal farming systems.

The E-Regions are regions where a very high proportion of the area is managed by sheep & goat farming systems. In average 42% of the area of these regions are managed by sheep & goat/other farming systems. Other important systems are beef cattle/permanent grassland managing 9% of the agricultural area and dairy cattle/permanent grassland and mixed farms each managing 8% of the area. The E-Regions are easily identifiable in Figure 4.1e with a high share of sheep & goat farming systems and, compared to the C-Regions, a smaller share of the area managed by beef cattle/permanent grassland systems.

Figure 4.1a: The clusters of regions according to the size dimension. X-axis = Share of agricultural area managed by Arable/Cereal farms. Y-axis = Share of agricultural area managed by Mixed farms

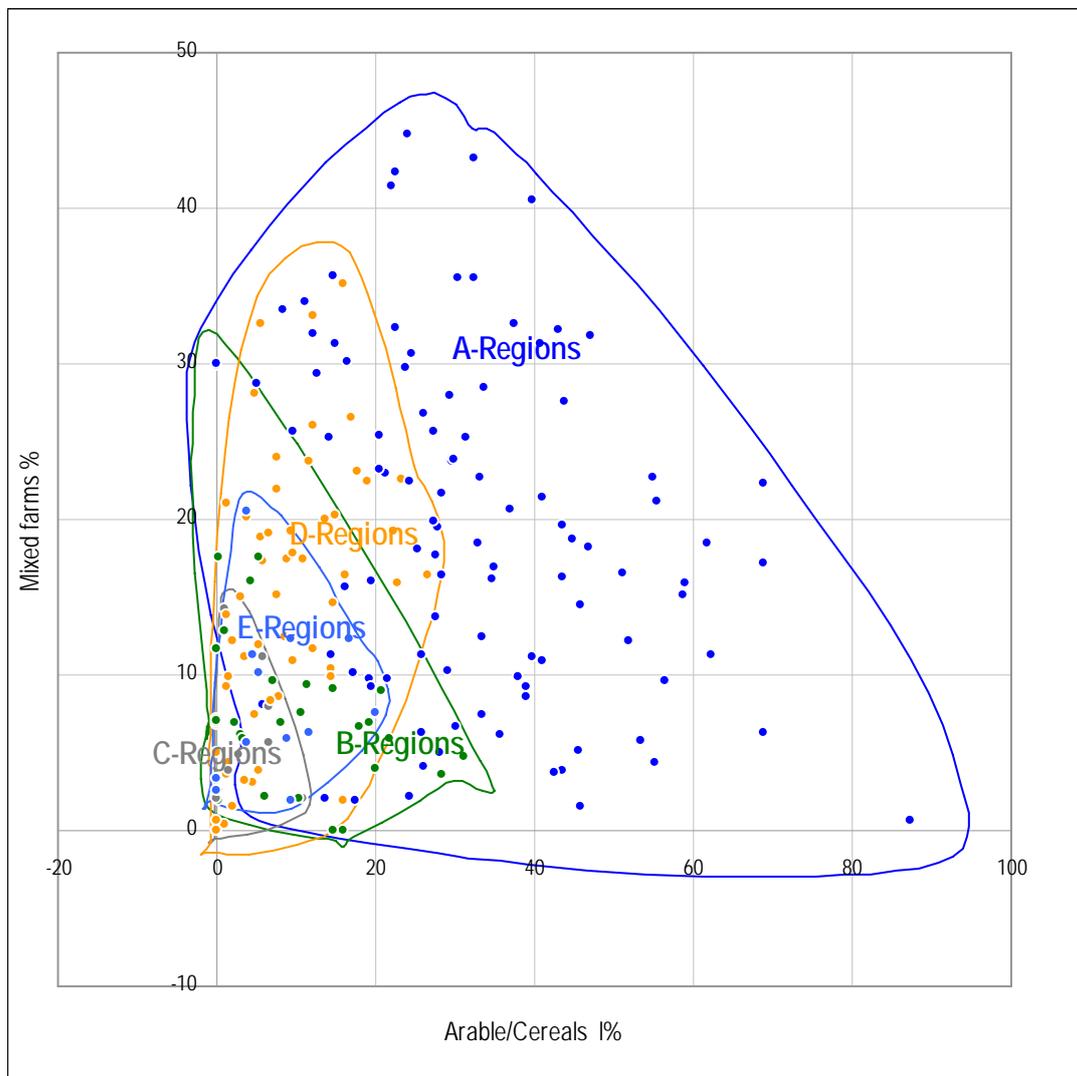


Figure 4.1b: The clusters of regions according to the size dimension. X-axis = Share of agricultural area managed by Arable/Cereal farms. Y-axis = Share of agricultural area managed by Dairy Cattle/Permanent grassland farms.

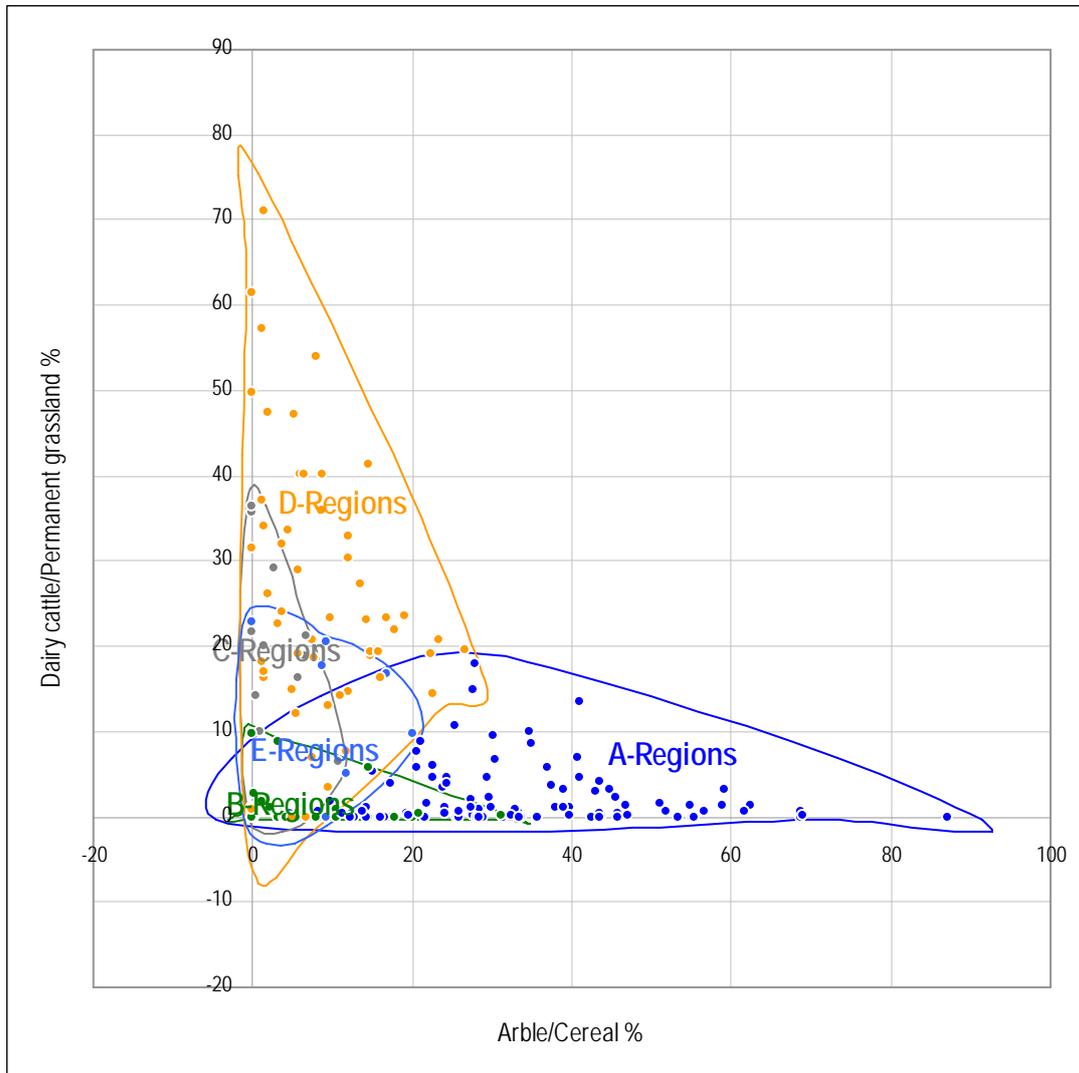


Figure 4.1c: The clusters of regions according to the size dimension. X-axis = Share of agricultural area managed by Permanent crops farms. Y-axis = Share of agricultural area managed by Arable/specialised crops farms

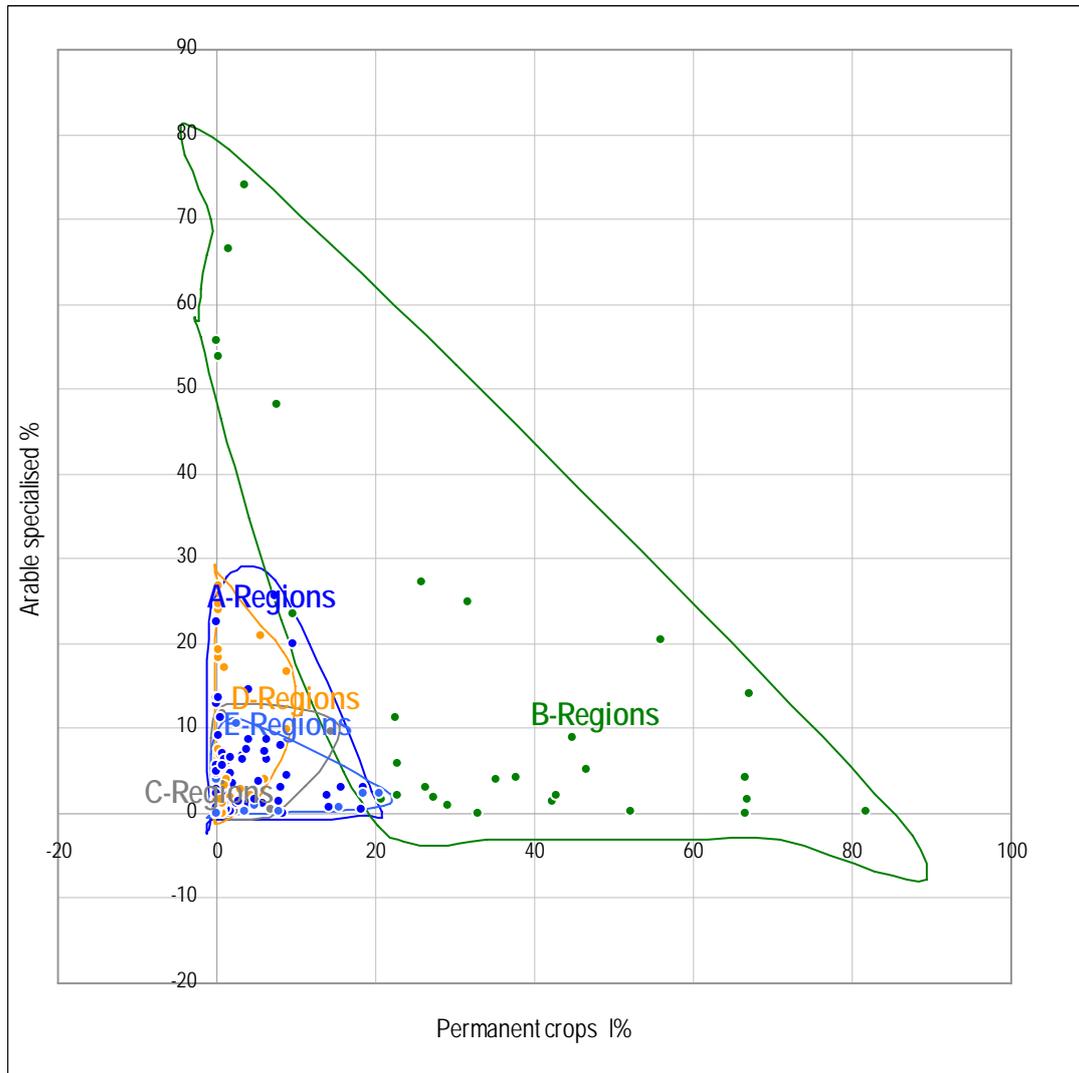


Figure 4.1d: The clusters of regions according to the size dimension. X-axis = Share of agricultural area managed by Dairy cattle/Permanent grassland farms. Y-axis = Share of agricultural area managed by Dairy cattle/Others farms

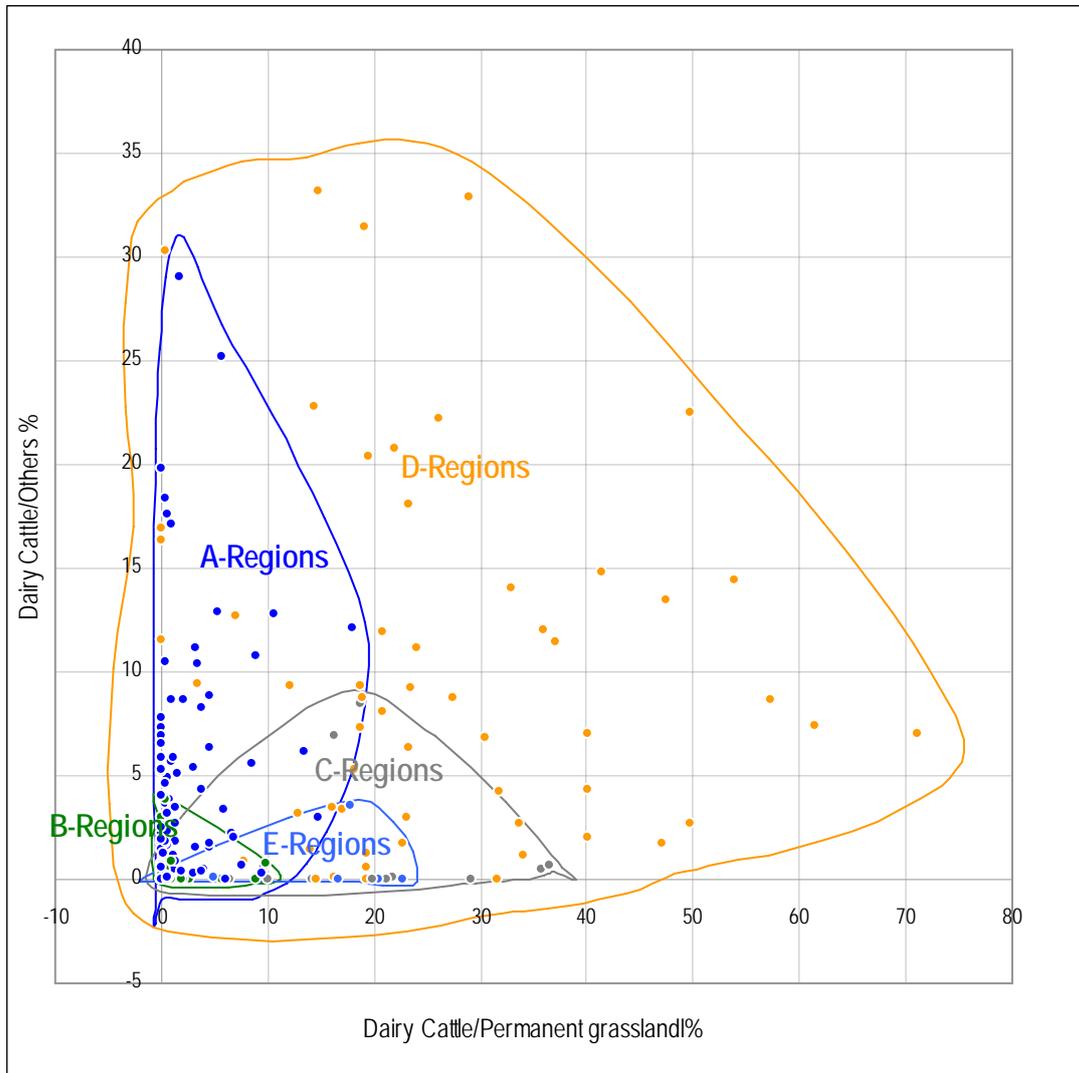
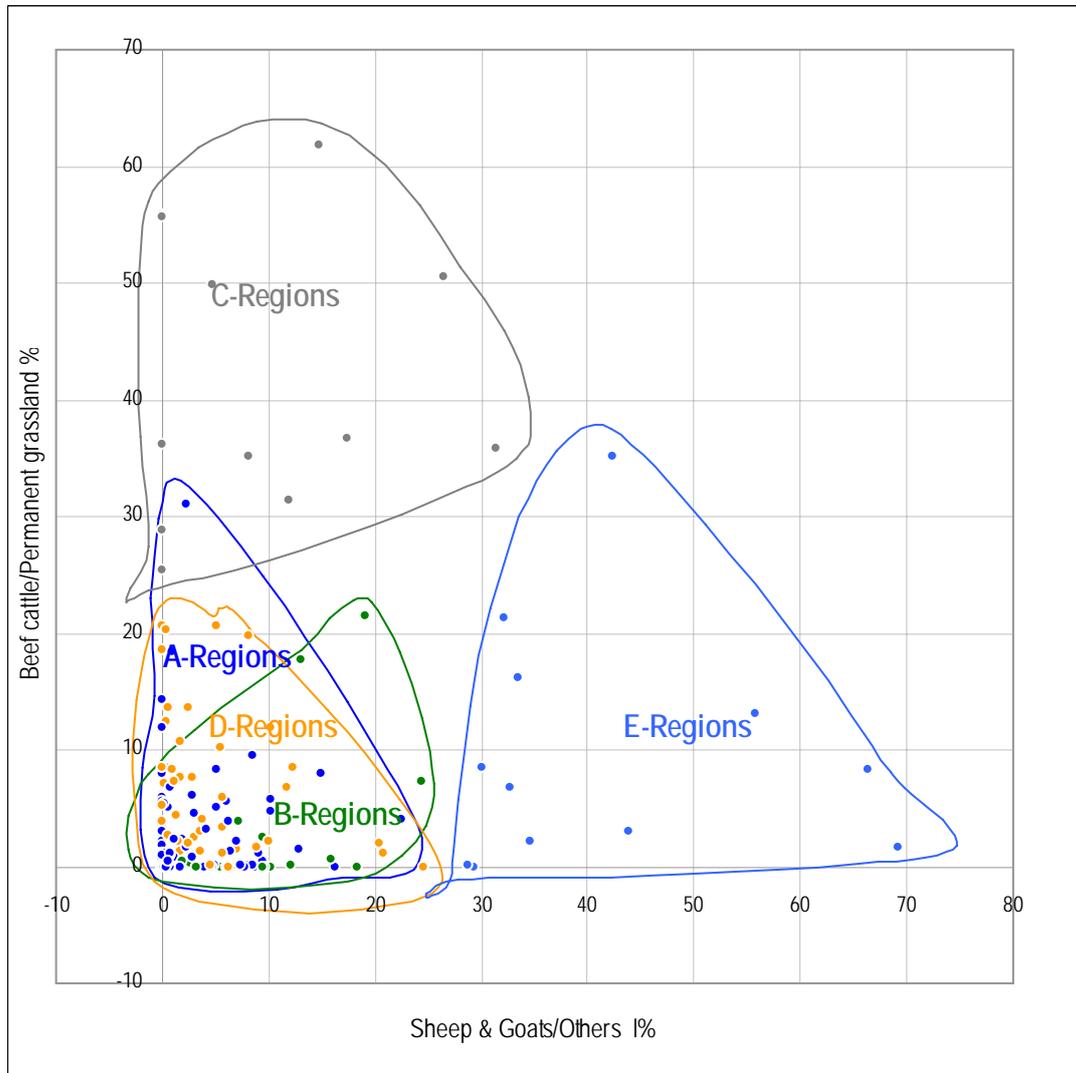


Figure 4.1e: The clusters of regions according to the size dimension. X-axis = Share of agricultural area managed by Sheep & Goats/Others farms. Y-axis = Share of agricultural area managed by Beef cattle/Permanent grassland farms



The distribution of the different types of regions is shown on the map in Figure 4.2.

The E-Regions dominated by sheep & goat farms can be found scattered in the Western and Southern part of EU-25: Scotland, England North and North-West, Wales, central Portugal, Extremadura and Pais Vasco, Corse, Sardegna, Abruzzo, Epeiros and Utrecht.

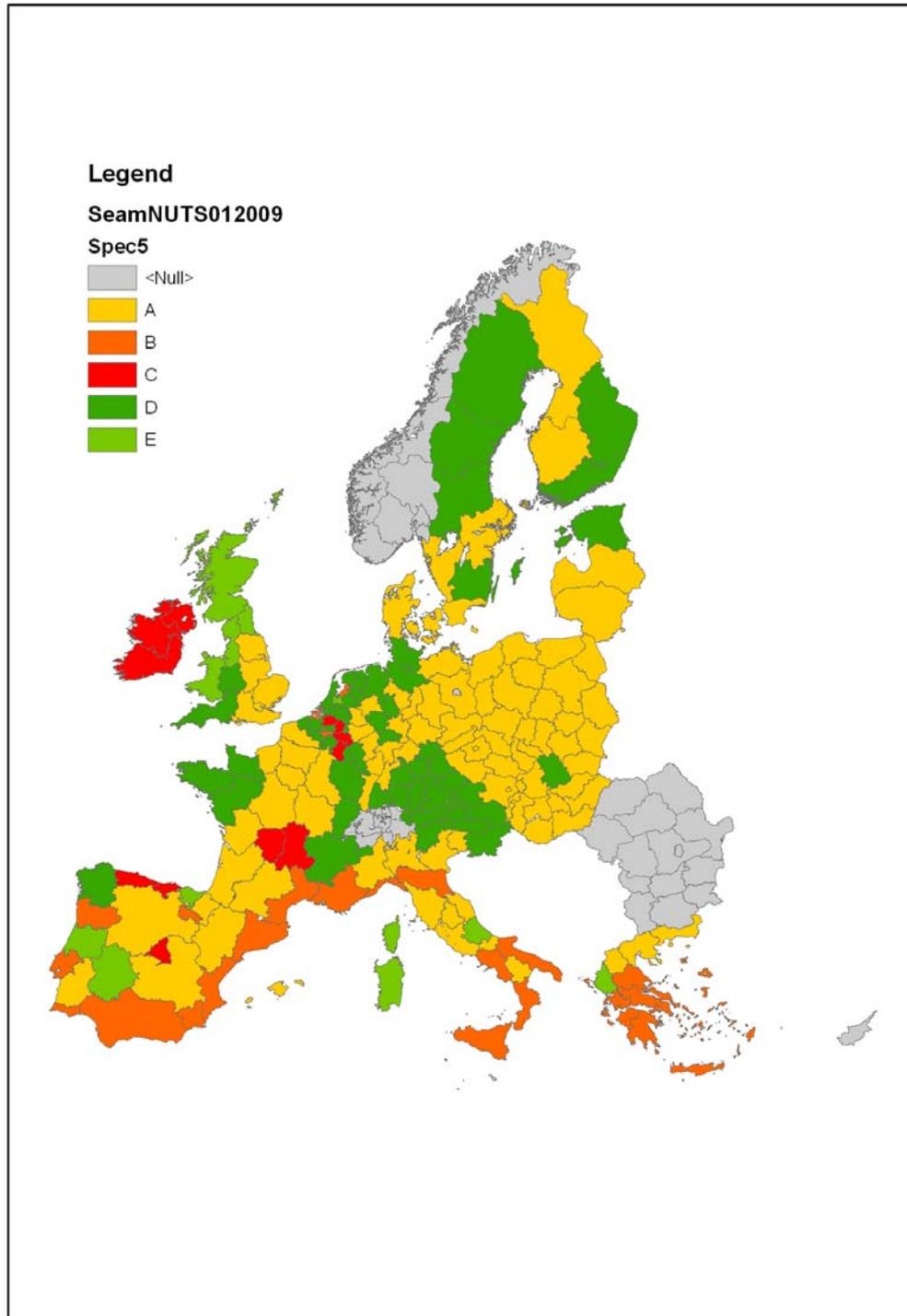
The C-Regions dominated by beef and dairy cattle systems with permanent grassland can be found in smaller groupings in the Western part of EU-25: Ireland and Northern Ireland, Limousin and Auvergne, Cantabria and Asturias and Luxembourg and the three North-Eastern regions of Belgium.

The B-Regions dominated by permanent crops and arable/specialised crops farming systems are mainly found in the Southern part of EU-25. Groupings of these regions are found along the coastline of the Mediterranean Sea from Liguria in Italy to Algarve in Portugal, in most of the Southern regions of Italy and in most of the Greek regions except the most Northern ones. Other regions of type B are Emilia-Romagna, Rioja, Lisboa and the North of Portugal. Also in Belgium and the Netherlands type B-Regions are found: Flevoland and Zeeland in the Netherlands and Brabant Wallon and Bruxelles in Belgium.

The A-Regions dominated by arable/cereal and mixed farming systems are as the most frequent type of region found in most parts of EU-25. A big group of these regions cover the Eastern part of Europe from Lithuania to Hungary and includes many Eastern and central German regions, Denmark and parts of Sweden and Finland. Another grouping stretches from Yorkshire and the Humber in the North over Northern France to Alentejo in Portugal. Finally, many regions in Italy and the most Northern regions of Greece are also of type A.

The B-Regions dominated by dairy farms are scattered in the Northern, Western and central part of EU-25. A large grouping of B-Regions is found in Slovenia, Austria, the Southern part of Germany and Bolzano/Bozen/Trento. Another, not completely connected, band are found from the Danish border to Germany in the North to Rhone-Alpes in the South. Also close to the Atlantic several regions are B-Regions: Galicia, Pays de la Loire, Basse-Normandie, Bretagne, West Midlands and South-Western England. Finally, B-Regions can be found in Estonia and regions in Eastern Finland and Northern Sweden.

Figure 4.2: Map of the type of regions according to the specialisation/land use dimension of the typology



5 The combined typology of agricultural regions of EU-25

In table 5.1 the regions are typified combining all three dimensions: Size, intensity and specialisation/land use. As can be seen the results show a big variation regarding the combined types as 36 of 45 possible combinations of the three dimensions actually occur in EU-25. However, the 10 most important combined types include 75% of the regions and half of the combined types (18) include 88% of the regions.

The most important combined type includes regions dominated by large scale farms, medium intensity farms and arable/cereal and mixed farms. The regions dominated by arable/cereal and mixed farms are found in 6 of the most important combined types. In rank 1, 3 and 5 the three cases of medium intensity, arable/cereal mixed farming regions are found. As mentioned with large scale farming in rank 1 and with small scale farming on rank 3 and mixed farm size pattern on rank 5. Together these three combined types include 35% of the regions in EU-25. Also the combined type including the regions dominated by dairy farms are high on the list. The two most important of these combined types are, in contrast to the arable/cereal mixed farming regions, discriminated by intensity. Most important is regions dominated by large scale, medium intensity dairy farms in rank 2, second most important is large scale, medium and high intensity dairy farms in rank 4. Together these two combined types include 19% of the regions of EU-25.

All the three types of size and all the three types of intensity are represented in the 10 most important combined types. However, two of the five specialisation/land use types cannot be found. The highest ranking of a combined type including sheep & goats can be found in rank 12 and the highest ranking of a combined type including beef and dairy cattle/permanent grassland can be found in rank 14.

At the low end of the ranking table 10 ranks include only one region and 9 ranks include only 2 regions. Together these ranks include 13% of the regions. Of the ranks only including 1 region half of the ranks are combined types that include sheep & goat systems and three ranks include regions dominated by dairy farms. These ranks include a variety of combined types regarding intensity, but the majority of the ranks (7) include combined types where small scale farming is dominating.

The map in Figure 5.1 shows the distribution of the regions in EU-25 on the combined typology of agricultural regions. The first pattern to notice is the divide of the regions dominated by arable/cereal and mixed farming. The most important combined type, regions dominated by large scale farms, medium intensity farms and arable/cereal and mixed farms, combines parts of two of the groupings mentioned in the Section 4: The grouping stretching from Humber in the North over Northern France to Alentejo in Portugal, but now only North of the Pyrenees, and the big group of regions covering the Eastern part of Europe from Lithuania to Hungary and including many Eastern and central German regions, Denmark and parts of Sweden and Finland, but now excluding Poland, the Baltic states and parts of Hungary, Sweden and Finland. The second most important of the combined types including the arable/cereal and mixed farming systems is including regions dominated by small scale intensity includes almost all Polish regions and Kentriki Makedonia in Greece. The third most important of the combined types including the arable/cereal and mixed farming systems is including regions dominated by a mixed farm size pattern and medium intensity. This combined type shows a very scattered occurrence from Northern Finland to Niederosterreich and regions Hungary and to Midi-Pyrenees and Navarra. A fourth combined type of arable/cereal and mixed farming systems dominated regions, rank 6: mixed farm sized of low

and medium intensity, is found as a grouping in Castilla y Leon, Castilla-La Mancha and Aragon. Singe regions are found in Finland, Sweden, Portugal and Italy.

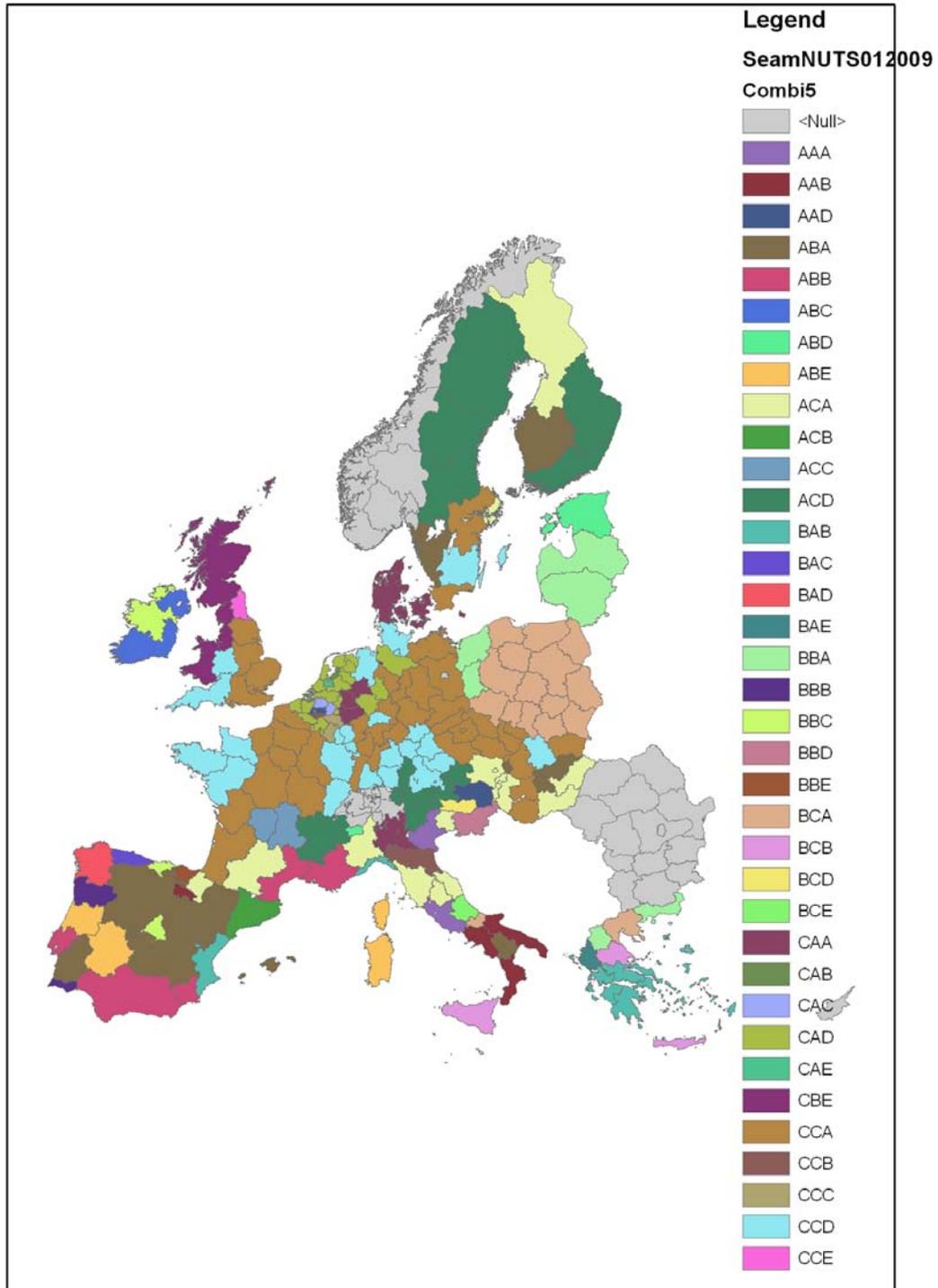
Table 5.1: Results of the combined typology of regions

Rank	Size	Intensity	Specialisation/ Land use	No. Of regions	Share of regions %	Accumulated %
1	C	C	A	42	20	20
2	C	C	D	24	11	31
3	B	C	A	16	8	39
4	C	A	D	16	8	47
5	A	C	A	15	7	54
6	A	B	A	12	6	59
7	A	C	D	12	6	65
8	B	A	B	9	4	69
9	B	B	A	6	3	72
10	C	A	A	6	3	75
11	A	B	B	5	2	77
12	A	B	E	4	2	79
13	A	A	B	4	2	81
14	B	B	C	3	1	83
15	B	C	B	3	1	84
16	C	A	B	3	1	85
17	C	B	E	3	1	87
18	A	B	C	2	1	88
19	A	B	D	2	1	89
20	A	C	C	2	1	90
21	B	B	B	2	1	91
22	C	A	C	2	1	92
23	C	C	B	2	1	93
24	C	C	C	2	1	93
25	A	A	A	2	1	94
26	A	A	D	2	1	95
27	A	C	B	1	0	96
28	B	A	C	1	0	96
29	B	A	D	1	0	97
30	B	A	E	1	0	97
31	B	B	D	1	0	98
32	B	B	E	1	0	98
33	B	C	D	1	0	99
34	B	C	E	1	0	99
35	C	A	E	1	0	100
36	C	C	E	1	0	100

The dairy farms are the second most important specialisation/land use dimension of the combined types. The most important of these combined types regions dominated by large scale, medium intensity dairy farms. This combined type occurs in a very scattered pattern from Småland in Sweden to Stredne Slovensko in Slovakia to Pays de la Loire in France to the West Midlands in England. Important groupings are found in Southern Germany and in North-Western France. The second most important dairy farms combined type is large scale, medium and high intensity in rank 4. This combined type is found only in regions of the Netherlands, Belgium and North-Western Germany. The third most important combined type with dairy farms includes mixed farm sizes of medium intensity (rank 7). These regions include a grouping of regions in South-Eastern Finland and Northern Sweden and a grouping

in the Alp region including the Eastern part of Austria, Bolzano/Bozen/Trento, Schwaben and Rhone-Alpes.

Map 5.1: Map of the regions of EU-25 according to the combined typology. First letter in legend = Size type, 2nd letter = Intensity type and 3rd letter = Specialisation/land use type



6 Outlook

The objective of this report was to develop a typology of the regions of EU-25 that captures the huge variety of farming systems within this territory. The aim of the typology is to provide a context to assess changes in agricultural and environmental policies.

With the typology of agricultural regions developed and with the implementation of the results into the SEAMLESS database the objective of the work has been reached. The developed typology can be used as contextual information in assessing modelling output within the SEAMLESS integrated framework. The typology can be used at both the level of each of the three dimensions or at the combined level depending on the issue to be assessed.

The current version of the typology is assessed to be relatively stable regarding the individual dimensions. However, further work on the combined typology might improve the quality of this. Especially the occurrence of many regions in combined types with only one or two regions included could be improved.

Future use of the established typology of agricultural regions also includes stratification of future work on farming systems. As an example we are planning to increase the sample of regions for which we have collected detailed farm management information in SEAMLESS. Here the typology could be used to ensure the representativity of the additional regions to be selected.

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Glossary

<i>Allocation</i>	This is a methodology that enables to add a (below regional) locational dimension to every individual farm contained in the FADN data base and every land use in the FSS database.
<i>European Size units</i>	An European Size Units The economic size of farms is expressed in terms of European Size Units (ESU). The value of one ESU is defined as a fixed number of EUR/ECU of Farm Gross Margin. Over time the number of EUR/ECU per ESU has changed to reflect inflation. Used in FADN to identify size.
<i>FADN</i>	Farm Accountancy Data Network of the European Union (FADN) has been established since 1965. The aim of the network is to gather accountancy data from farms for the determination of incomes and business analysis of agricultural holdings. Based on sample farms covering information on farms in EU-27.
<i>FADN farm</i>	One sample farm in the Farm Accountancy Data Network. FADN is based on a representative sample of all agricultural holdings.
<i>Farm type</i>	<p>A classification of farms according to different dimensions. In SEAMLESS a farm typology for the whole EU has been developed. The different dimensions of this typology are:</p> <ul style="list-style-type: none">• Size: Measured as the economic size of farms• Intensity: Measured as the total output in Euro per ha• Specialisation: Measured as the standard gross margins from different types of crops and livestock• Land use: Measured as the proportion of the agricultural area covered by specific types of crops.
<i>NUTS regions</i>	The Nomenclature of Territorial Units for Statistics, (NUTS, for the French nomenclature d'unités territoriales statistiques), is a geocode standard for referencing the administrative divisions of countries for statistical purposes. The standard was developed by the European Union, and thus only covers the member states of the EU in detail.
<i>Standard gross margin</i>	The standard Gross Margin (SGM) of a crop or livestock item is defined as the value of output from one hectare or from one animal less the cost of variable inputs required to produce that output. It is used in FADN to identify farm types and size classes.

Appendices

Appendix 1: Definitions of the specialisation and land use types in the SEAMLESS typology of farming systems.

Table App.1.1: Types in the specialisation dimension with definitions and reference to codes in Community typology

Specialisation type	EU-code	Definition
Arable systems	1 + 6	> 2/3 of SGM from arable or (> 1/3 of SGM from arable and/or permanent crops and/or horticulture)
Dairy cattle	4.1	> 2/3 of SGM from dairy cattle
Beef and Mixed cattle	4.2 and 4.3	> 2/3 of SGM from cattle and < 2/3 of SGM from dairy cattle
Sheep, Goats and mixed grazing livestock	4.4	> 2/3 of SGM from grazing livestock and < 2/3 of SGM from cattle
Pigs	5.1	> 2/3 of SGM from pigs
Poultry and mixed Pigs/poultry	5.2	> 2/3 of SGM from pigs & poultry and < 2/3 of SGM from pigs
Mixed farms	7	All other farms
Mixed livestock	8	> 1/3 and < 2/3 of SGM from pigs & poultry and/or > 1/3 and < 2/3 of SGM from cattle
Permanent crops	3	> 2/3 of SGM from permanent crops
Horticulture	2	> 2/3 of SGM from horticultural crops

Table App. 1.2: Land use types and definitions. The FADN codes for the crops are given in Annex 1

Land use type	Definition
Land independent	Utilised agricultural area (UUA) = 0 or LU (Livestock units)/ha (hectare) => 5
Horticultural	(> 0 UAA or LU/ha<5) and >= 50% of UAA in horticultural crops
Permanent crop	(> 0 UAA or LU/ha<5) and < 50% of UAA in horticultural crops and >= 50% of UAA in permanent crops
Temporary grassland	(> 0 UAA or LU/ha<5) and < 50% of UAA in horticultural crops and < 50% of UAA in permanent crops and >= 50% of UAA in grass and >= 50% Temporary grass)
Permanent grassland	(> 0 UAA or LU/ha<5) and < 50% of UAA in horticultural crops and < 50% of UAA in permanent crops and >= 50% of UAA in grass and < 50% Temporary grass)
Fallow land	(> 0 UAA or LU/ha<5) and < 50% of UAA in horticultural crops and < 50% of UAA in permanent crops and < 50% of UAA in grass and >= 12.5% Fallow)
Cereal	(> 0 UAA or LU/ha<5) and < 50% of UAA in horticultural crops and < 50% of UAA in permanent crops and < 50% of UAA in grass and < 12.5% Fallow) and >= 50% Cereals
Mixed crop	(> 0 UAA or LU/ha<5) and < 50% of UAA in horticultural crops and < 50% of UAA in permanent crops and < 50% of UAA in grass and < 12.5% Fallow) and < 50% Cereals and < 25% of arable land in specialised crops.
Specialised crop (Grain Maize, potatoes, sugar beet, hops, soya, tobacco, medicinal plants, sugar cane, cotton, fibre lax, hemp, mushrooms, vegetables in open, flowers in open, grass seeds, other seeds)	(> 0 UAA or LU/ha<5) and < 50% of UAA in horticultural crops and < 50% of UAA in permanent crops and < 50% of UAA in grass and < 12.5% Fallow) and < 50% Cereals and >=25% of arable land in specialised crops.

App 2: Descriptions of all clusters of regions according to the specialisation/land use dimension

Table App2.1 : Descriptions of all clusters of regions according to specialisation/land use. All 21 clusters are described here, Table 4.2 includes 8 selected types

		Arable / Cereal	Arable / Fallow	Arable / Specialised crops	Arable / Others	Dairy cattle / Permanent grass	Dairy cattle / Temporary grass	Dairy cattle / Land independent	Dairy cattle / Others	Beef and mixed cattle/Permanent grass	Beef and mixed cattle / Temporary grass	Beef and mixed cattle / Land independent	Beef and mixed cattle / Others	Sheep and goats / Land independent	Sheep and goats / Others	Pigs / Land independent	Pigs / Others	Poultry and mixed pigs/poultry	Mixed farms	Mixed livestock	Horticulture	Permanent crops
A	Avrg.	33	8	4	8	2	2	0	4	2	1	0	1	0	3	0	2	0	19	5	0	2
	Min	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
	Max	87	60	26	58	18	22	7	29	31	9	2	12	2	23	5	24	5	45	41	3	18
	SD	16	11	5	9	3	4	1	6	4	2	0	2	0	4	1	5	1	11	8	1	4
B	Avrg.	10	3	16	9	1	1	0	0	2	0	0	0	1	6	1	0	0	8	2	3	34
	Min	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Max	31	14	74	29	10	10	6	4	21	5	0	3	7	24	12	9	4	30	11	18	82
	SD	9	3	22	8	3	2	1	1	5	1	0	1	2	7	2	2	1	6	3	4	22
C	Avrg.	3	2	2	2	19	1	0	1	42	6	0	1	0	10	1	0	0	5	2	1	2
	Min	0	0	0	0	1	0	0	0	25	0	0	0	0	0	0	0	0	0	0	0	0
	Max	11	17	12	9	36	3	2	8	62	48	1	7	0	31	7	0	0	14	7	5	14
	SD	3	5	4	2	10	1	1	3	12	13	0	2	0	11	2	0	0	4	2	1	4
D	Avrg.	9	3	4	3	25	9	0	10	6	2	0	3	0	4	1	1	0	14	4	1	1
	Min	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Max	27	14	27	25	71	69	4	33	21	33	2	18	2	32	15	11	3	35	23	17	9
	SD	7	3	7	4	16	18	1	9	6	5	0	4	0	6	2	2	1	9	5	3	2
E	Avrg.	7	3	2	5	8	1	0	0	9	1	0	2	2	42	0	0	0	8	2	1	7
	Min	0	0	0	0	0	0	0	0	0	0	0	0	0	29	0	0	0	2	0	0	0
	Max	17	12	10	24	23	10	2	4	35	4	0	18	12	69	1	2	0	20	14	3	20
	SD	5	3	3	7	9	3	0	1	10	1	0	5	4	14	0	1	0	5	4	1	7