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**RP 1ST RESULTS 2021 N°09**

# GEOGRAPHICAL DISTRIBUTION OF IMMIGRANTS IN LUXEMBOURG:
## Dynamics and Spatial Segregation with Natives

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**This publication characterises the geographical distribution of the immigrant population at the level of Luxembourgish municipalities and the fine geographical cells (1 km²) within them. It highlights the heterogeneous locations of immigrants according to their region of origin and duration of stay. It compares these locations with those of individuals born in Luxembourg, referred to as 'natives', highlighting the differences in spatial segregation between the groups and their geographical breakdown. Finally, it analyses the specific location patterns of natives born to two Luxembourg-born parents and second-generation immigrants born in Luxembourg but with at least one foreign-born parent.**

**Nationwide, the presence of foreign-born residents is significant, with an average share of 49.3% of the total population at the time of the 2021 census. However, variations at the municipal level range from 21.8% in Wahl to 72.7% in Luxembourg City. The location of immigrants depends both on their origin and the duration of their stay in Luxembourg. For example, people born in Portugal are prominently found in municipalities in the south and north-east of the country, corresponding to the former steel and textile regions. Those originating from neighbouring countries are scattered between the capital and the border municipalities. Other Europeans primarily concentrate in the capital, as do more recent immigrants from the rest of the world, who are also highly present in other towns and urban clusters. On average, spatial segregation with natives remains at a low to moderate level, regardless of the origin or length of stay of immigrants. This finding is of significant importance in a context where integration and living together are national priorities. Regarding second-generation immigrants, their geographical distribution is similar to that of the Portuguese community, revealing a fairly marked persistence of location patterns specific to communities of origin.**

The geographical distribution of immigrants raises complex issues with social, economic and cultural dimensions. It impacts disparities in growth and demographic structure, as well as the needs for public services. It potentially affects local economies, modifying the demand for goods and services and generating specific economic dynamics. In terms of social cohesion, numerous existing studies indicate that a high concentration of immigrants can influence the attitudes of natives towards immigration, either positively according to contact theory (Allport 1954; Steinmayr 2021; Dill 2013), or negatively if it causes social tensions or intensifies prejudice and discrimination (Halla et al. 2017; Dustmann et al. 2019). As for immigrants, the choice of their place of residence affects their access to essential resources such as employment, healthcare services, housing and their children's education. In this context, the concentration of immigrants in specific areas is generally perceived as a determining factor in their integration process,

influencing their interactions with the native population and shaping the development of a sense of belonging.

In this publication, we characterise the geographical distribution of immigrants in 2021, highlighting significant differences based on the countries of origin and the duration of stay in Luxembourg. We then examine spatial segregation within administrative entities such as communes or cantons, and at a finer geographical level, leveraging available national-level data at a 1 km² grid cell. In simple terms, the spatial segregation of immigrants means a tendency to live clustered in certain areas or neighborhoods rather than being distributed evenly among the native population. This spatial segregation can contribute to the formation of ethnically homogenous neighbourhoods, limiting opportunities for cultural exchange and hindering the potential benefits of diversity. Finally, we examine the geographical distributions of natives with two parents born in Luxembourg, and those with at least one parent born abroad. This comparison reveals similarities, but also differences which reflect the persistence of patterns of location of populations of foreign origin.

# 1.
# Geographical breakdown of the immigrant population as a whole

Firstly, we define the immigrant population as all individuals born abroad, irrespective of their nationality. The use of the country of birth criterion as an element of distinction is justified by its invariability throughout the life cycle, its independence from changes in naturalisation policies, and its ability to identify more precisely ethnic or cultural groups within the population. According to the 2021 Luxembourg census, the foreign-born population numbers 317,702, or 49.3% of the total population (643,941 inhabitants). On the other hand, people born in Luxembourg will be referred to as "natives", regardless of their parents' origin. They represent 326,239 people, or 50.7% of the total population.

Maps 1.A and 1.B illustrate the proportion of the municipal population represented by the immigrant population in each municipality (A) and in each 1 km² grid cell (B)[1] . Map 1.A shows that all Luxembourg municipalities have a relatively significant immigrant population, which distinguishes Luxembourg from other European nations[2] . Nevertheless, there is significant variation in the proportion of immigrants in the municipal population, ranging from one to three times. The highest proportions are found in the country's two most populous cities, Luxembourg City (72.7% immigrants) and Esch-sur-Alzette (56.1%), as well as in around ten municipalities close to the capital, such as Strassen (65.1%), Bertrange (56.9%), Hesperange (55.1%), Kopstal (54.9%), Walferdange (54.4%), Mamer (54.2%) and Sandweiler (51.2%). Two other municipalities have proportions in excess of 50%, namely Larochette (53.1%) and Differdange (52.3%). More generally, some border municipalities have proportions of immigrants above 45% in the cantons of Clervaux and Wiltz in the north, Vianden, Echternach and Remich in the east, as well as in some municipalities along the Luxembourg-Arlon axis and near the town of Diekirch. Conversely, the five municipalities with the lowest proportions of immigrants are Wahl (21.8%), Grosbous (23.7%) and Useldange (24.1%) in the canton of Redange, Nommern (23.7%) in the canton of Mersch, and Putscheid (24.8%) in the canton of Vianden. Despite this, the rates are still above 20%.
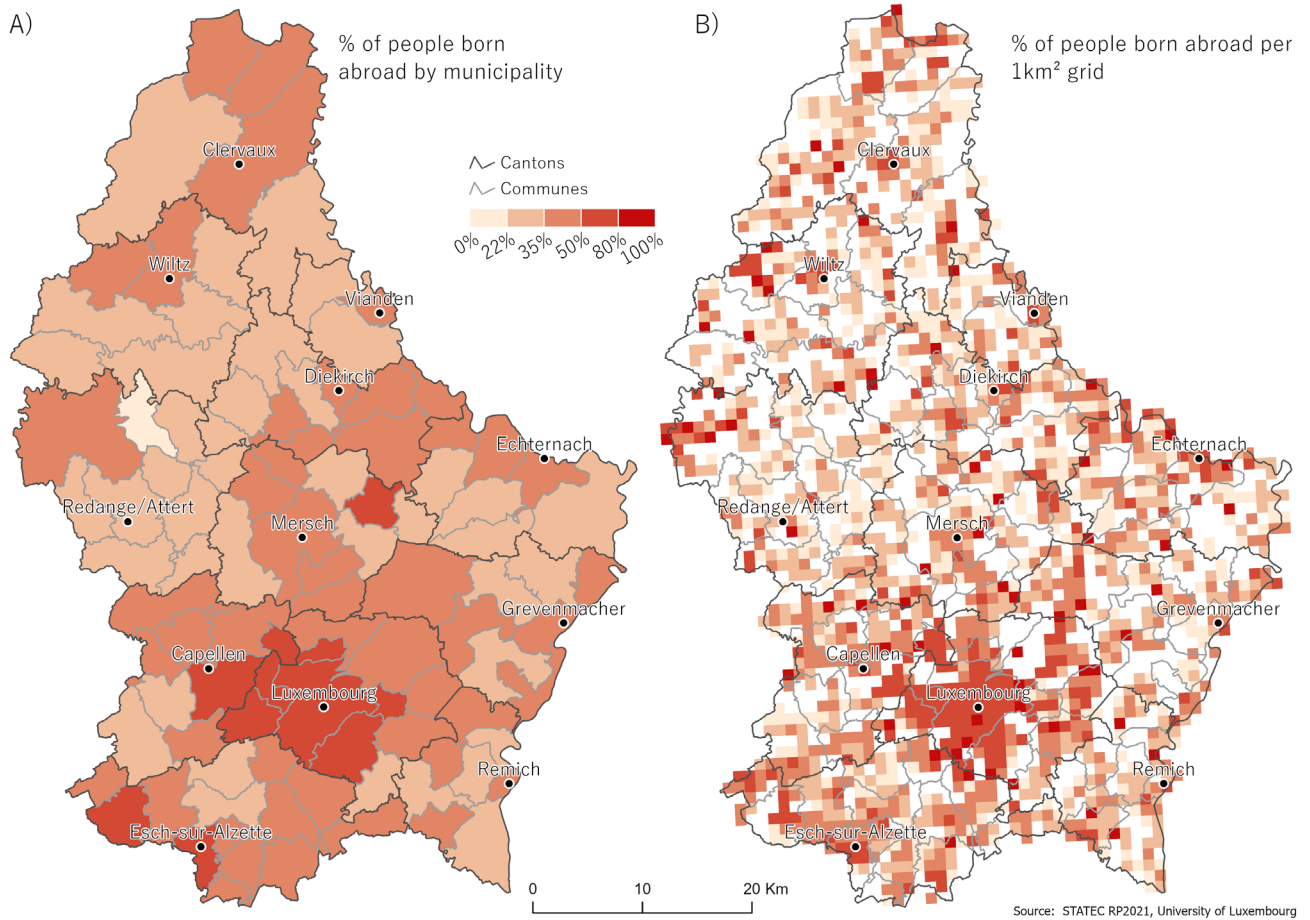
Using the data available by 1 km² grid cell (map 1.B), we can considerably refine the analysis of exposure to immigration and diversity. Firstly, it reveals that the geographical location of immigrants is more concentrated than the analysis by municipality suggests, given that 41.5% of the 1 km² cells remain uninhabited. Secondly, it illustrates the significant variation in the proportion of immigrants within municipalities. On map 1.B, the proportion of immigrants per 1 km² cell varies between 0% (in 148 cases) and 100% (in 39 cases), reflecting sometimes very high migratory intensity. Around a hundred cells (precisely 95) have more immigrants than the average for Luxembourg City (72.7%)[3]. These cells with a high migratory intensity are concentrated in certain districts and near the capital, as well as along the borders, which does not appear as clearly at municipal level (map 1.A). This demonstrates the need for an analysis of spatial segregation based on the specific characteristics of neighbourhoods and small housing units.

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1    For purely illustrative purposes, map A1 in the appendix shows the complementary fraction of native-born people in the total population, by municipality (A) and by 1 km² grid cell (B).

2    According to Eurostat, in 2022, the proportion of people born abroad is 12.4% in the EU27, and 23.2% in Malta, the second most affected country after Luxembourg.

3    In some cells, the percentages are calculated on a small number of inhabitants.

**Map 1. Share of immigrants in the total population by municipality (A) or 1 km² grid cell (B)**

A)

% of people born abroad by municipality

Cantons
Communes

0% 22% 35% 50% 80% 100%

Clervaux

Wiltz

Vianden

Diekirch

Echternach

Redange/Attert

Mersch

Grevenmacher

Capellen

Luxembourg

Remich

Esch-sur-Alzette

0     10     20 Km

B)

% of people born abroad per 1km² grid

Clervaux

Wiltz

Vianden

Diekirch

Echternach

Redange/Attert

Mersch

Grevenmacher

Capellen

Luxembourg

Remich

Esch-sur-Alzette

Source: STATEC RP2021, University of Luxembourg

# 2.
# Heterogeneous distribution by group

The geographical distribution of immigrants can vary considerably depending on their geographical origin and their date of arrival in Luxembourg. Map 2 distinguishes immigrants according to their country of birth. Four categories of residents are identified: the 82,900 people born in the border countries (France, Germany and Belgium), the 72,948 people born in Portugal, the 61,908 people born in the other countries of the European Union of 27 (EU27), and the 99,548 people born outside the European Union.[4] Map 3 distinguishes between immigrants according to the length of stay in Luxembourg. We also distinguish four groups: the 95,218 people who arrived less than 5 years ago, the 76,299 people who arrived between 5 and 10 years ago, the 67,419 people who arrived between 11 and 20 years ago, and the 78,115 people who have lived in Luxembourg for more than 20 years.[5] More detailed maps providing the proportions of immigrants, by origin and length of stay, within each 1 km² cell are provided in the appendix (maps A2 and A3).

## 2.1.
## Analysis by country of origin: differences due to proximity to borders and the country's economic transformation

Let us focus first on the groups by country of birth. Map 2.A shows the proportions of immigrants from border countries in Luxembourg municipalities. This group makes up 12.9% of the resident population, with 54% originating from France, 26% from Belgium and 20% from Germany. Unfortunately, it is not possible to know whether these people come from the border regions in their country of origin, or from regions further away from Luxembourg. This immigration is highly present primarily around the city of Luxembourg and in the border areas close to the countries of origin. Ten municipalities account for more than 18%. These include

Luxembourg (21.4%), Kopstal (20%), Strassen (19.9%), Habscht (18.3%), Hesperange (18.2%), and Steinfort (18.1%), all located close to the capital. The majority of residents born in France live in this central region and in the south of the country. A closer look at this population shows that its location remains stable over time, with little influence from length of stay. Other individuals from border countries, mainly those born in Belgium, have a strong presence along the border in the north of the country, in the municipalities of Winseler (26.3%) in the canton of Wiltz, Weiswampach (24.7%) in the canton of Clervaux, as well as Ell (18.7%) and Rambrouch (18.2%) in the canton of Redange. In comparison, individuals born in Germany make up a smaller proportion of the population bordering Germany.

Map 2.B shows the proportion of immigrants from Portugal in each municipality. Residents born in Portugal represent 11.3% of the total population, making up the largest community of foreign origin since the 1980s. Immigration of Portuguese workers began in the 1950s, mainly illegally, before being regulated from the early 1970s. Unlike people from neighbouring countries, people of Portuguese origin make up a relatively small proportion of the population of the central region. They are more present in the south of the country, in the canton of Esch-sur-Alzette, and in the north-east, in the cantons of Vianden, Diekirch and Echternach, as well as in the area around Larochette. Ten municipalities have a large over-representation of immigrants born in Portugal. These are Larochette (31.1%), Differdange (24.7%), Vianden (23.4%), Bettendorf (23.3%), Pétange (21.6%), Esch-sur-Alzette (21.3%), Vallée de l'Ernz (21%), Echternach (20.4%), Reisdorf (19.7%), and Troisvierges (18.6%). Their presence in the north-east was already significant in 1991, two decades after the signing of migration agreements between the two countries. On the other hand, their presence in the south has gradually increased, to the detriment of the city of Luxembourg.[6]

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4 The number of residents born abroad is 317,702. The total number of groups by country/region of origin is 317,304, to which must be added 398 individuals born abroad but who did not specify their country of birth.

5 The total number of groups by length of stay is 317,051, to which must be added 651 individuals born abroad but who did not specify their length of stay.
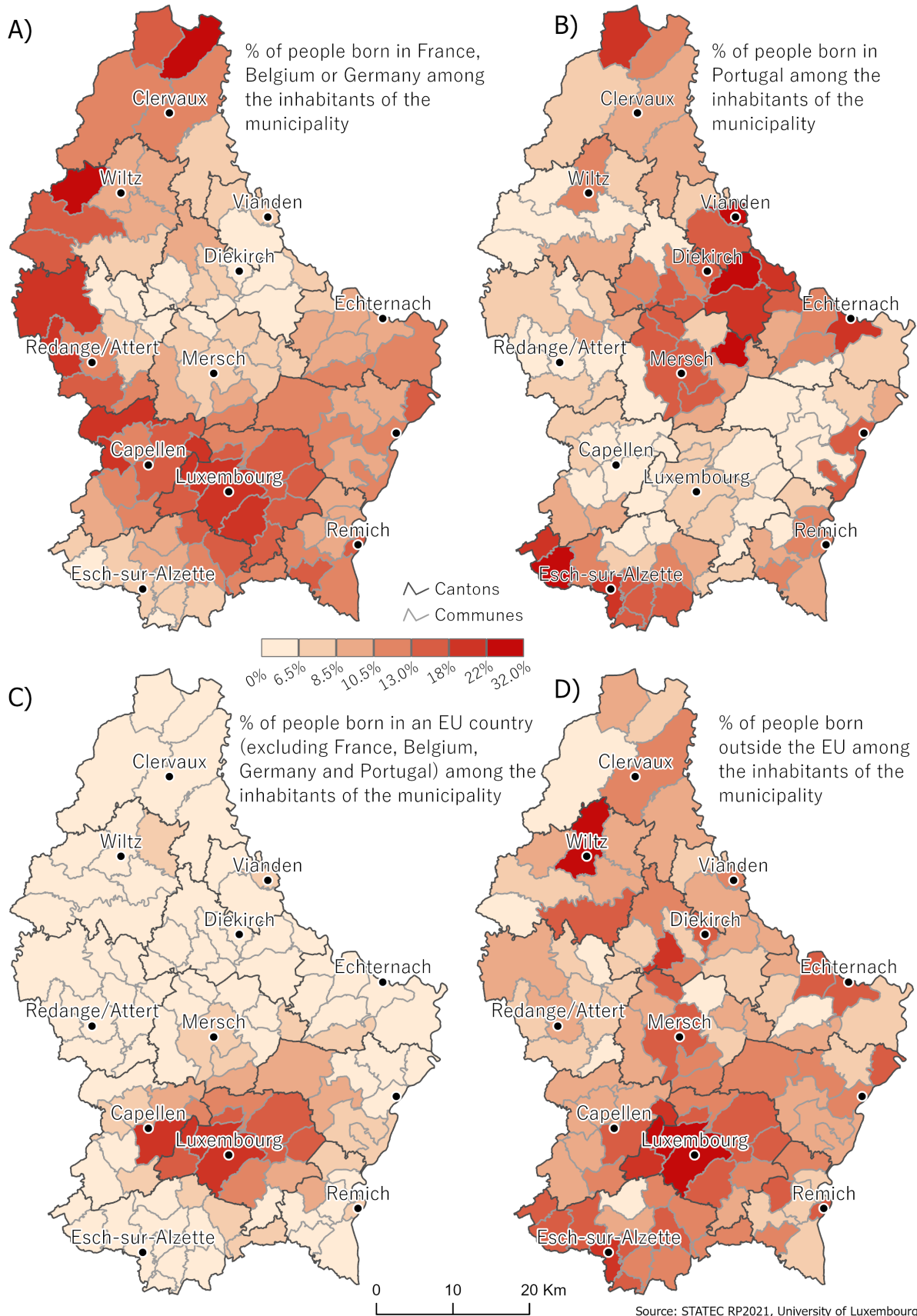
6 In the 1991 census, the proportion of residents born in Portugal in the country as a whole was 7.3%. The distribution of this population in the ten municipalities mentioned above was as follows: 36.4% in Larochette, 29.5% in Reisdorf, 21% in Bettendorf, 19% in Echternach, 18.7% in Vallée de l'Ernz, while it reached 16.5% in Esch-sur-Alzette, 14.9% in Vianden, 14.4% in Differdange, 12.2% in Pétange and 12.0% in Troisvierges. By contrast, the proportion of Portuguese in the capital was 15.4% in 1991, compared with 7.3% today.

Map 2.C shows the municipal shares of immigrants born in the rest of the European Union (EU27 excluding France, Germany, Belgium and Portugal). This is the smallest group, representing 9.6% of the total population. Since the 1980s, this influx of European workers has been a response to the development of international services, such as banking and European institutions. This immigration is mainly concentrated around the city of Luxembourg. Six municipalities have proportions of other European immigrants exceeding 15%. These are Luxembourg (20.4%), Strassen (18.3%), Mamer (18.1%), Bertrange (16.9%), Niederanven (15.7%), Sandweiler (22.1%) and Walferdange (15.3%).

Finally, map 2.D shows the municipal shares of immigrants born outside the EU27. These immigrants represent 15.5% of the total population and are the group that has seen the strongest growth in recent decades.

This growth reflects the diversification of immigration to Luxembourg, with significant inflows from countries such as China, Montenegro, India, Cape Verde, Kosovo, Brazil, Russia, Morocco and Turkey. Moreover, in recent years, Luxembourg has been one of the OECD countries that hosts the most asylum seekers per capita, second only to Greece (OECD, 2019). These non-European immigrants are mainly to be found in three of the country's cities (Luxembourg, Esch-sur-Alzette and Wiltz) and their suburbs, also in connection with the location of refugee reception centres. Specifically, seven municipalities have proportions of non-European nationals exceeding 18%. These are Luxembourg (23.6%), Wiltz (22.9%), Strassen (22.3%), Esch-sur-Alzette (21.2%), Ettelbruck (19.4%), Kopstal (18.2%) and Bertrange (18%), closely followed by Diekirch, Rumelange and Hesperange, at over 17%.

**Map 2. Share of immigrants in the total population by country or region of birth (Percentages by municipality)**
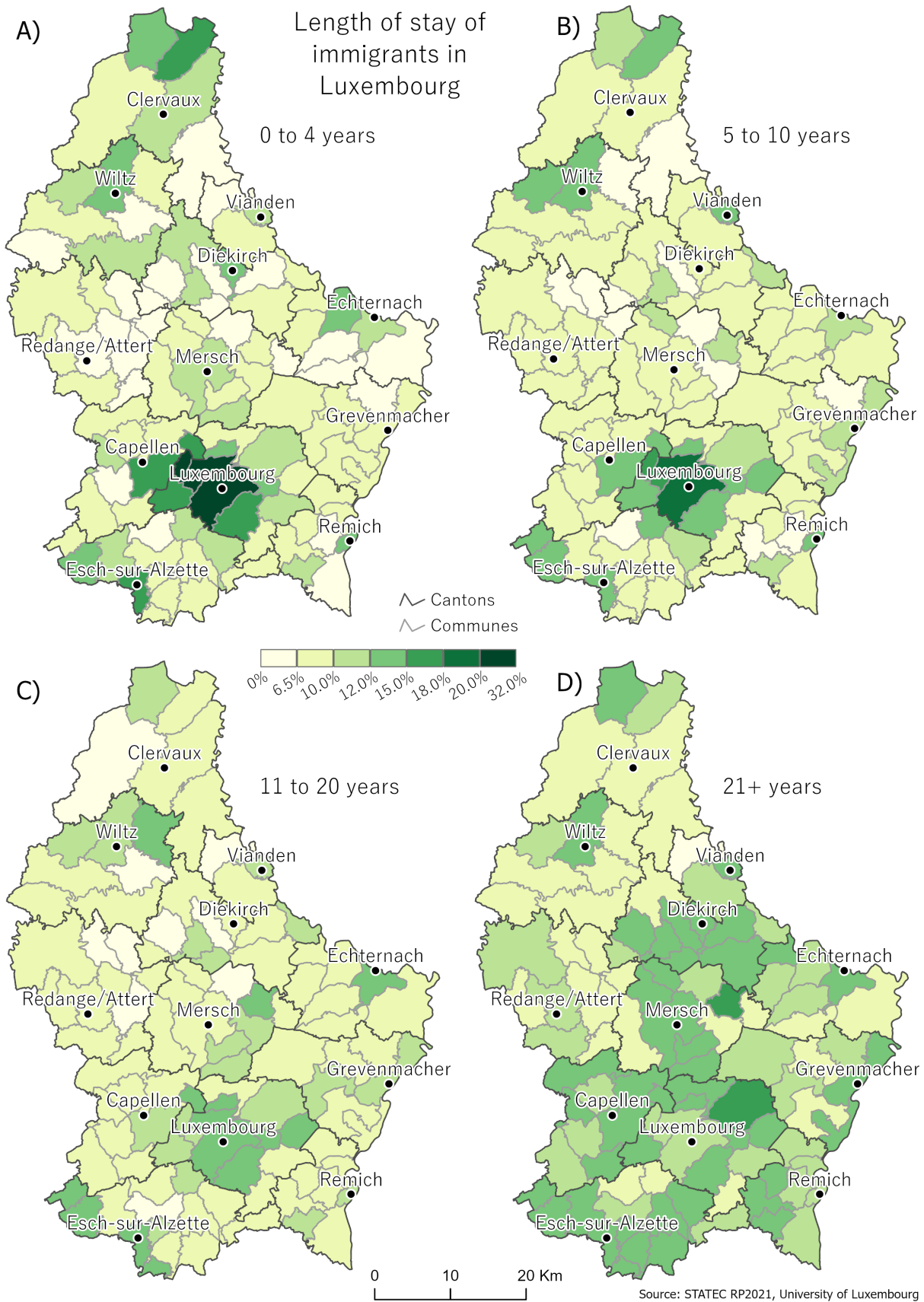


A) % of people born in France, Belgium or Germany among the inhabitants of the municipality

B) % of people born in Portugal among the inhabitants of the municipality

C) % of people born in an EU country (excluding France, Belgium, Germany and Portugal) among the inhabitants of the municipality

D) % of people born outside the EU among the inhabitants of the municipality

Cantons
Communes

0%  6.5%  8.5%  10.5%  13.0%  18%  22%  32.0%

0   10   20 Km

Source: STATEC RP2021, University of Luxembourg

## 2.2.
## Analysis by length of stay: recent immigration concentrated in the capital

Map 3 shows the geographical distribution of immigrants by length of stay, for all origins, at municipal level. More specifically, map 3.A shows the proportions of immigrants who have arrived in the last 4 years. Luxembourg City has a high proportion of very recent immigrants (31.6%) in its total population, which suggests that the capital plays a role as a 'gateway' for new arrivals. Luxembourg City is followed by its neighbours Strassen (24.7%), Bertrange (17.8%), Kopstal (17.5%) and Mamer (16.1%) to the west of the capital, and Hesperange (16.8%) to the east. Esch-sur-Alzette (16.6%) and the municipality of Weiswampach (16.1%), in the canton of Clervaux, also have significant rates.

Map 3.B shows a similar pattern for immigrants who arrived between 5 and 10 years ago, although there was a noticeable drop in the country's two main cities: 18.2% in Luxembourg City and 13.1% in Esch-sur-Alzette. This trend continues for immigrants who arrived between 11 and 20 years ago, as shown on map 3.C, with proportions of 12.7% in Luxembourg and 12.6% in Esch-sur-Alzette. Larochette (14.1%), Differdange (13.1%), and Walferdange (12.9%) make up the top 3 in this category.

Finally, map 3.D shows a more diffuse distribution of immigrants who arrived more than 20 years ago across the country. The proportion of immigrants who arrived a long time ago is now only 10% in the capital, which is less than in the neighbouring municipalities, those to the south, and in the corridor leading to Nordstad. This spread of long-term immigrants throughout the territory is all the more visible when the analysis is based on 1 km² cells (see Appendix A3). These variations may reflect both a mechanism for the gradual relocation of newcomers in the country, after an initial concentration in the major cities before gradually spreading out, and the migratory history of Luxembourg, where the communities that arrived more than 20 years ago initially settled in the southern mining basin and in the municipalities in the east of the country. Portuguese immigration and, to a lesser extent, older Italian immigration, significantly contribute to this phenomenon.

**Map 3. Share of immigrants in the total population by length of stay (Percentages by municipality)**



Length of stay of immigrants in Luxembourg

A) 0 to 4 years
B) 5 to 10 years
C) 11 to 20 years
D) 21+ years

Cantons
Communes

0%  6.5%  10.0%  12.0%  15.0%  18.0%  20.0%  32.0%

0    10    20 Km

Source: STATEC RP2021, University of Luxembourg

# 3.
# Spatial segregation with natives

The disparities in exposure to immigration between municipalities highlight the fact that natives and immigrants make distinct location choices. In this section, we examine the location dynamics of natives and immigrants as a function of the degree of urbanisation of the municipalities, before deepening our exploration with measures of spatial segregation at the municipal level and at a more detailed geographical level with 1 km² cells.

## 3.1.
## Recent immigrants occupy more urban areas than natives

Table 1 compares the proportions of natives and immigrants according to the degree of urbanisation of 1 km² cells. In line with the publication on the 'Spatial distribution of the population in Luxembourg' (RP 1st

results 2021, N° 07), the seven categories of the OECD definition of the degree of urbanisation (level 2) can be grouped into three categories (level 1): *urban centres*, made up of groups of small cells where the density of each cell exceeds 1,500 people per km² and where the population living in this group of contiguous cells exceeds 50,000 inhabitants (in this case, the urban centre of Luxembourg covering 47 km² with a population of 157,407); *urban clusters*, comprising dense and semi-dense clusters and peri-urban cells (these clusters are found mainly in the south of the country, on the Luxembourg-Arlon axis, on another Luxembourg-Mersch-Diekirch axis, and in the town of Wiltz); and finally, *rural areas* characterised by a lower density and comprising the three categories of rural cells.

**Table 1. Distribution of populations by level 1 degree of urbanisation**

| Population/Urban degree | City centre | Urban clusters | Rural cells |
|---|---|---|---|
| **Born in Luxembourg (natives)** | 30.2% | 53.2% | 63.2% |
| **Born abroad (immigrants)** | 69.8% | 46.8% | 36.8% |
| **Total** | **100.0%** | **100.0%** | **100.0%** |
| Of which immigrants by region of origin | | | |
| *Border countries* | *20.7%* | *9.4%* | *11.7%* |
| *Portuguese* | *7.1%* | *15.0%* | *9.5%* |
| *Rest of EU27* | *19.5%* | *6.9%* | *5.8%* |
| *Outside the EU27* | *22.5%* | *15.5%* | *9.8%* |
| *Total* | *69.8%* | *46.8%* | *36.8%* |
| Of which immigrants by length of stay | | | |
| *From 0 to 4 years* | *29.1%* | *11.5%* | *8.2%* |
| *From 5 to 10 years* | *17.5%* | *11.0%* | *8.7%* |
| From 11 to 20 years old | *12.6%* | *10.6%* | *8.7%* |
| *Over 20 years old* | *10.5%* | *13.7%* | *11.1%* |
| *Total* | *69.8%* | *46.8%* | *36.8%* |

Source: STATEC RP 2021.

While the majority of Luxembourg-born people live in rural cells (63.2%), their proportion is close to that of immigrants in urban clusters (53.2%), but they are largely in the minority in Luxembourg's urban centre (30.2%). The Portuguese community and immigrants who have been present for more than 20 years have the highest proportions in urban clusters. For all other immigrant groups, the highest proportions are found in the urban centre, which is mainly made up of the capital, where house prices are the highest. It should also be noted that in the capital and the communes making up the urban centre, the proportion of immigrants decreases drastically with their duration of residence (29.1% are immigrants who arrived less than 4 years ago, but only 10.5%, i.e. almost three times less, are immigrants who have been in Luxembourg for more than 20 years). These factors should be seen in the context of the increasingly strong demographic growth that Luxembourg has experienced in recent years and the results of the analyses in Publication N°. 07, which show a concentration and densification in urbanised areas.
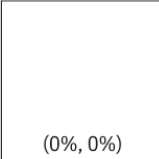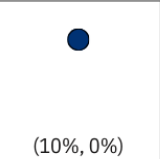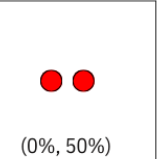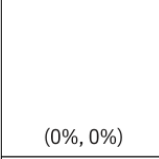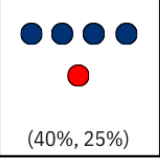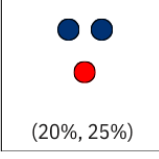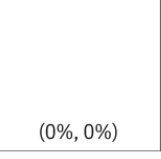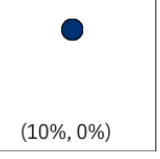
Spatial segregation can occur for a number of reasons. Firstly, immigrants choose to live close to each other because of cultural, linguistic or family ties, or simply because of the facilities provided by family/friends in terms of housing. Secondly, native-born residents may choose to live closer to or further away from immigrants. Finally, segregation may be the result of economic factors, such as the search for jobs in specific sectors or unequal access to affordable housing in particular neighbourhoods. It can have consequences on various aspects of the integration of immigrants, such as their economic interactions, their relationship with the native population, cultural sharing, or the development of a sense of common belonging.

## 3.2.
## Low to moderate spatial segregation between and within administrative units, but varying depending on the origin and duration of stay of immigrants

To deepen this analysis, it is desirable to take into account the spatial segregation between immigrants and natives within a geographically defined area (such as communes or cantons) or according to the degree of urbanisation. More detailed measures of spatial segregation can be produced from the data available per 1 km² cell making up the area. The census provides these measures of population per cell, allowing to assess whether immigrants and natives are evenly distributed or whether they are concentrated within specific areas. Duncan's spatial segregation index provides a statistical measure of the spatial dissimilarity between two population groups (see box and Duncan et al., 1961).

**Duncan's localised spatial segregation index**

To construct this index at local level, we start by identifying the proportion of natives and immigrants resident in each cell of the area (1 km²) and calculate the absolute difference between these two shares. Take the example below of a fictional spatial area consisting of exactly nine 1 km² zones. This area contains ten native-born individuals (shown in blue) and four immigrants (shown in red); three cells are uninhabited. The central cell contains four natives and one immigrant, representing 40% and 25% of the two populations respectively. The absolute difference is therefore 15% (i.e. 0.15). Duncan's spatial segregation index (D) is the sum of these differences for all the cells in the area, divided by two, given that the sum of the percentages of the two communities reaches 200% (i.e. 2.00). In an extreme case where the same percentages for the two populations are found in all the cells (for example, five natives and two immigrants in one cell, the same numbers in a second cell, and zero elsewhere), the index is equal to zero. An index close to zero means that the two groups are relatively evenly distributed. In the other extreme case, where natives and immigrants occupy separate cells, the index is equal to one, indicating total spatial segregation. In practice, spatial segregation can be considered low if the Duncan index is below 0.25, moderate if it is between 0.25 and 0.5, and high if it is above 0.5. In our example, D=0.55.

Maps 4.A and 4.B show the Duncan index calculated for each municipality (A) or by taking into account the geographical distribution of the native and immigrant populations in a 9 km² square centred on each cell (B). The latter case corresponds precisely to that of the fictional spatial zone in our methodological box, comprising the eight cells contiguous to the central cell. The same principles were applied to each inhabited cell in the country. Although several studies have examined spatial segregation on the basis of sub-municipal divisions, our localised assessment of spatial segregation, carried out at a level as precise as 1 km² cells, represents an innovative contribution to our analysis. This approach makes it possible to identify whether the spatial segregation indices observed at municipal level conceal significant disparities within municipalities.[7]

Map 4.A shows that the level of spatial segregation between natives and immigrants remains low (below 0.25) in the vast majority of Luxembourg municipalities. In particular, spatial segregation is minimal around the city of Luxembourg and extends across the whole band from the canton of Capellen to that of Grevenmacher. A moderate level of spatial segregation (between 0.25 and 0.50) is observed in two municipalities, Winseler and Bourscheid, where the proportions of immigrants are 46.3% and 34.1% respectively. Slightly lower indices, between 0.20 and 0.25, are found in a number of other municipalities, such as Rambrouch and Wahl in the canton of Redange, Putscheid and Vianden in the canton of Vianden, and Vallée de l'Ernz and Berdorf in the east. Remarkably, no municipality has a Duncan index greater than 0.50, a conservative value defining a situation of high spatial segregation between the two population categories.



| | | |
|---|---|---|
| (0%, 0%) | (10%, 0%) | (0%, 50%) |
| (0%, 0%) | (40%, 25%) | (20%, 0%) |
| (20%, 25%) | (0%, 0%) | (10%, 0%) |

**An example of a fictitious spatial zone:**

● A native (N = 10 in total)
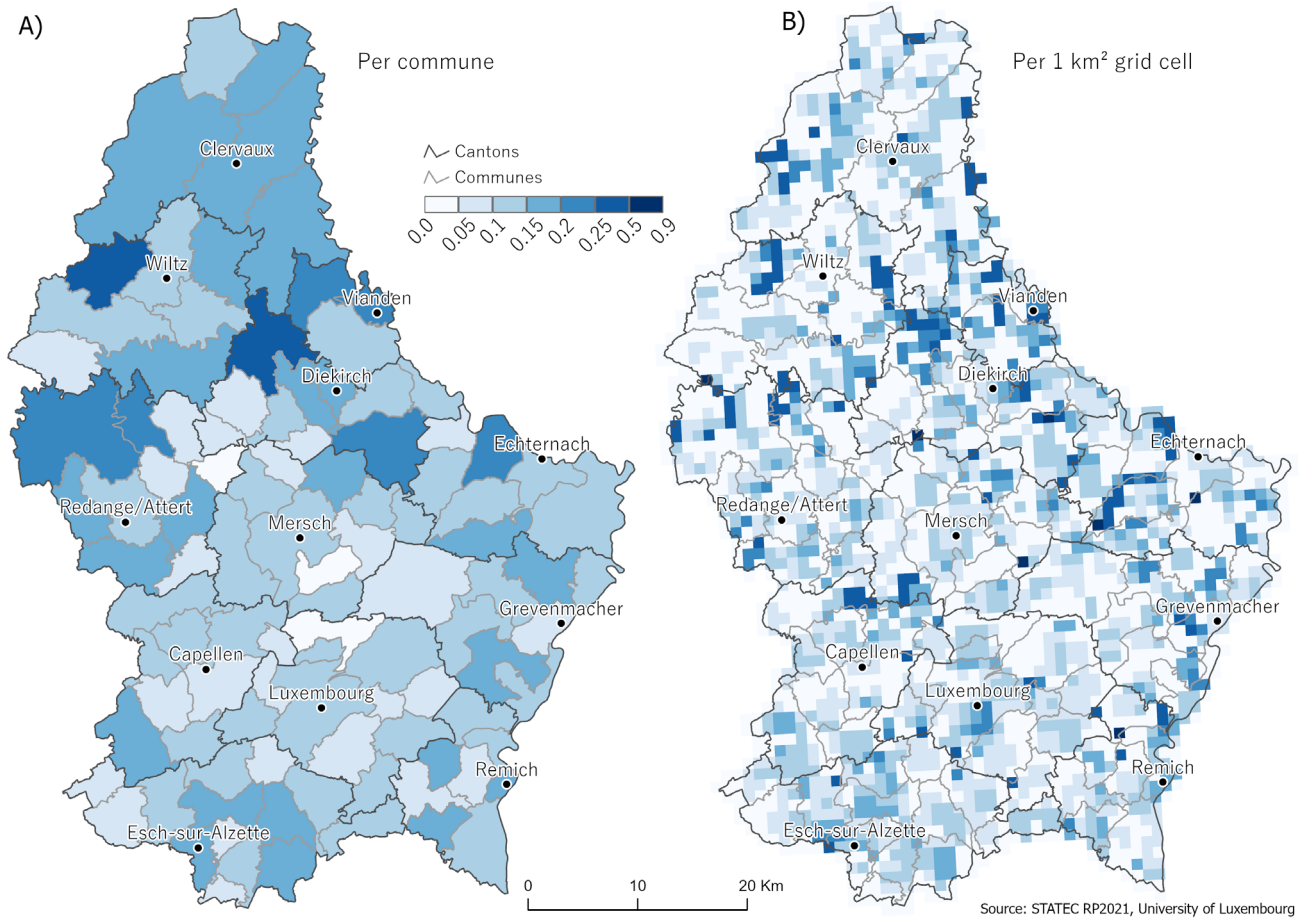
● An immigrant (M = 4 in total)

$(N_i, M_i)$ = Number of natives $(N_i)$ and immigrants $(M_i)$ in $i$ cell

$\left(\dfrac{N_i}{N}, \dfrac{M_i}{M}\right)$ = Proportion of natives and immigrants in $i$ cell

Duncan index: $D = \dfrac{1}{2}\sum_{i=1}^{9}\left|\dfrac{N_i}{N} - \dfrac{M_i}{M}\right|$

**Map 4: Index of spatial segregation between natives and immigrants**

A)

Per commune

B)

Per 1 km² grid cell

Cantons
Communes

0.0 0.05 0.1 0.15 0.2 0.25 0.5 0.9

0    10    20 Km

Source: STATEC RP2021, University of Luxembourg

Map 4.B provides a more precise visualisation of spatial segregation by 1 km² cells. The south and centre of the country stand out as areas where native and immigrant communities are almost evenly distributed, with the exception of a few notable districts in the municipalities of Habscht or Helperknapp (with the presence of a reception centre for refugees), among others. In the municipalities where spatial segregation is moderate, this phenomenon is influenced by a few *clusters of* neighbourhoods inhabited by immigrants from neighbouring countries, as is the case in the municipalities of Wincrange and Winseler along the Belgian border, or by immigrants of German or Portuguese origin in the municipalities of Putscheid, Vianden and Reisdorf. Only about a dozen neighbourhoods with high spatial segregation appear sporadically across the country[8].

Rather than focusing separately on each commune or small geographical area, it is possible to construct average indices of spatial segregation between natives and immigrants by aggregating all the geographical areas of the national territory. In Table 2, these average indices are calculated by varying the housing units from the most aggregated to the most disaggregated (from cantons to communes, then to 1 km² cells), and by considering the different categories of immigrants distinguished in Section II, classified according to geographical origin or date of arrival in Luxembourg.

Spatial segregation tends to decrease systematically as the size of the reference residential unit increases. On average, the spatial segregation index between natives and immigrants as a whole is equal to 0.20 when we focus on the distribution by canton, 0.23 by commune, and 0.26 by cell of 1 km². Spatial segregation is therefore stronger when differences in location are studied at the level of detailed spatial areas (streets or neighbourhoods) rather than at the municipal or canton level. This is mainly a mechanical effect, insofar as increasing the level of spatial disaggregation is equivalent to adding sources of heterogeneity in the location choices of natives and immigrants. Nevertheless, the disparities between the measures of spatial segregation offer some indication of the spatial scale at which the location choices of natives and immigrants diverge most markedly.

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8    Remember that some cells may contain a small number of residents.

Significant disparities emerge when immigrants are distinguished according to region of origin and year of arrival. Regardless of the residential unit considered, residents born in Portugal have the locations closest to the natives, followed by nationals of non-European countries, then border countries. The most marked spatial segregation with native-born residents is observed among nationals of other European countries, who are heavily concentrated in the city of Luxembourg.

**Table 2. Spatial segregation indices (Duncan) by geographical area and immigrant group**

| Group/space unit | By canton | By municipality | Per cell (1km²) |
|---|---|---|---|
| Total immigrants | 0.20 | 0.23 | 0.26 |
| **Immigrants by region of origin** | | | |
| *Border countries* | *0.26* | *0.29* | *0.31* |
| *Portuguese* | *0.15* | *0.23* | *0.29* |
| *Rest of EU27* | *0.37* | *0.40* | *0.41* |
| *Outside the EU27* | *0.21* | *0.27* | *0.31* |
| **Immigrants by length of stay** | | | |
| *From 0 to 4 years* | *0.33* | *0.36* | *0.41* |
| *From 5 to 10 years* | *0.22* | *0.25* | *0.29* |
| *From 11 to 20 years old* | *0.15* | *0.21* | *0.24* |
| *Over 20 years old* | *0.09* | *0.13* | *0.16* |

Source: STATEC RP 2021.

The low level of spatial segregation between people born in Portugal and natives is mainly observable at canton level. However, the Duncan index for the Portuguese increases significantly when the scale is extended to municipalities or cells, thus coming closer to the indices obtained for individuals from border countries and nationals of non-European countries. Spatial segregation by neighbourhood within the Portuguese community is proportionally more marked than in other communities, although this is not enough to reverse the rankings. In contrast, for other Europeans and immigrants from border countries, the shift from cantons to detailed areas has less impact on the measurement of spatial segregation, suggesting that the most preponderant component of spatial segregation resides at the cantonal level. On average, all groups show low to moderate levels of spatial segregation at national level.

It is also interesting to note that the spatial segregation index decreases systematically with the length of stay. The spatial segregation of long-term residents is much lower than that of newcomers, especially when the analysis is carried out at canton level. Once again, this phenomenon may be explained by the fact that duration of stay favours a certain degree of integration, in line with the previous publication on Luxembourgish practices[9] , or by differences in the composition of cohorts by region of origin - concentration of recently arrived non-Europeans in the city of Luxembourg vs. more diffuse Portuguese immigration throughout the country.

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9    See the publication "Linguistic diversity on the rise" (RP 1st results 2021 N° 08).

# 4.
# Second-generation immigrants and the persistence of location patterns

The previous analysis focused on the geographical distribution of foreign-born individuals, in comparison with the total or Luxembourg-born population. However, a significant proportion of the Luxembourg-born population has an indirect migratory background. In accordance with the publication on "The Migration Background of the Population of the Grand Duchy of Luxembourg: Structure and Demographic Implications" (RP 1st résults 2021, N°06), we restrict indirect origin to second-generation immigrants. In this perspective, we examine the geographical distribution of individuals born in Luxembourg to at least one parent born abroad. This group represents 24.3% of the total population. Map 5 compares the geographical distribution of these second-generation immigrants (map 5.B) with that of natives whose two parents were born in Luxembourg (map 5.A), representing 26.3% of the total population.

These two categories of native share a common characteristic: they represent a relatively small proportion of the population of Luxembourg City and the surrounding area. However, there are also significant differences between them. Those born to two parents who were born in Luxembourg are in the majority in the smaller municipalities in the north and west of the country, particularly in the cantons of Redange, Wiltz and Clervaux. For example, they represent more than 50% of the population in the municipalities of Wahl, Grosbous, Useldange and Nommern.

On the other hand, second-generation immigrants are proportionately more numerous in the more populated municipalities in the north-east of the country (cantons of Vianden and Echternach) as well as in the canton of Esch-sur-Alzette (municipalities of Pétange, Differdange, Esch-sur-Alzette, Rumelange). The greater concentration of second-generation immigrants in the same geographical areas as people of Portuguese origin is probably due to the fact that a significant number of second-generation immigrants are direct or indirect descendants of the community of Portuguese origin. As a result, their location reflects the choices made by Portuguese nationals established in Luxembourg in the early 2000s, and reflects a relatively strong persistence of location patterns specific to populations of foreign origin.
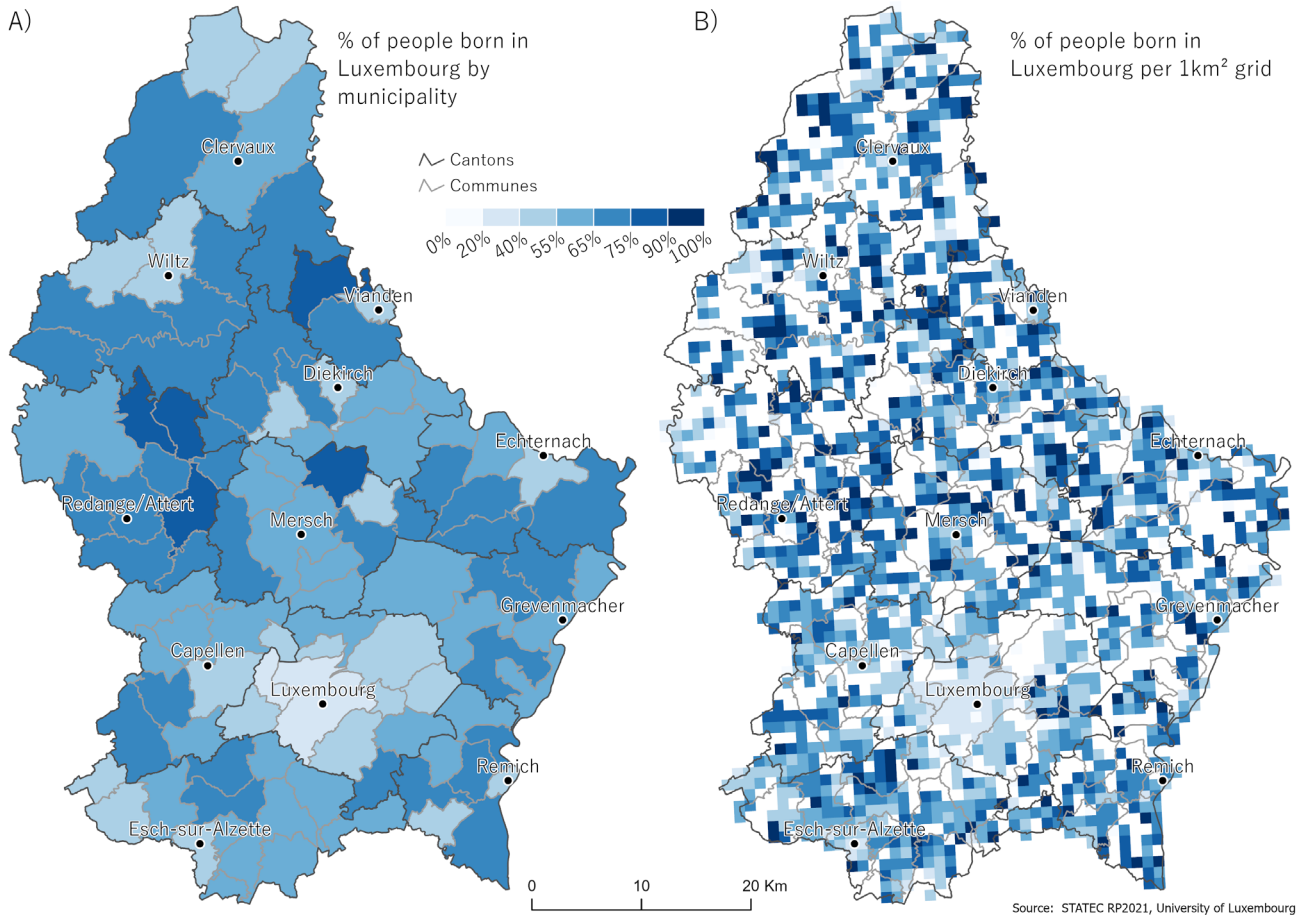
**Map 5. Share in the municipal population of people born in Luxembourg to two parents born in Luxembourg (A) or to at least one parent born abroad (B)**



Source: STATEC RP2021, University of Luxembourg
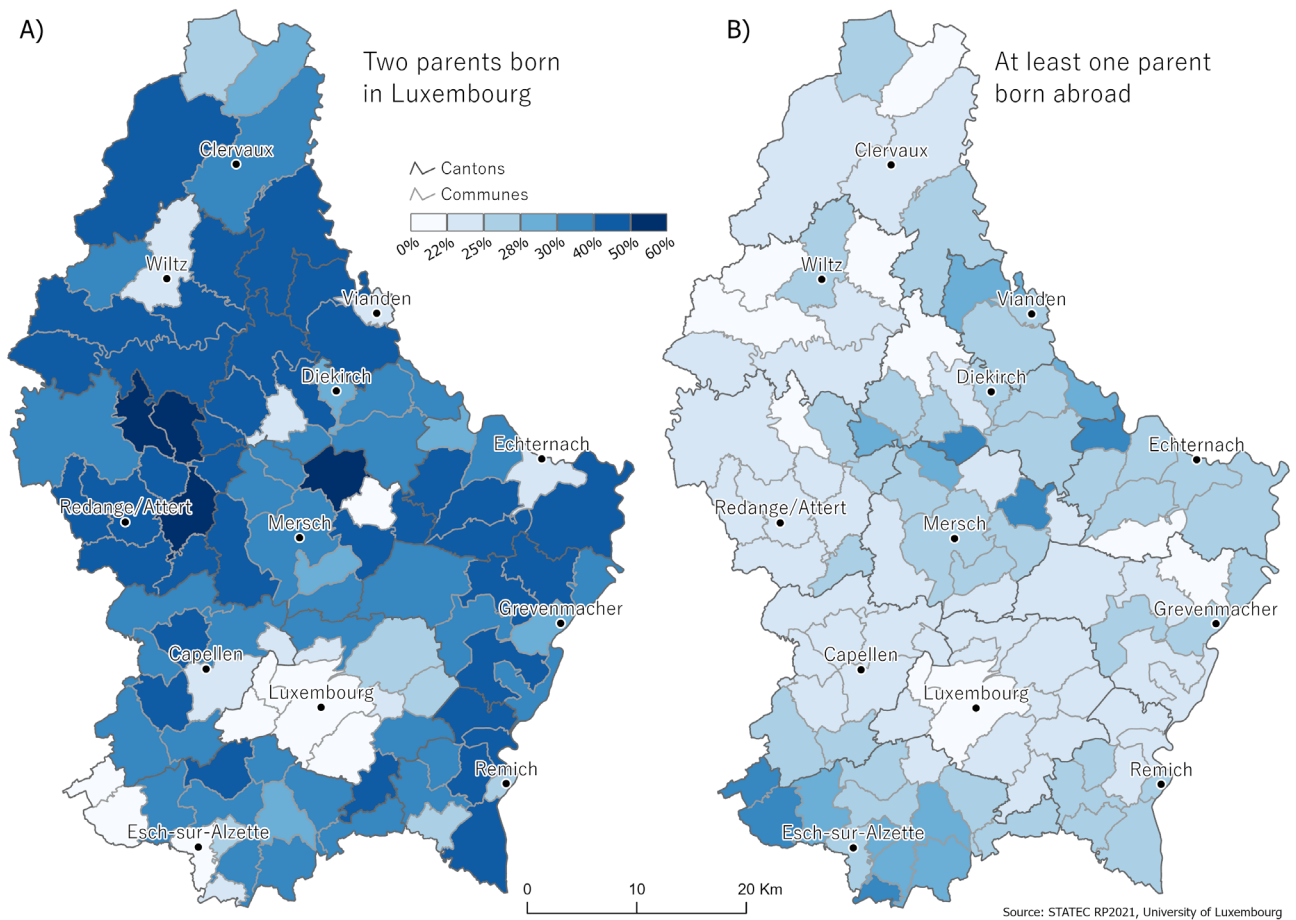
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**Map A1. Proportions of natives in the population by commune (A) and by 1 km² cell (B).**



A)

% of people born in Luxembourg by municipality

Cantons
Communes

0%  20%  40%  55%  65%  75%  90%  100%

Clervaux
Wiltz
Vianden
Diekirch
Echternach
Redange/Attert
Mersch
Grevenmacher
Capellen
Luxembourg
Remich
Esch-sur-Alzette

0    10    20 Km

B)

% of people born in Luxembourg per 1km² grid

Clervaux
Wiltz
Vianden
Diekirch
Echternach
Redange/Attert
Mersch
Grevenmacher
Capellen
Luxembourg
Remich
Esch-sur-Alzette

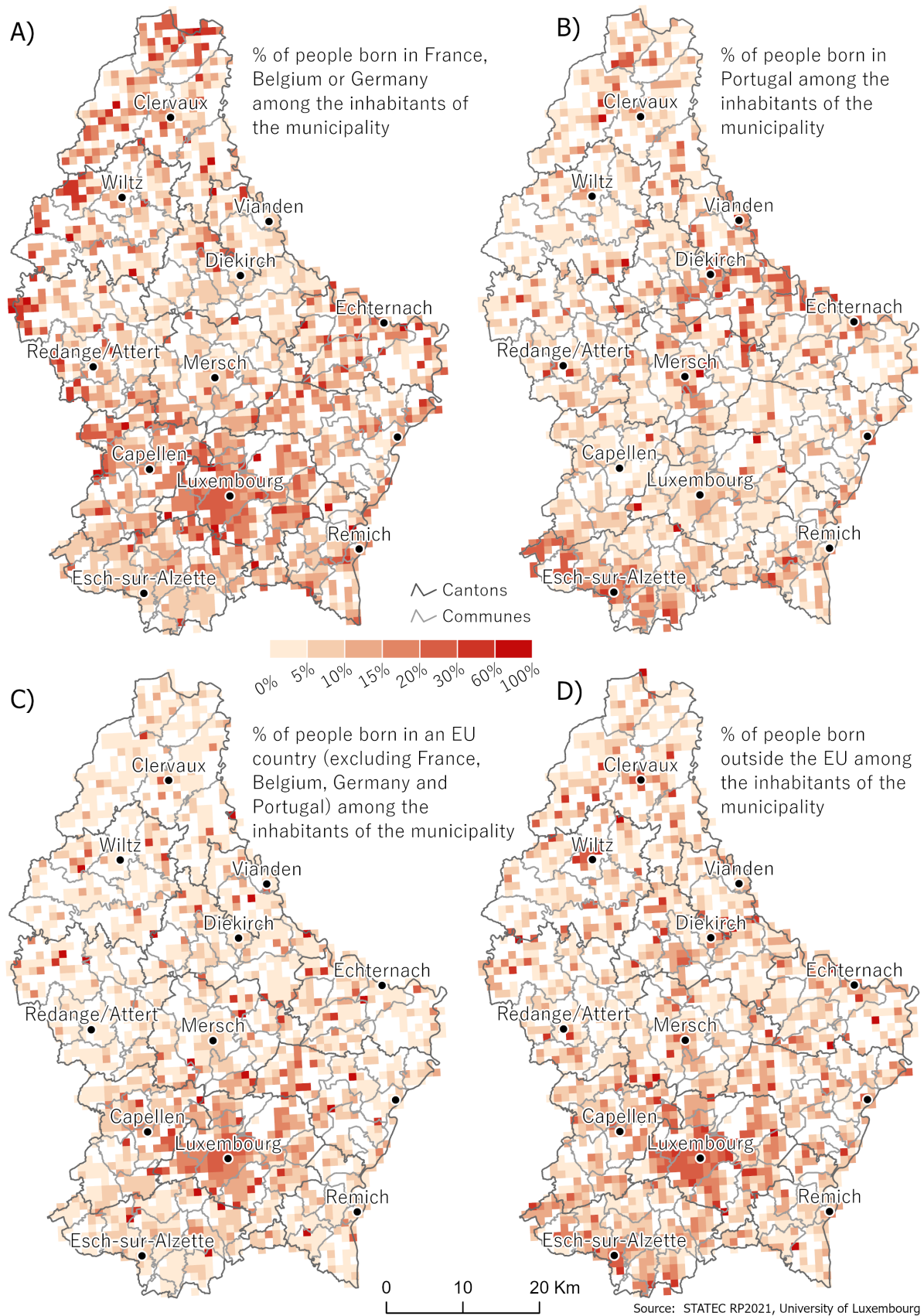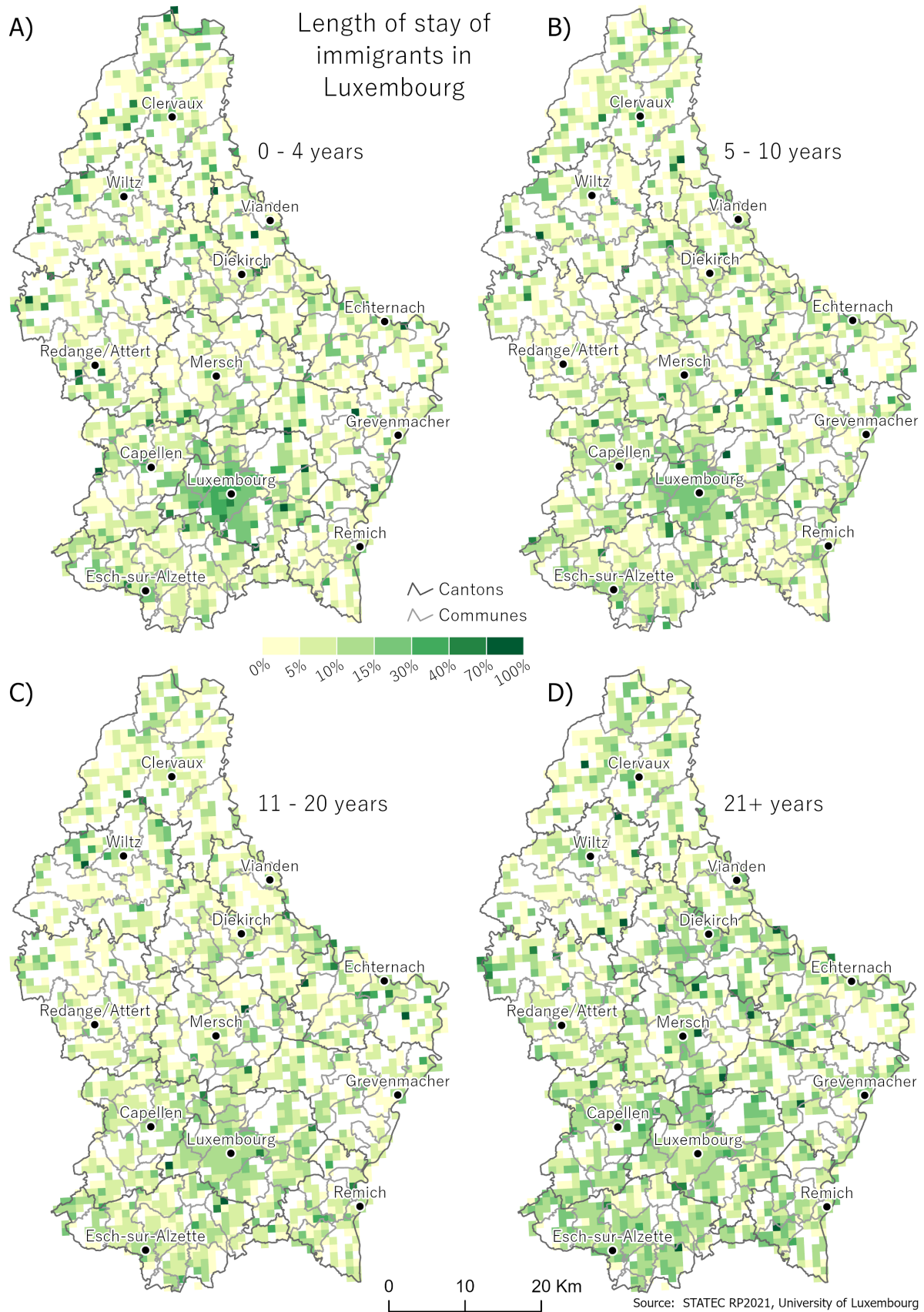Source: STATEC RP2021, University of Luxembourg

## Map annex

Map A.1 illustrates the proportion of natives (people born in Luxembourg) by municipality and by cell of 1 km², offering an easy comparison with map 1 in the body of the text. It highlights the low presence of native-born people in the country's two most populous cities, Luxembourg and Esch-sur-Alzette, as well as in municipalities close to the capital and in border areas. This last trend is even more visible at the scale of 1 km² cells.

While maps 2 and 3 in the body of the text set out the geographical distributions of specific immigrant populations within Luxembourg municipalities, maps A2 and A3 below adopt a 1 km² cell construction. This gives a clearer picture of the geographical areas of the country that are either low or high exposed to immigration.

**Map A2. Share of immigrants in the population by region of birth per 1 km² cell**



A) % of people born in France, Belgium or Germany among the inhabitants of the municipality

B) % of people born in Portugal among the inhabitants of the municipality

C) % of people born in an EU country (excluding France, Belgium, Germany and Portugal) among the inhabitants of the municipality

D) % of people born outside the EU among the inhabitants of the municipality

0%  5%  10%  15%  20%  30%  60%  100%

Cantons
Communes

0   10   20 Km

Source: STATEC RP2021, University of Luxembourg

**Map A3. Share of immigrants in the population by length of stay and by 1 km² cell**



Length of stay of immigrants in Luxembourg

A) 0 - 4 years
B) 5 - 10 years
C) 11 - 20 years
D) 21+ years

Cantons
Communes

0%  5%  10%  15%  30%  40%  70%  100%

0    10    20 Km

Source: STATEC RP2021, University of Luxembourg

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