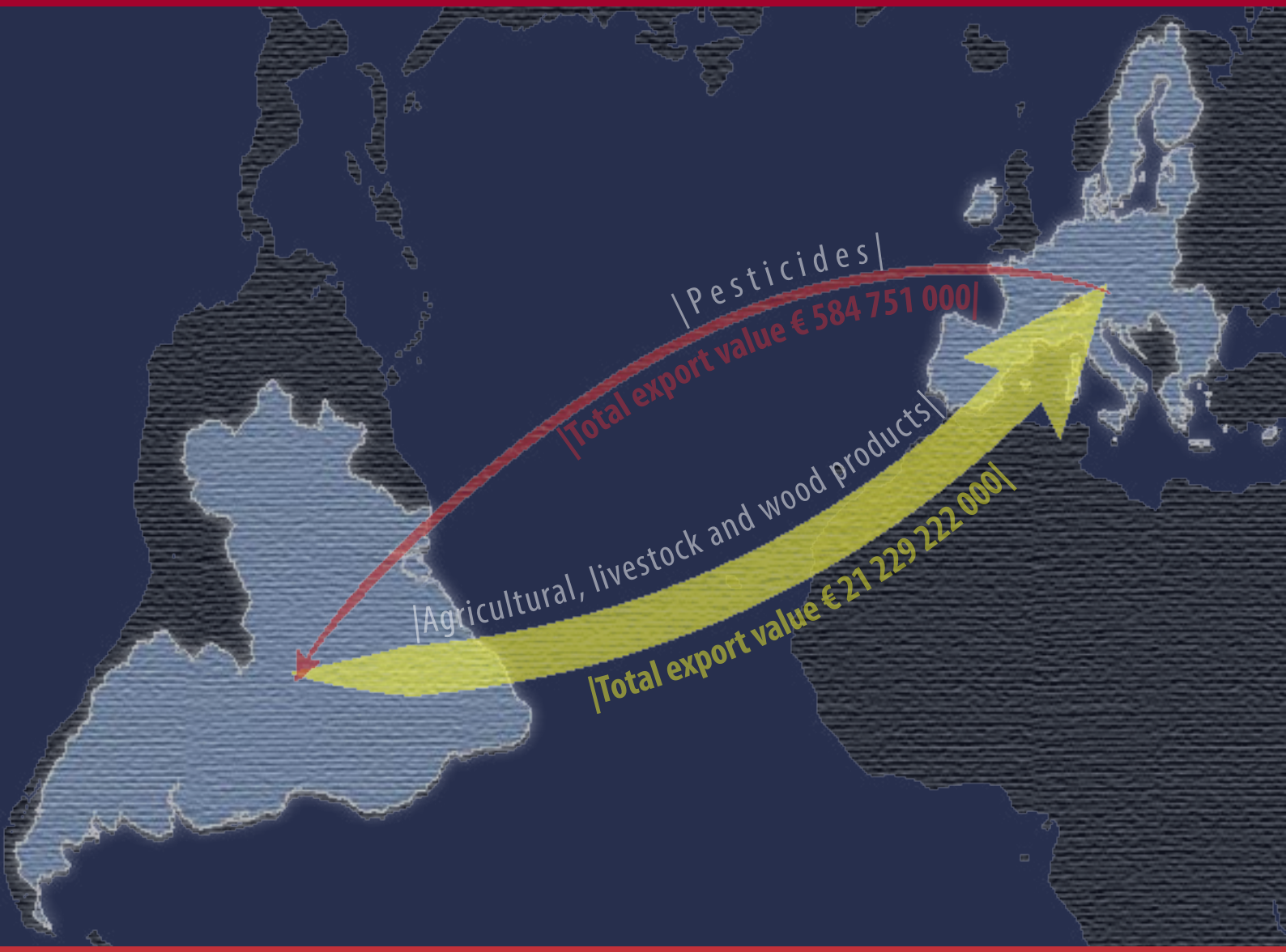
Geography of Asymmetry:
the vicious cycle of pesticides and colonialism in the commercial relationship between Mercosur and the European Union



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Geography of Asymmetry: the vicious cycle of pesticides and colonialism in the commercial relationship between Mercosur and the European Union

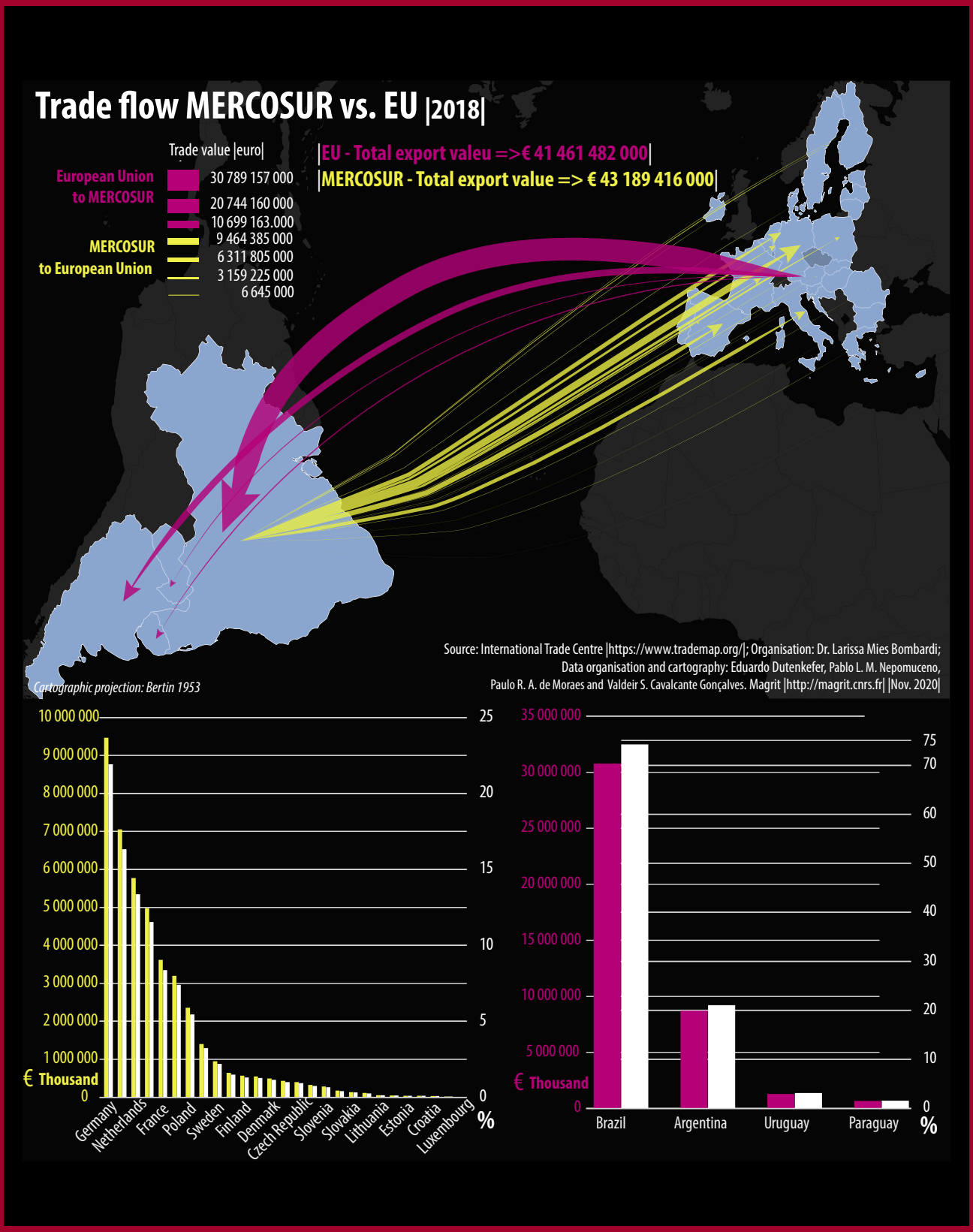
The renowned Uruguayan writer Eduardo Galeano, in *Las Venas Abiertas de América Latina (Open Veins of Latin America*), stated in the initial phrases of his work that Latin America had specialised in losing.

There are two sides to the international division of labour: one in which some countries are specialised in winning and another in which they are specialised in losing. Our part of the world, which we today call Latin America, was precocious: it has specialised in losing since the remote times during which the Europeans of the Renaissance thrust themselves across the sea and sank their teeth into its throat

(Galeano, E.,
Las Venas Abiertas de América Latina, 1971. My translation).

The word "tragedy" appears various times in Galeano's work to define the social conditions of Latin American countries. Today, it would seem that the Mercosur-European Union Trade Agreement is prepared to seal Latin America's fate as an ongoing tragedy.

[Map 1]


Trade flow MERCOSUR vs. EU |2018|
Trade value |euro|
European Union to MERCOSUR
30 789 157 000
20 744 160 000
10 699 163.000
9 464 385 000
MERCOSUR to European Union
6 311 805 000
3 159 225 000
6 645 000
|EU - Total export valeu =>€ 41 461 482 000|
|MERCOSUR - Total export value => € 43 189 416 000|
Source: International Trade Centre |https://www.trademap.org/|; Organisation: Dr. Larissa Mies Bombardi;
Data organisation and cartography: Eduardo Dutenkefer, Pablo L. M. Nepomuceno,
Paulo R. A. de Moraes and Valdeir S. Cavalcante Gonçalves. Magrit |http://magrit.cnrs.fr| |Nov. 2020|
Cartographic projection: Bertin 1953
10 000 000
9 000 000
8 000 000
7 000 000
6 000 000
5 000 000
4 000 000
3 000 000
2 000 000
1 000 000
€ Thousand
0
25
20
15
10
5
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%
Germany
Netherlands
France
Poland
Sweden
Finland
Denmark
Czech Republic
Slovenia
Slovakia
Lithuania
Estonia
Croatia
Luxembourg
35 000 000
30 000 000
25 000 000
20 000 000
15 000 000
10 000 000
5 000 000
€ Thousand
0
75
70
60
50
40
30
20
10
0
%
Brazil
Argentina
Uruguay
Paraguay

1. The EU–Mercosur asymmetry

The maps presented in this publication clearly and unambiguously illustrate the "tragedy foretold" by Eduardo Galeano, despite what the hegemonic discourse surrounding the Mercosur-European Union Trade Agreement would have us believe, claiming that the accord would be of great benefit to both trade blocs.

In strictly monetary terms, there has been a certain equilibrium in the commercial exchanges established between Mercosur and the EU. In fact, there has even been a discreet economic advantage for Mercosur if we base our analysis on the numbers from 2018.

The total export values derived from their relationship are, in truth, very similar for both trade blocs. In 2018, the EU exported around 41 billion euros' worth of goods to Mercosur, and Mercosur exported around 43 billion euros' worth to the EU, as can be seen on **Map 1 (Trade Flow MERCOSUR vs. EU)**.

The primary countries that export from the EU to Mercosur are Germany (which accounts for 20% of the total export value), the Netherlands (around 17%), and France (around 14%). The leading exporter from Mercosur to the EU is Brazil, accounting for more than 70% of the total export volume from the trade bloc, followed by Argentina, which accounts for around 20%, and then Paraguay and Uruguay, which account together for the remaining total volume at around 5%.

Without a doubt, these numbers may give the appearance of economic equality in the commercial trading relationship between the two blocs. However, this apparent equality masks the subordination of Mercosur's social-environmental and human needs and interests behind these financial figures regarding exports.

While the main products exported by the EU to Mercosur are machinery, vehicles, nuclear reactors, pharmaceuticals, and electronic equipment, the main products exported by Mercosur to the EU are soybean meal, animal feed, ore, grains, cellulose, vegetable oils, fruit, and coffee.

As can be seen in **Table 1**, exports from Mercosur to the EU consist mostly of agricultural and mineral products. Among the categories of the 12 most exported products from Mercosur to the EU, 8 are related to agriculture and livestock farming, three to mining, and only one to industrial products such as machinery.

However, we see precisely the opposite situation when looking at the types of goods that the EU exports to Mercosur: of the 12 categories of most exported products, 11 are related to aggregated technology, and only the 12th category is related to commodities. This difference in the lists of exports between the two trade blocs makes evident the still existing asymmetry established by the old model of the international division of labour, in which wealthy nations export industrialised products (which nowadays include components with advanced technology), and poorer countries export basic goods such as food and mining products. To this day, we continue to reproduce the colonial model that the European colonial powers established 500 years ago.

There, therefore, exists a first level of asymmetry between these two trade blocs. Nevertheless, this first level, economic and technological in nature, is only the outer layer of a profound asymmetry that begins at the macroscopic level and goes to the microscopic, or cellular, rather, because of the substances exported by the EU that are prohibited for use there but absorbed by the environment and the very bodies of the people of Latin America.

[Table 1]

Bilateral trade between the European Union (EU 27) and the Southern Common Market (MERCOSUR) |2018|

The top twelve

|in thousands of euros|

	The European Union (EU 27)'s imports from the Southern Common Market (MERCOSUR) - 2018		The European Union (EU 27)'s exports to the Southern Common Market (MERCOSUR) - 2018	
Ranking	**Products**	**euros**		**euros**
1	Residues and waste from the food industries; prepared animal fodder	5 307 193	Machinery, mechanical appliances, nuclear reactors, boilers; parts thereof	8 563 605
2	Ores, slag and ash	4 878 157	Vehicles other than railway or tramway rolling stock, and parts and accessories thereof	3 889 529
3	Pulp of wood or of other fibrous cellulosic material; recovered (waste and scrap) paper or paperboard	3 550 286	Pharmaceutical products	3 774 187
4	Mineral fuels, mineral oils and products of their distillation; bituminous substances; mineral waxes	3 521 721	Electrical machinery and equipment and parts thereof; sound recorders and reproducers, television image and sound recorders and reproducers, and parts and accessories of such articles	3 619 815
5	Oil seeds and oleaginous fruits; miscellaneous grains, seeds and fruit; industrial or medicinal plants; straw and fodder	2 637 538	Mineral fuels, mineral oils and products of their distillation; bituminous substances; mineral waxes	2 566 009
6	Iron and steel	2 009 605	Organic chemicals	2 160 325
7	Coffee, tea, maté and spices	1 984 446	Optical, photographic, cinematographic, measuring, checking, precision, medical or surgical instruments and apparatus; parts and accessories thereof	2 004 503
8	Preparations of vegetables, fruit, nuts or other parts of plants	1 712 010	Plastics and articles thereof	1 619 004
9	Meat and edible meat offal	1 653 276	Aircraft, spacecraft, and parts thereof	1 609 743
10	Machinery, mechanical appliances, nuclear reactors, boilers; parts thereof	1 561 861	Miscellaneous chemical products	1 277 647
11	Edible fruit and nuts; peel of citrus fruit or melons	1 328 483	Articles of iron or steel	891 709
12	Cereals	851 727	Commodities not elsewhere specified	805 010

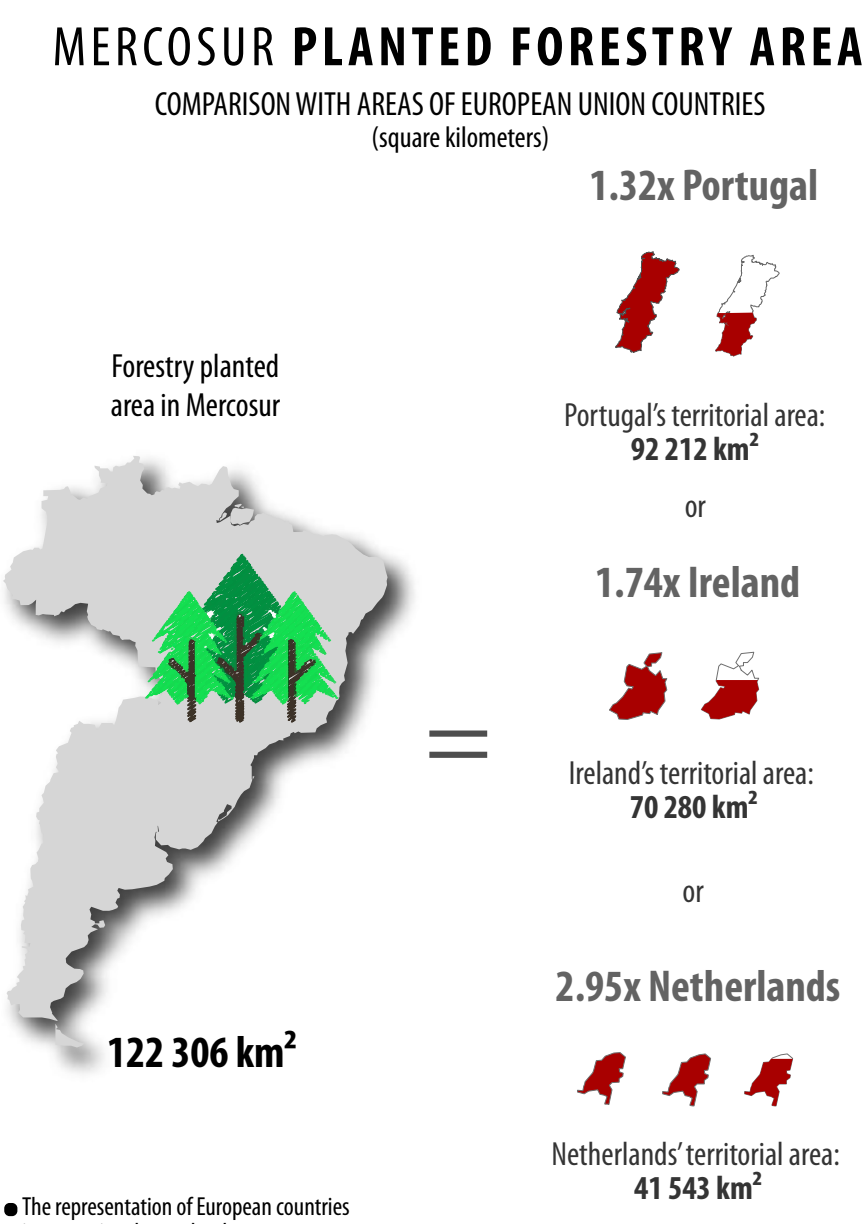
Source: https://www.trademap.org/

Let us begin our analysis with the macroscopic aspect of this bilateral relationship.

For Mercosur to produce its "top 12" exports, such as grains, soybean meal, beef, and cellulose (beef accounting for 1 billion euros' worth of exports annually, and the most emblematic case, soya beans and their derivatives, having accounted for 5 billion euros' worth in 2018 alone), it has had to allocate an enormous area of land within its member countries to the development of the agricultural and livestock farming activities required for such production.

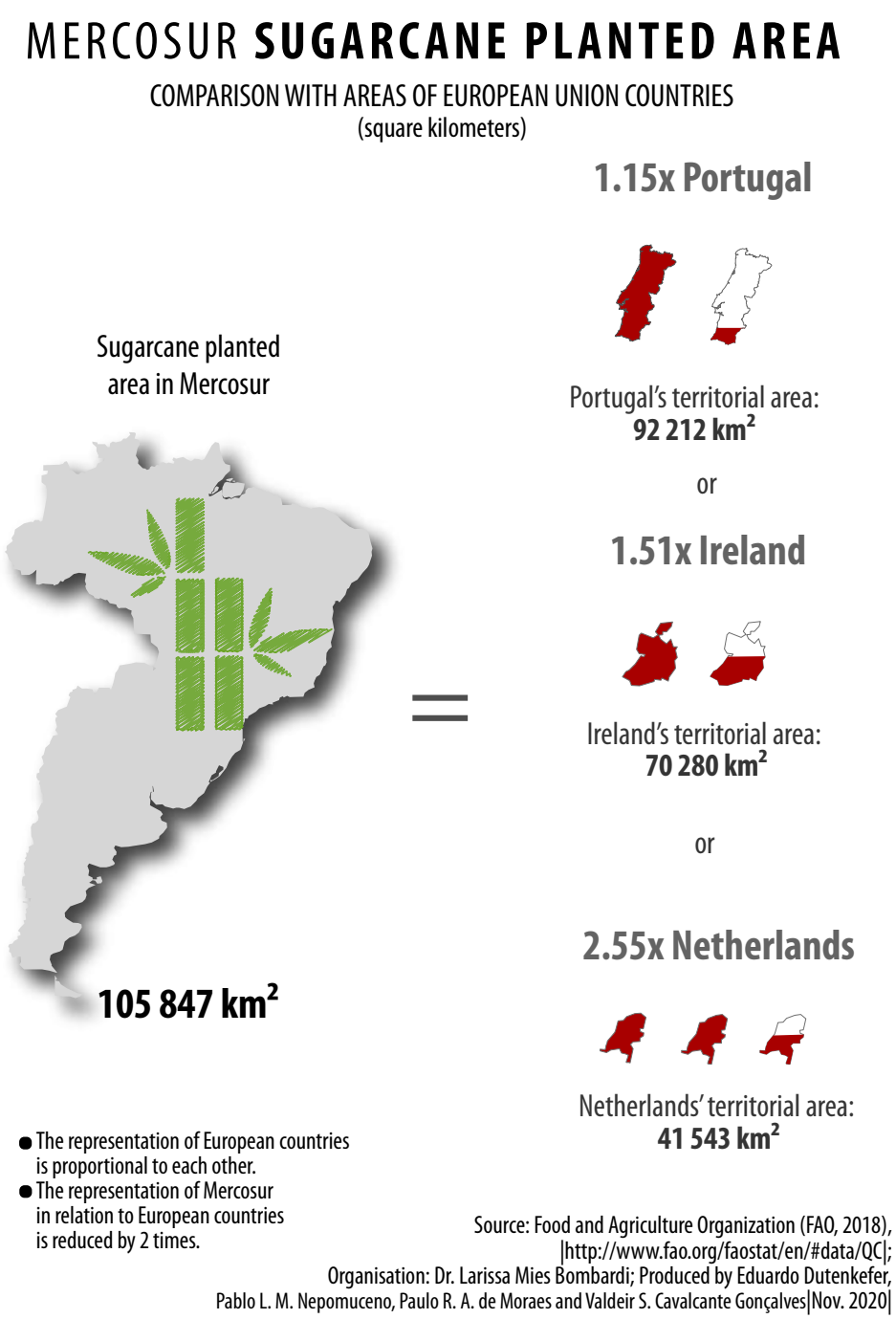
As seen on **Map 2**, the area within Mercosur occupied by planted forests (eucalyptus and pine) is larger than the entire country of Portugal! This area also corresponds to the size of two Irelands and practically three Netherlands.

[Map 2]



The situation is no different when it comes to sugarcane [**Map 3**]. The substitution of fossil fuels with ethanol, produced from sugarcane, has had a significant territorial impact: the area of land used to grow sugarcane within Mercosur is equivalent to the territory of Portugal, one and a half Irelands, and two and a half Netherlands.

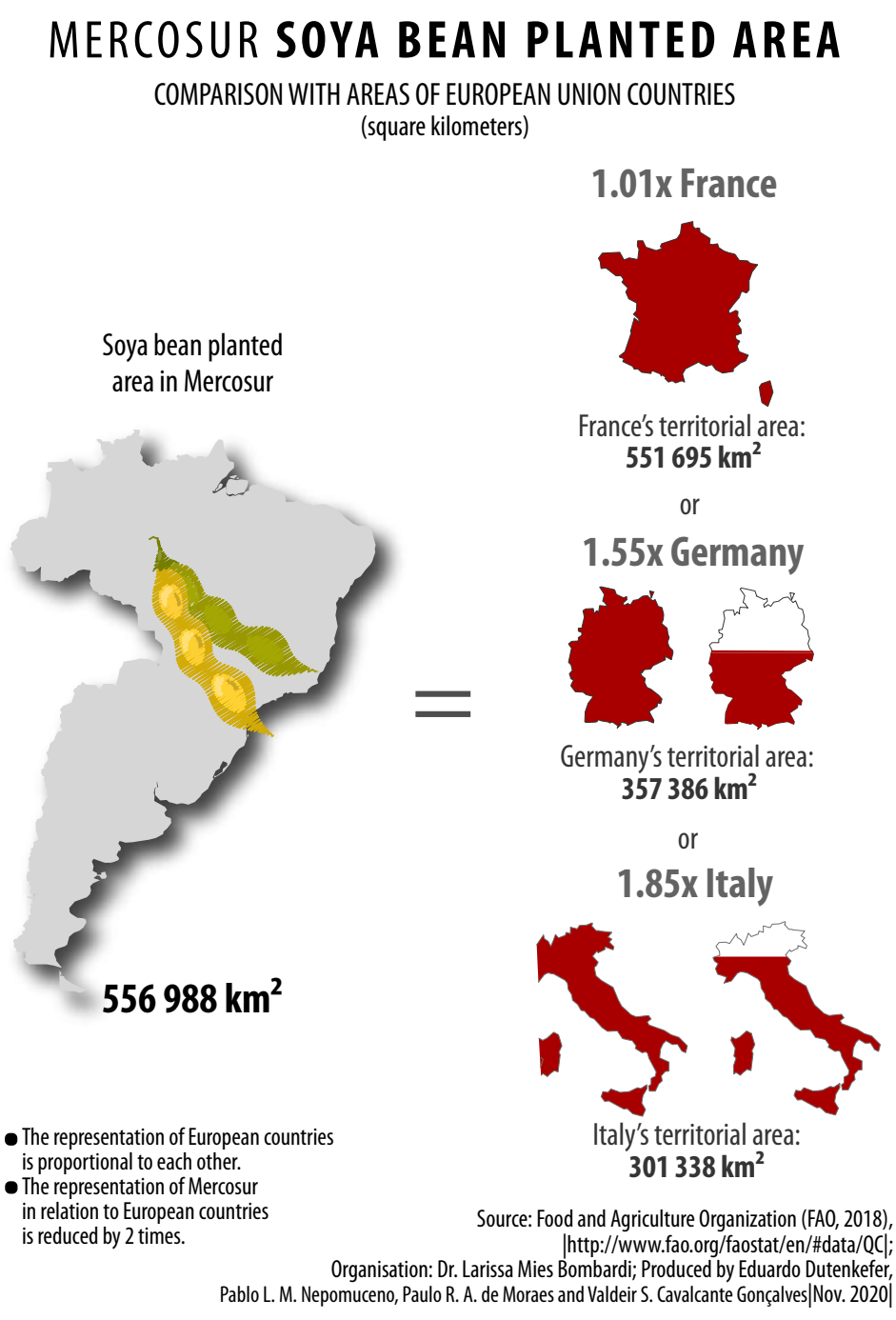
[Map 3]



As can be seen on **Map 4**, the area utilised for soya bean farming within Mercosur is equivalent to two Italys, one and a half Germanys, or no less than the entire territory of France!

Furthermore, the area of land allotted to the production of commodities has dramatically increased within Mercosur countries over a relatively short period of time. A map based on the data on Brazil demonstrates the extent of this expansion very clearly:

[Map 4]

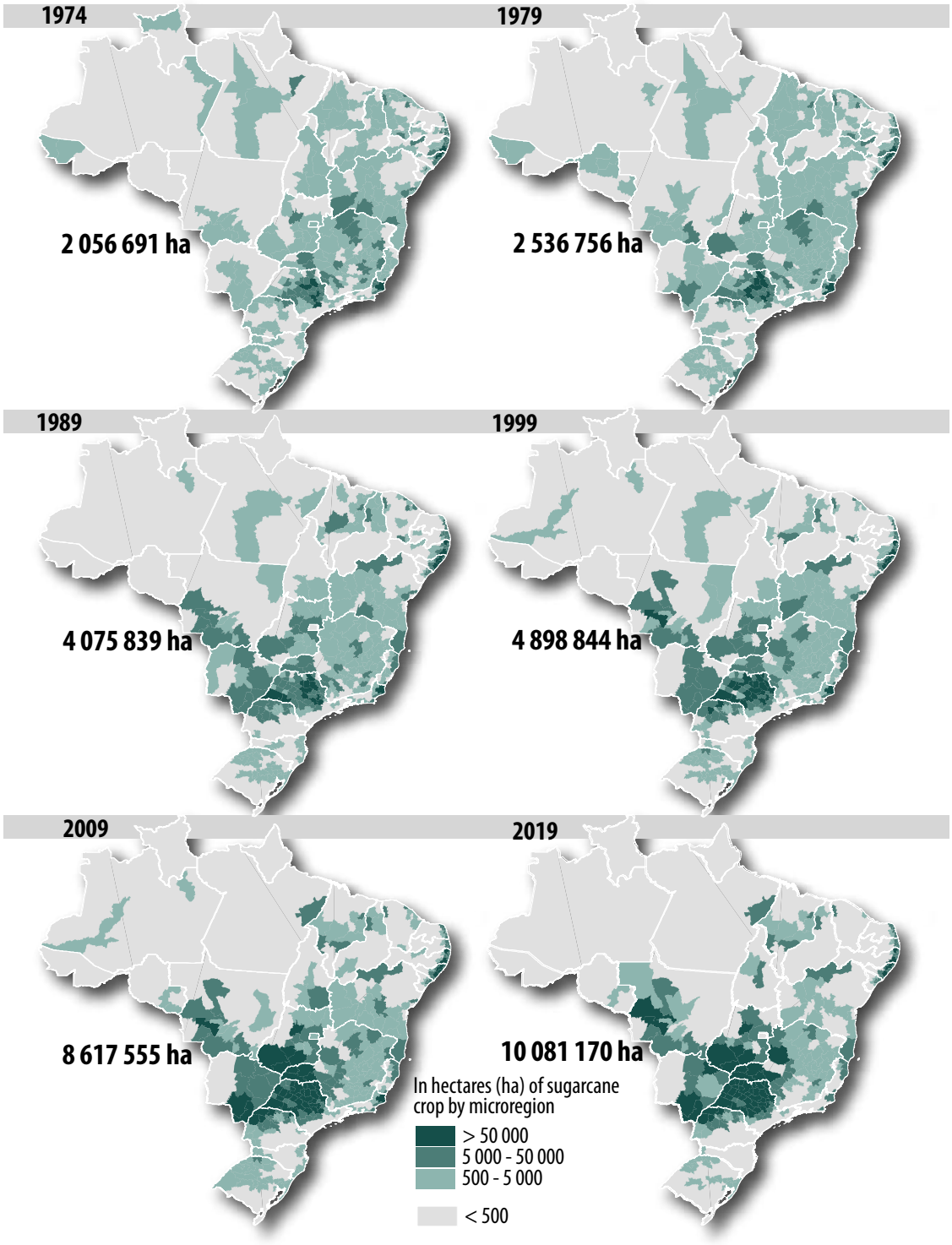


In 45 years, the area used to grow sugarcane in Brazil has increased around fivefold [**Map 5**].

[Map 5]

EXPANSION OF SUGARCANE CROP IN BRAZIL

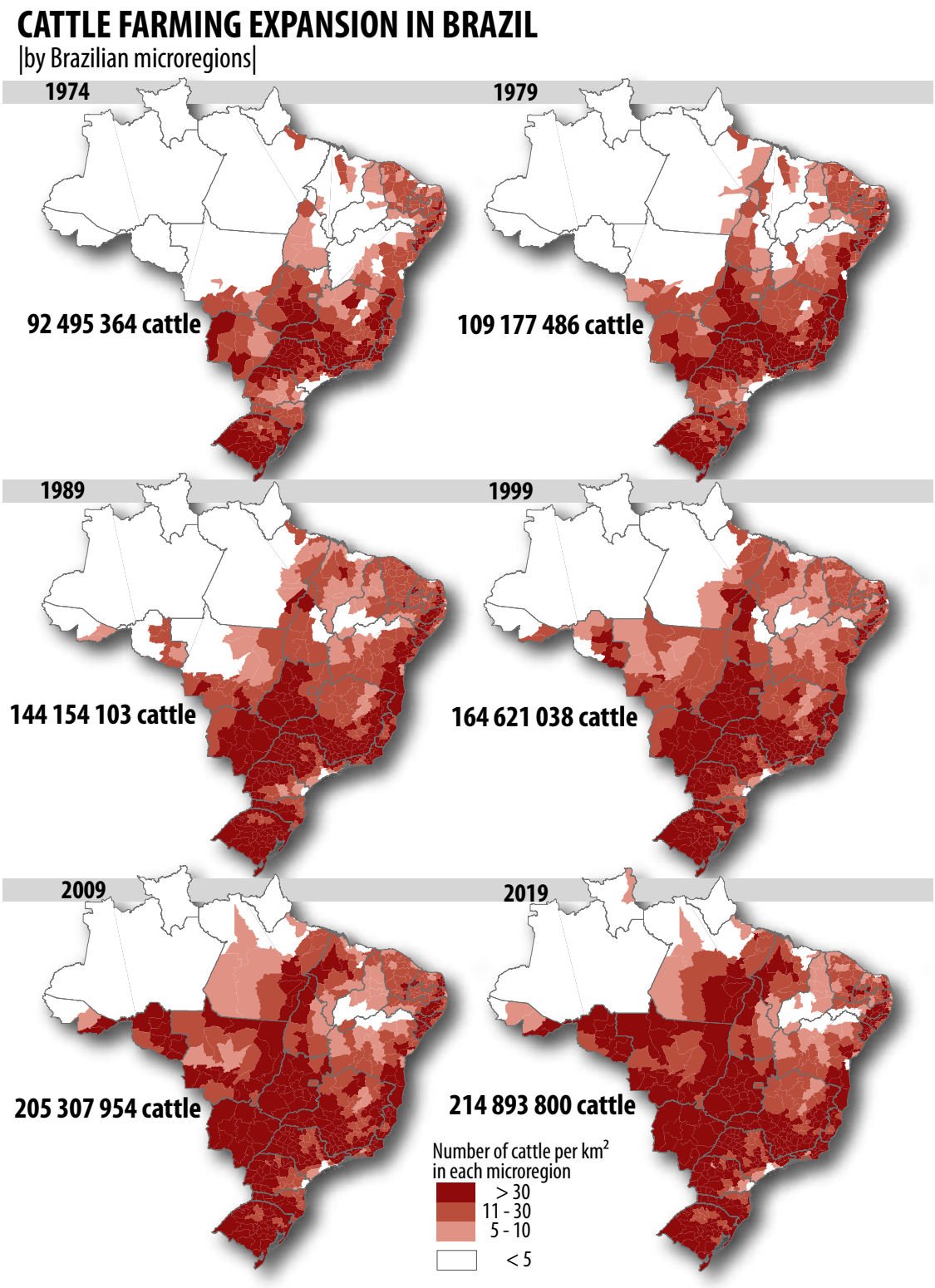
|by Brazilian microregions|



Source: IBGE - SIDRA, 2020; Organisation: Dr. Larissa Mies Bombardi;
Elaboration: Eduardo Dutenkefer, Pablo L. M. Nepomuceno, Paulo R. A. de Moraes and Valdeir S. Cavalcante Gonçalves|Nov. 2020|

As shown on **Map 6**, heads of cattle have tripled over a period of 45 years, with the national cattle herd amounting to more than 214 million heads in 2019, equivalent to more than one animal per person if we compare this number to the human population of

[Map 6]



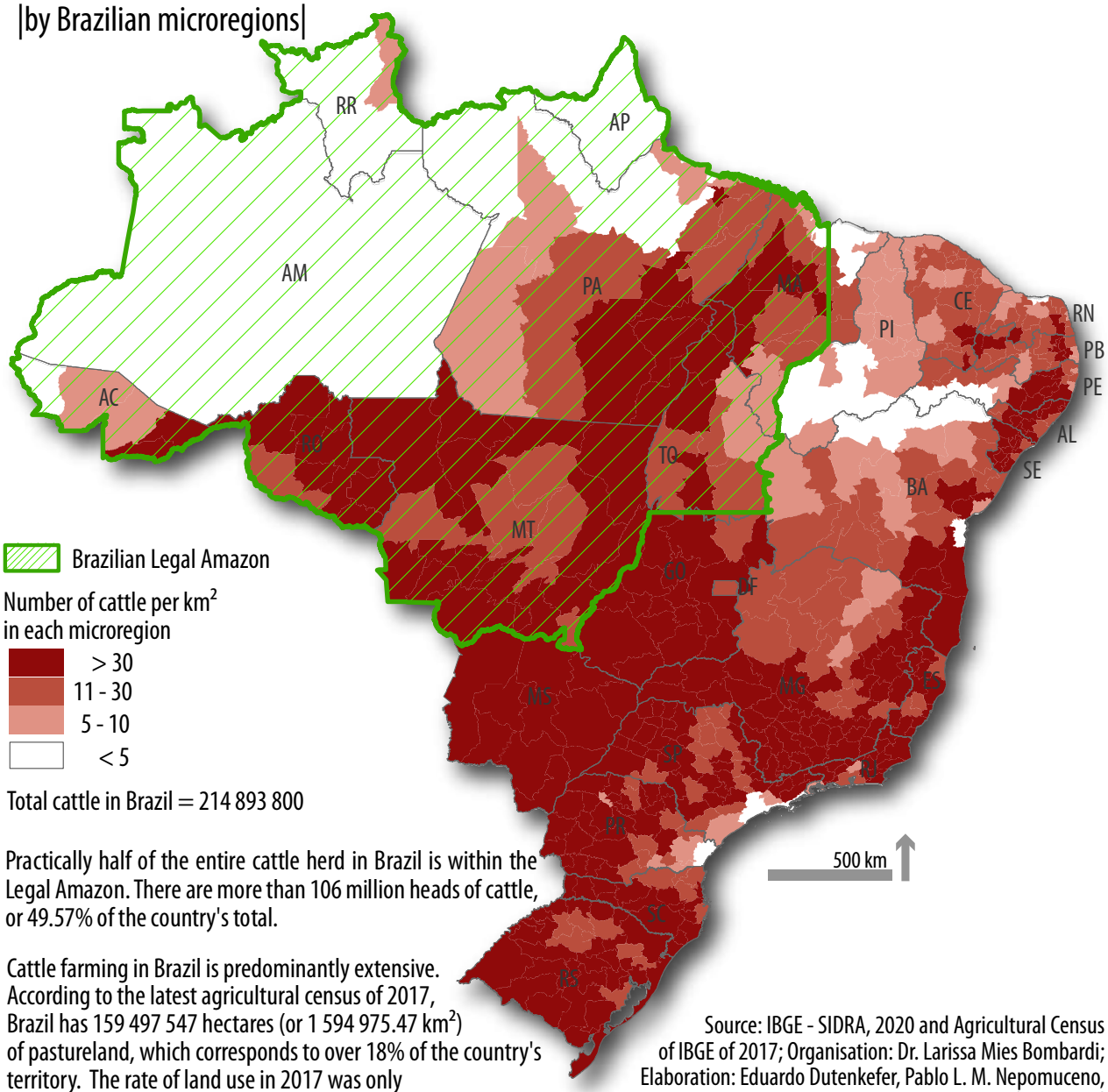
Source: IBGE - SIDRA, 2020; Organisation: Dr. Larissa Mies Bombardi;
Elaboration: Eduardo Dutenkefer, Pablo L. M. Nepomuceno, Paulo R. A. de Moraes and Valdeir S. Cavalcante Gonçalves|Nov. 2020|

Brazil, which was 210 million people in 2019. This increase in the number of cattle has had an enormous land use impact, especially since, as can be seen on **Map 7**, much of the expansion has taken place in the Brazilian Amazon.

[Map 7]

CATTLE DENSITY IN BRAZIL AND THE BRAZILIAN LEGAL AMAZON

|by Brazilian microregions|



Total cattle in Brazil = 214 893 800

Practically half of the entire cattle herd in Brazil is within the Legal Amazon. There are more than 106 million heads of cattle, or 49.57% of the country's total.

Cattle farming in Brazil is predominantly extensive. According to the latest agricultural census of 2017, Brazil has 159 497 547 hectares (or 1 594 975.47 km²) of pastureland, which corresponds to over 18% of the country's territory. The rate of land use in 2017 was only 1.35 oxen per hectare of pasture.

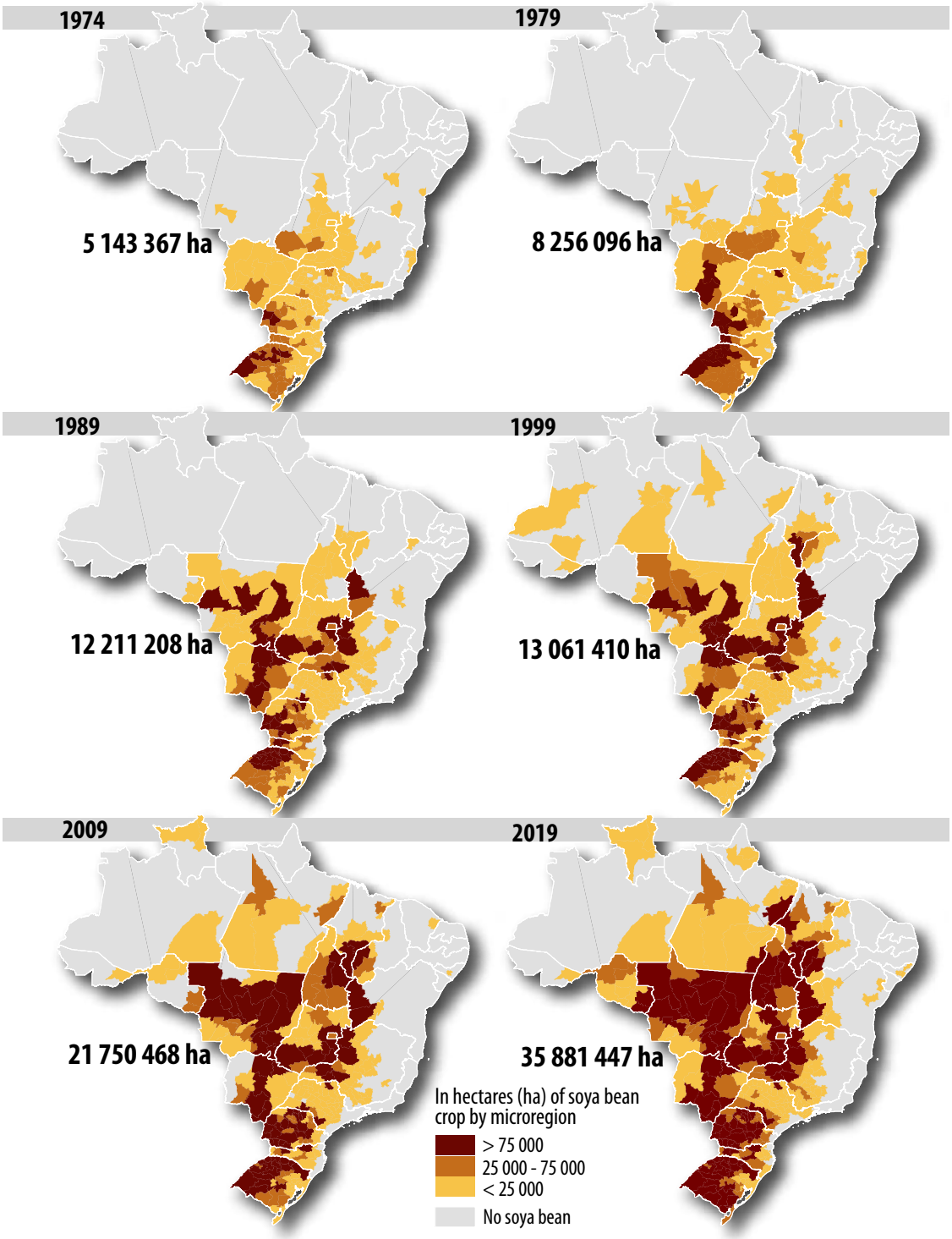
Source: IBGE - SIDRA, 2020 and Agricultural Census of IBGE of 2017; Organisation: Dr. Larissa Mies Bombardi; Elaboration: Eduardo Dutenkefer, Pablo L. M. Nepomuceno, Paulo R. A. de Moraes and Valdeir S. Cavalcante Gonçalves |Nov. 2020|

The case of soya bean production is, without a doubt, the most emblematic of all. The area of land used to grow soya beans in Brazil has increased sixfold in 45 years, with much of this expansion taking place quite recently. **Map 8**.

[Map 8]

EXPANSION OF SOYA BEAN CROP IN BRAZIL

|by Brazilian microregions|



Source: IBGE - SIDRA, 2020; Organisation: Dr. Larissa Mies Bombardi;
Elaboration: Eduardo Dutenkefer, Pablo L. M. Nepomuceno, Paulo R. A. de Moraes and Valdeir S. Cavalcante Gonçalves|Nov. 2020|

As shown in the graph that follows, the area used to grow soya beans in Brazil has increased exponentially. **Graph 1**.

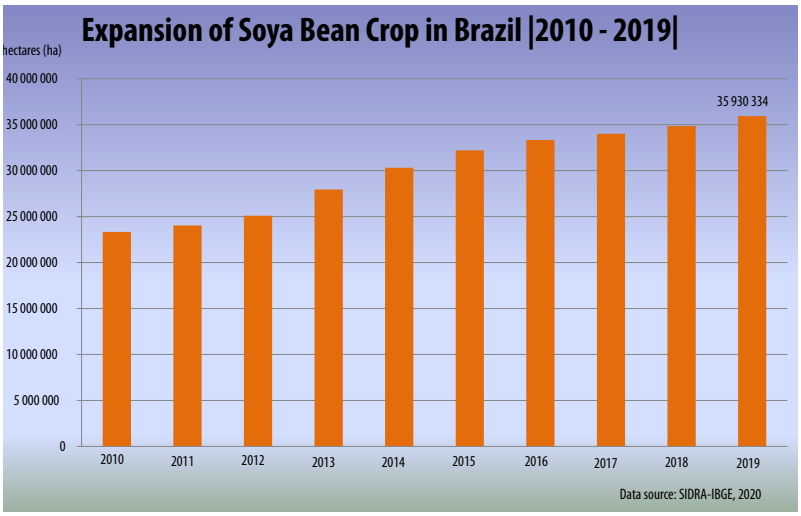
Between 2010 and 2019, the area used to raise soya beans in Brazil has increased 53,95%. In this period the total agricultural area has increased 28,46%. **Graph 2**.

This increase in commodity crops has led to enormous environmental and social impacts. Deforestation and intensive use of pesticides are clear examples of these impacts.

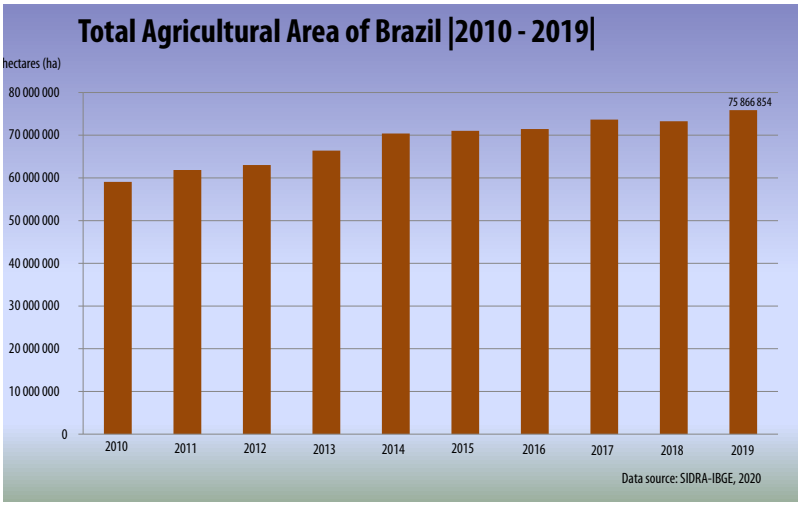
The large-scale use of pesticides has accompanied the expansion of mono-crops such as soya bean in Brazil. For this reason, the use of pesticides in Brazil, a Mercosur country for which we have detailed data, has increased at an extremely accelerated rate over recent years. **Graph 3**.

While soya bean farming expanded by 53.95% between 2010 and 2019 in Brazil, the use of pesticides during this period increased by 71.46%!

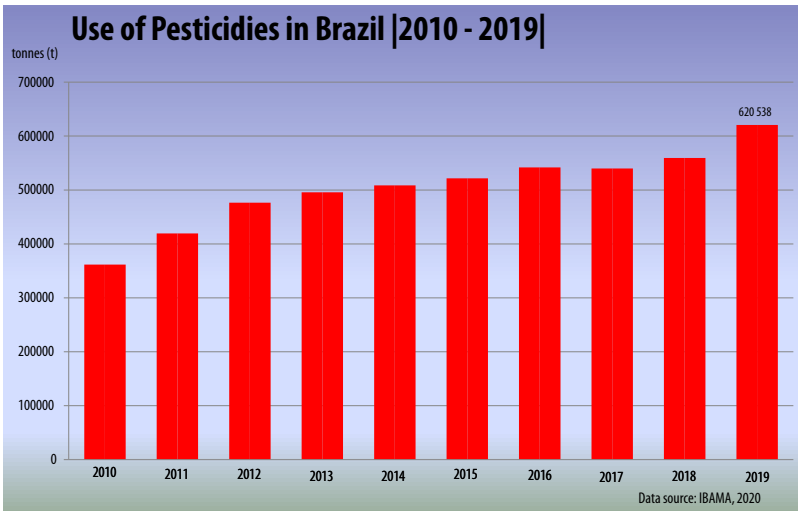
[Graph 1]



[Graph 2]



[Graph 3]



The number of agricultural establishments that use pesticides has multiplied significantly over recent years, especially in the region referred to as the Legal Amazon. **MAP 9**

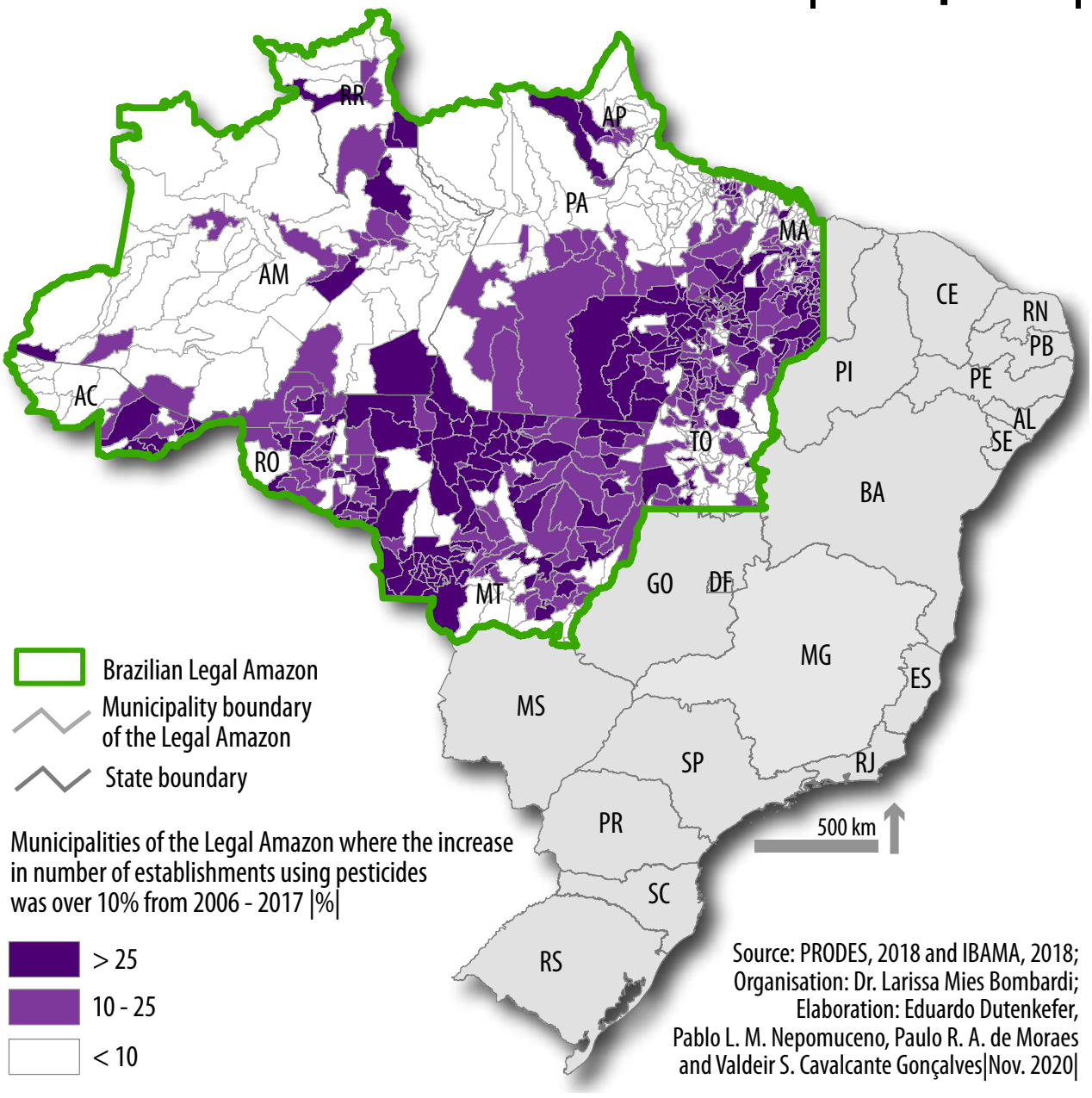
Note that many of the municipalities in the eastern and southeastern regions of the Brazilian Legal Amazon have seen an increase in the number of agricultural establishments that use pesticides. This is a direct result of the expansion of commercial agriculture in this area.

Obviously, the expansion of monocrops that require the use of pesticides in the Brazilian Legal Amazon is preceded by deforestation.

[Map 9]

PESTICIDES IN BRAZIL

AGRICULTURAL ESTABLISHMENTS |Municipalities|



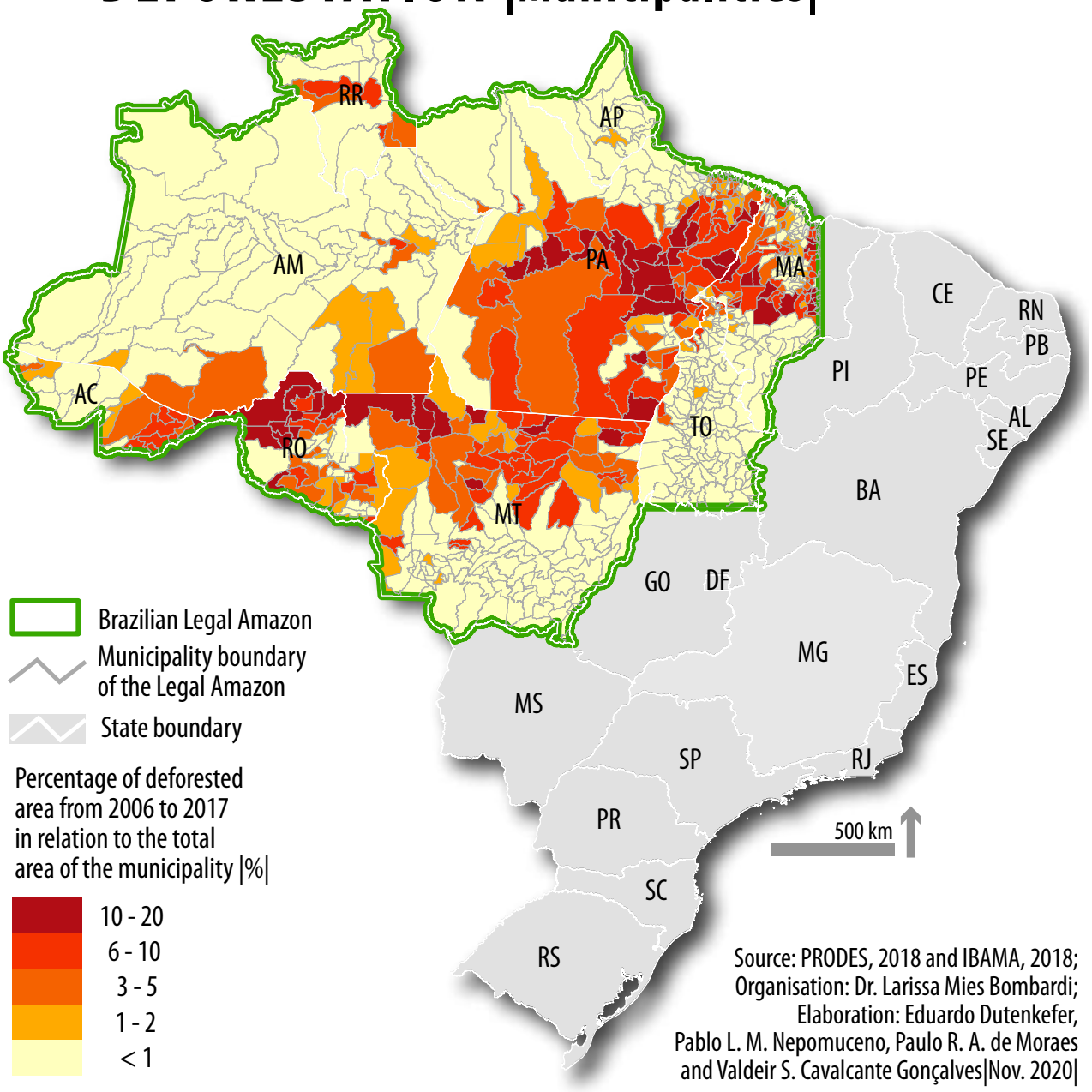
Note that, over the same period represented in the previous map, a large increase in deforestation has taken place precisely in the eastern and southeastern regions of the Legal Amazon. **MAP 10**

When you add the two together, deforestation and the increase in the use of pesticides, what you get is a tragic picture of the Brazilian Legal Amazon that summarises the environmental and social impacts of the economic framework that Mercosur member countries have adopted. This is especially true in the case of Brazil, whose current economic framework has been built in large part on a foundation of expanding the production of agricultural commodities.

[Map 10]

BRAZILIAN LEGAL AMAZON

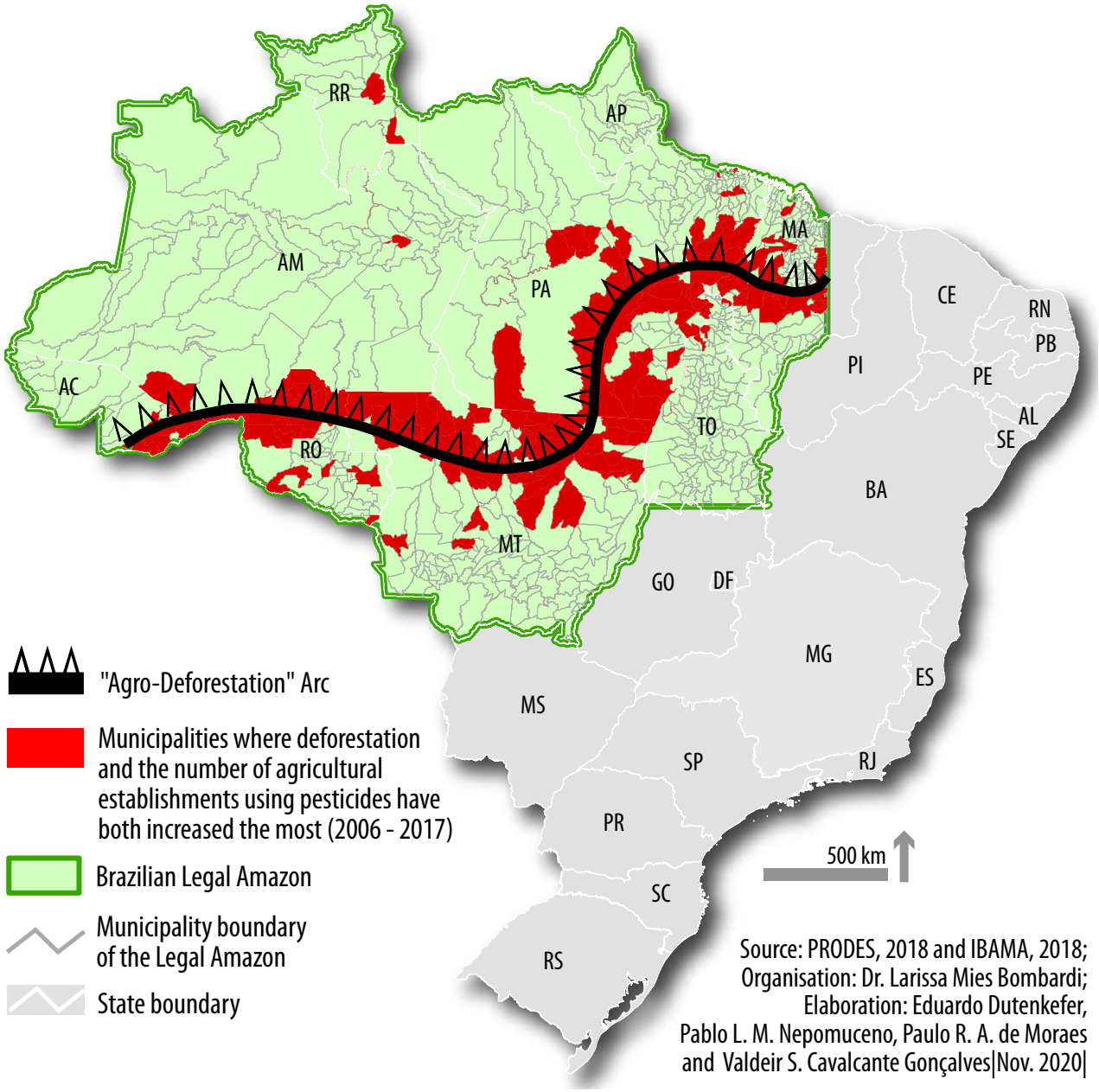
DEFORESTATION |Municipalities|



Source: PRODES, 2018 and IBAMA, 2018;
Organisation: Dr. Larissa Mies Bombardi;
Elaboration: Eduardo Dutenkefer, Pablo L. M. Nepomuceno, Paulo R. A. de Moraes and Valdeir S. Cavalcante Gonçalves|Nov. 2020|

[Map 11]

BRAZILIAN LEGAL AMAZON
PESTICIDES AND DEFORESTATION



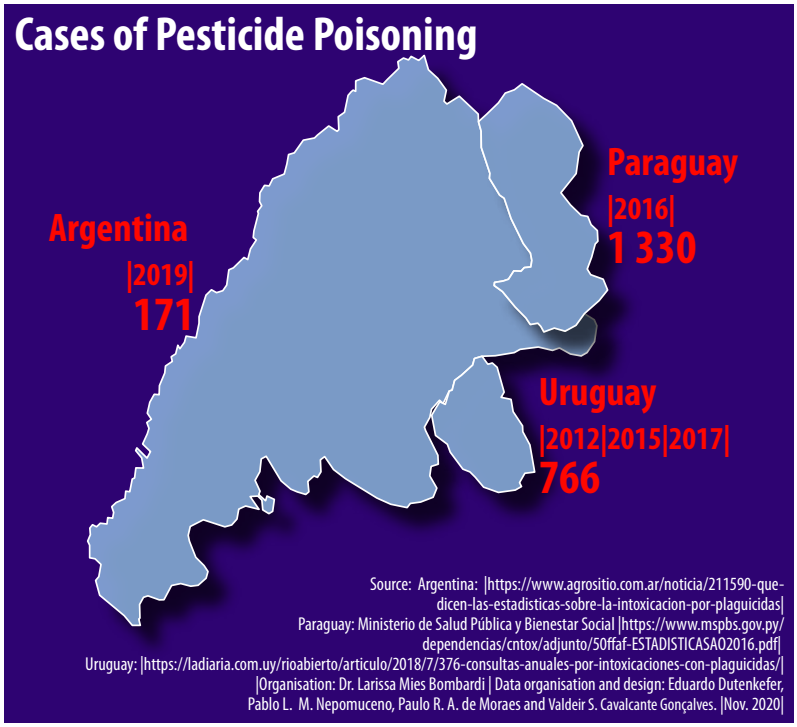
Source: PRODES, 2018 and IBAMA, 2018;
Organisation: Dr. Larissa Mies Bombardi;
Elaboration: Eduardo Dutenkefer, Pablo L. M. Nepomuceno, Paulo R. A. de Moraes and Valdeir S. Cavalcante Gonçalves|Nov. 2020|

2. Colonialism

This intensive use of pesticides on Mercosur's agricultural establishments has had a severe impact on the health of the population, as seen on **Map 12**.

In 2019, Argentina recorded 171 cases of pesticide poisoning by chemicals used in local agriculture. When adding up the numbers from 2012, 2015, and 2017, the amount of people who suffered from pesticide poisoning in Uruguay comes out to 766. In 2016 alone, Paraguay recorded 1330 people with pesticide poisoning from substances used in local agriculture. Thus, the techno-economic subordination of Mercosur in relation to the EU has also meant the subordination of environmental and human health in the region to agribusiness interests.

[Map 12]



As illustrated above, the negative impacts of such an inequitable model of development have not been restricted to macroscopic aspects that are quite evident when we look at the destruction of forests to make way for commodity crops, but extends to the microscopic level as well. The increase in cases of pesticide poisoning within Mercosur's population paints a very clear picture of what can be referred to as "molecular colonialism[1]."

The former European colonies of Latin America, which have already seen much of their natural wealth plundered through violence and genocide, are now experiencing another phase of colonialism, which is not only characterised by the physical violence involved in the displacement of traditional peoples and communities who are driven from their land to make way for "modern" agriculture[2]. The peoples of Mercosur's countries are, to a great extent, also under assault from a kind of chemical violence, evidenced by the large number of people poisoned by substances developed and often sold by countries in the EU.

Thanks to its United Health System (SUS), Brazil has important public data on pesticide poisoning cases that have occurred among its population. In spite of the well-known fact that such poisonings are under-reported, the numbers are staggering, as the following maps indicate:

[1] https://www.anthropocene-curriculum.org/contribution/molecular-colonialism and https://vimeo.com/294971699

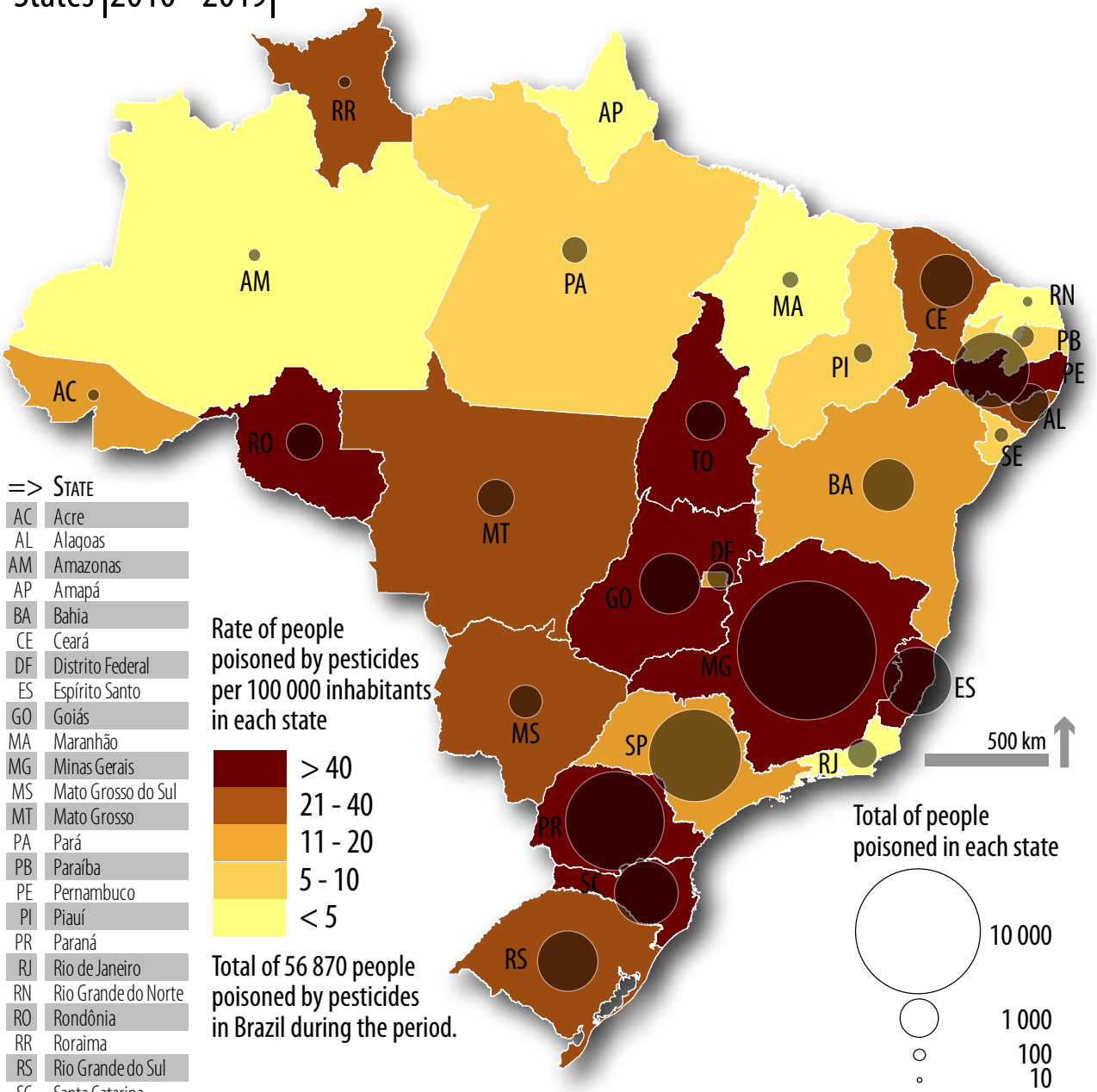
[2] http://www.mpf.mp.br/ms/sala-de-imprensa/noticias-ms/sentenca-inedita-determina-indenizacao-de-r-150-mil-a-comunidade-indigena-vitima-de-aplicacao-irregular-de-agrotoxico

As seen on **Map 13**, over the last ten years, 56 thousand people have been poisoned by pesticides used in Brazilian agriculture. The country has experienced an average of 5687 cases of such poisonings per year, which is equivalent to 15 people poisoned by pesticides every day.

[Map 13]

BRAZIL - PEOPLE POISONED BY PESTICIDES

States |2010 - 2019|

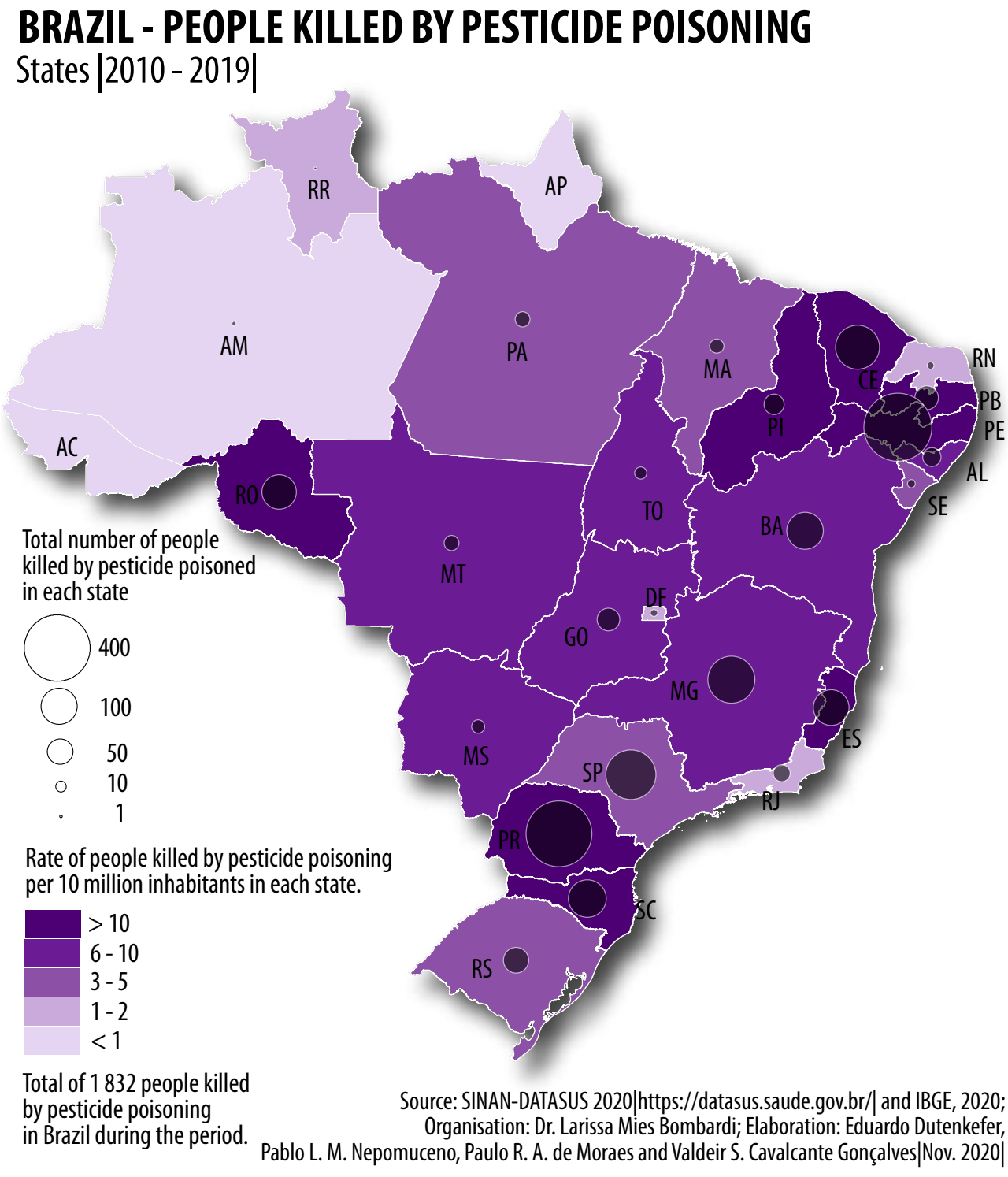


=>	State
AC	Acre
AL	Alagoas
AM	Amazonas
AP	Amapá
BA	Bahia
CE	Ceará
DF	Distrito Federal
ES	Espírito Santo
GO	Goiás
MA	Maranhão
MG	Minas Gerais
MS	Mato Grosso do Sul
MT	Mato Grosso
PA	Pará
PB	Paraíba
PE	Pernambuco
PI	Piauí
PR	Paraná
RJ	Rio de Janeiro
RN	Rio Grande do Norte
RO	Rondônia
RR	Roraima
RS	Rio Grande do Sul
SC	Santa Catarina
SE	Sergipe
SP	São Paulo
TO	Tocantins

Source: SINAN-DATASUS 2020|https://datasus.saude.gov.br/| and IBGE, 2020;
Organisation: Dr. Larissa Mies Bombardi; Elaboration: Eduardo Dutenkefer,
Pablo L. M. Nepomuceno, Paulo R. A. de Moraes and Valdeir S. Cavalcante Gonçalves|Nov. 2020|

What is more, a number of people with pesticide poisoning from substances used in Brazilian agriculture have died due to this condition, as shown on **Map 14**:

[Map 14]

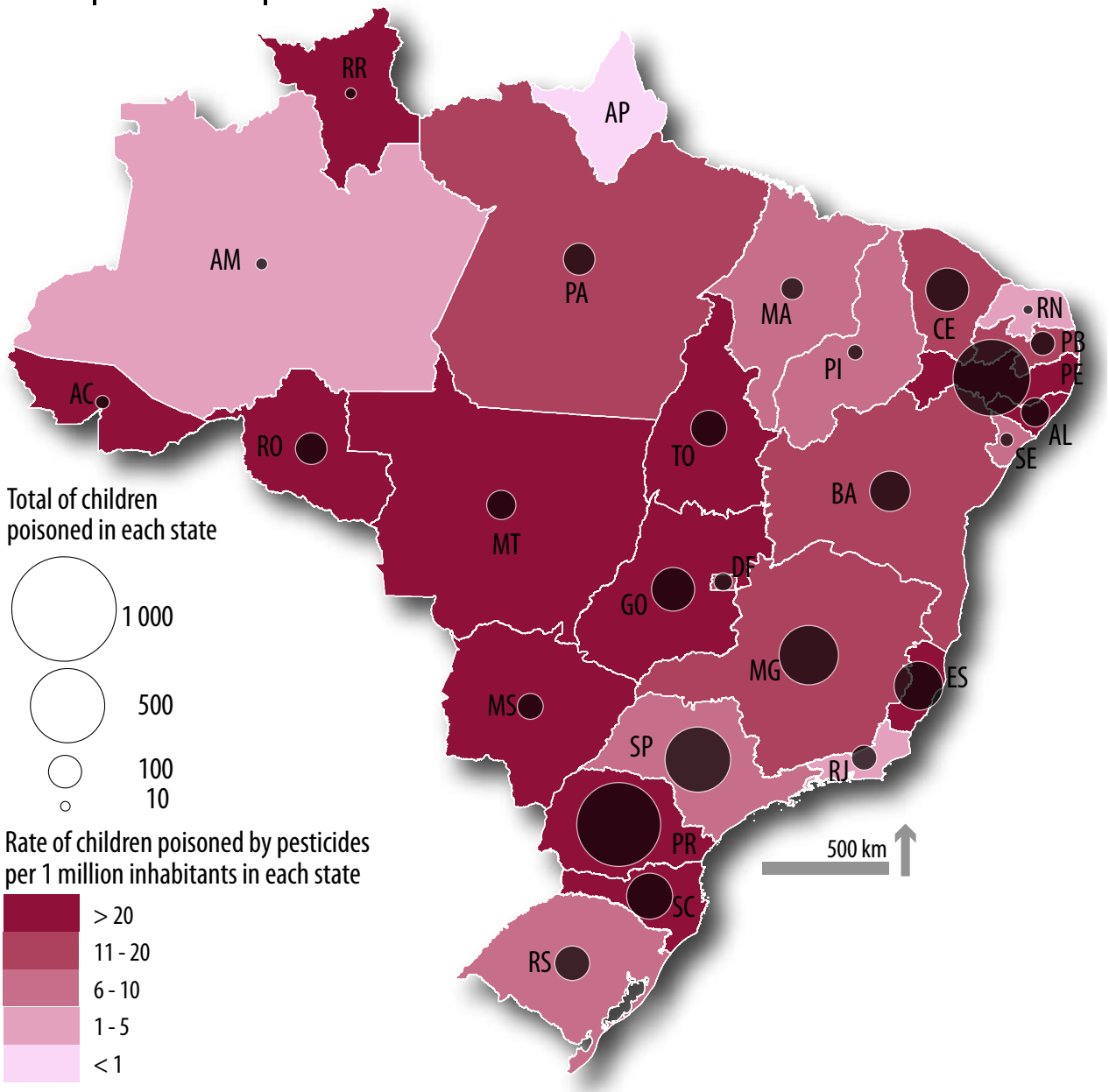


In the last ten years, 1832 people have died from being poisoned by pesticides used on Brazilian farms, which is equivalent to an average of 183 people per year, or one death by pesticide poisoning every two days.

[Map 15]

BRAZIL - CHILDREN POISONED BY PESTICIDES |0-14 years old|

States |2010 - 2019|

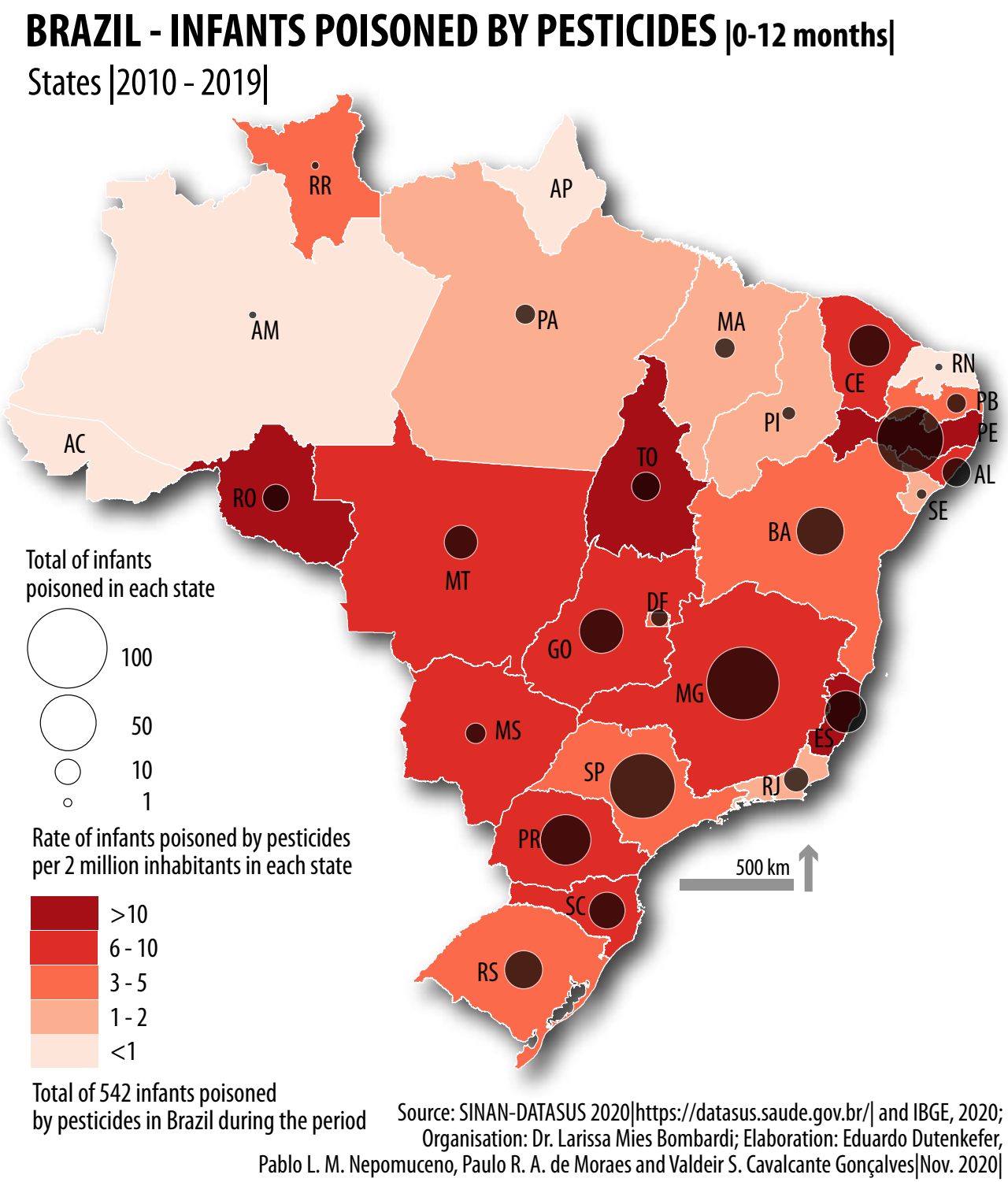


Total of 3 750 children poisoned by pesticides in Brazil during the period

Source: SINAN-DATASUS 2020|https://datasus.saude.gov.br/| and IBGE, 2020;
Organisation: Dr. Larissa Mies Bombardi; Elaboration: Eduardo Dutenkefer, Pablo L. M. Nepomuceno, Paulo R. A. de Moraes and Valdeir S. Cavalcante Gonçalves|Nov. 2020|

The situation illustrated on Map 14 is a dire one that has even afflicted children and infants, as illustrated by **Maps 15 and 16**:

[Map 16]



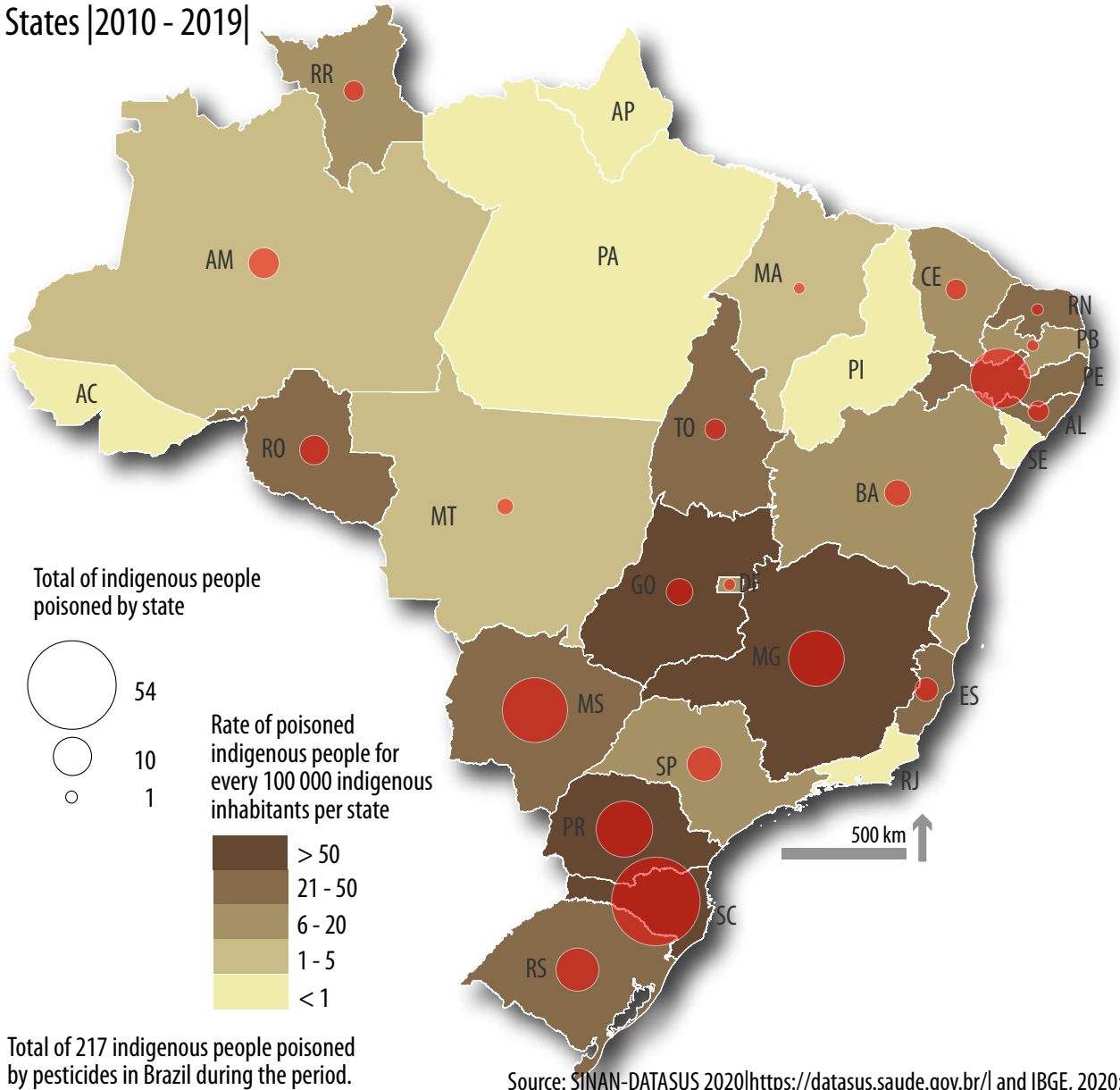
Between 2010 and 2019, no less than 3750 children between 0 and 14 years old were poisoned by pesticides used in local agriculture. This means that more than 350 children suffer from pesticide poisoning every year in Brazil.

Among the children poisoned during this period, more than 500 hundred were infants. A total of 542 infants between 0 and 12 months old were reported to be poisoned by pesticides used in local agriculture over ten years. This constitutes nothing less than a silent

[Map 17]

BRAZIL - POISONING OF INDIGENOUS POPULATION BY PESTICIDES

States |2010 - 2019|



Total of 217 indigenous people poisoned by pesticides in Brazil during the period.

Source: SINAN-DATASUS 2020|https://datasus.saude.gov.br/| and IBGE, 2020;
Organisation: Dr. Larissa Mies Bombardi; Elaboration: Eduardo Dutenkefer,
Pablo L. M. Nepomuceno, Paulo R. A. de Moraes and Valdeir S. Cavalcante Gonçalves|Nov. 2020|

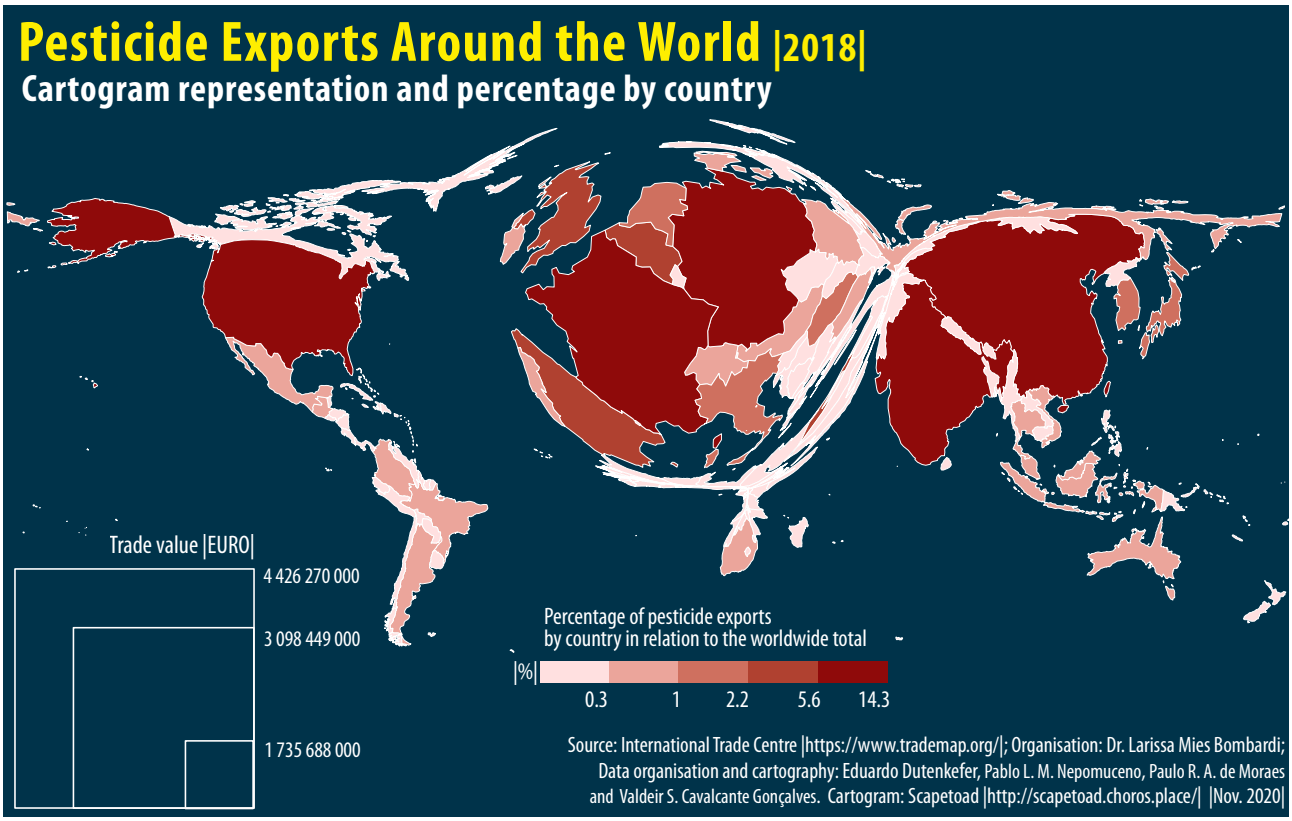
attack on the country's children, or rather, a case of mass infanticide, to be more precise. In addition to an attack on children, the way these substances have been used has affected different ethnicities in an unequal manner. Indigenous people have been proportionately the most affected of all (Bombardi, 2019).

Map 17 shows that more than 200 cases of pesticide poisoning of indigenous people have been recorded in the country, with cases in practically every state in Brazil, including many cases of individuals that were not even working in commercial agriculture.

As can be seen, the original peoples of this land continue to suffer from the oppression they have experienced for 500 years. The forms of violence to which they are subjected today are often invisible, perpetrated by substances utilised in "technological" agriculture, whether it be through aerial spraying, a practice still permitted in Mercosur countries, or the advance of monocrops on indigenous lands.

These pesticides, as is well known, have been developed, produced, and exported primarily by developed countries, among which EU member countries are significant players, a fact illustrated by the anamorphosis **map 18** presented below:

[Map 18]



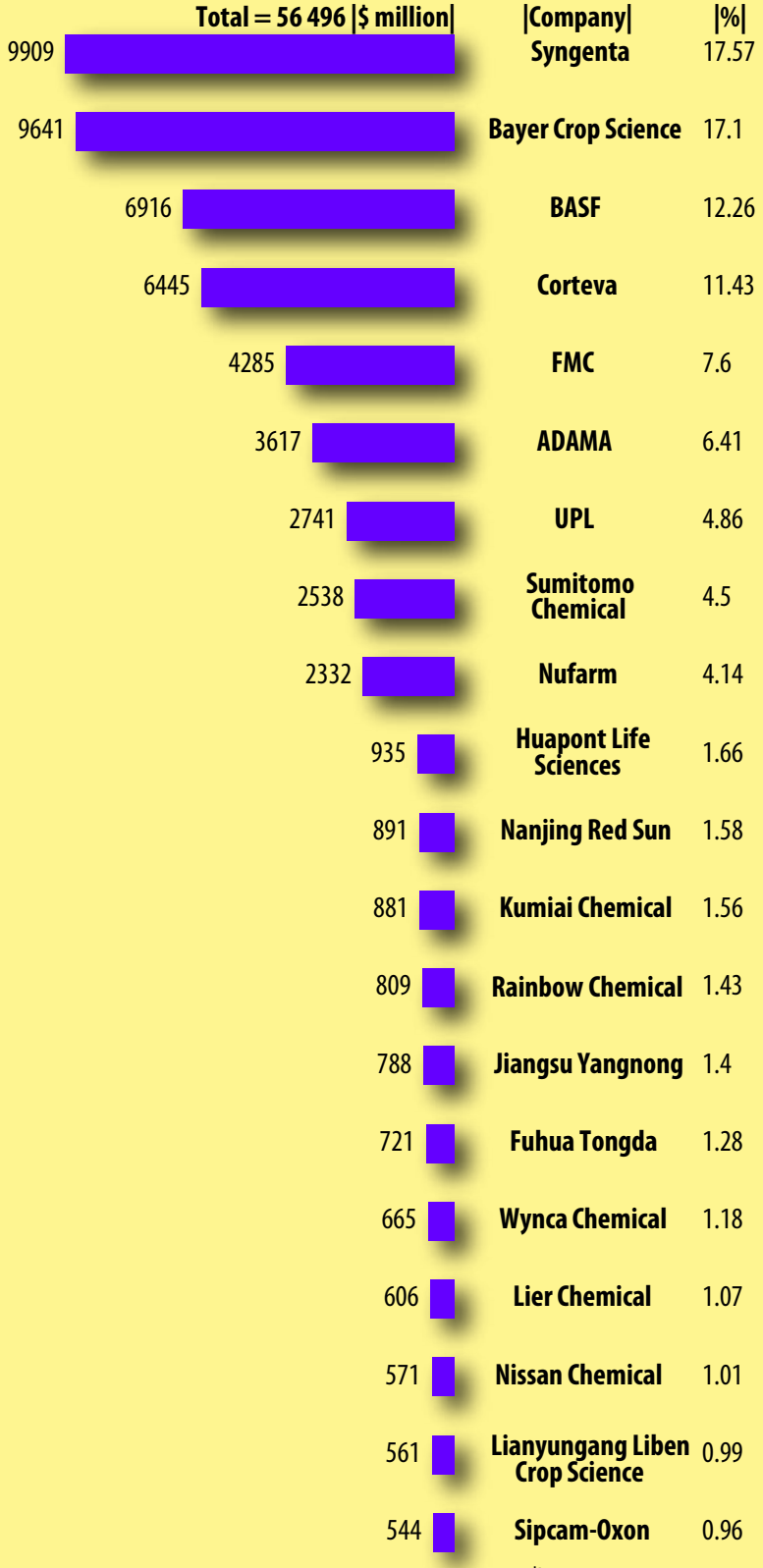
[Table 2]

The international pesticide market is controlled by the EU, China, and the United States, which together, through a number of their companies, were responsible for 83% of pesticide sales throughout the world in 2018, as is shown in **Table 2**.

Currently, 30% of pesticide sales worldwide are made by companies headquartered in the EU (not including Syngenta, which has been acquired by the Chinese company ChemChina). Together, the leading European companies in this sector sold more than 17 billion euros' worth of pesticides in 2018.

In addition to being one of the leaders of the world pesticide market, the EU exports to other countries substances that are prohibited within its own territories, adopting, therefore, a double standard in their conduct[3]. Such conduct, though legal, should be considered unethical at best.

Pesticide Sales in 2018 |leading companies|



Source: |http://news.agropages.com/|;
Organisation: Dr. Larissa Mies Bombardi; Elaboration: Eduardo Dutenkefer, Pablo L. M. Nepomuceno, Paulo R. A. de Moraes and Valdeir S. Cavalcante Gonçalves.|Nov. 2020|

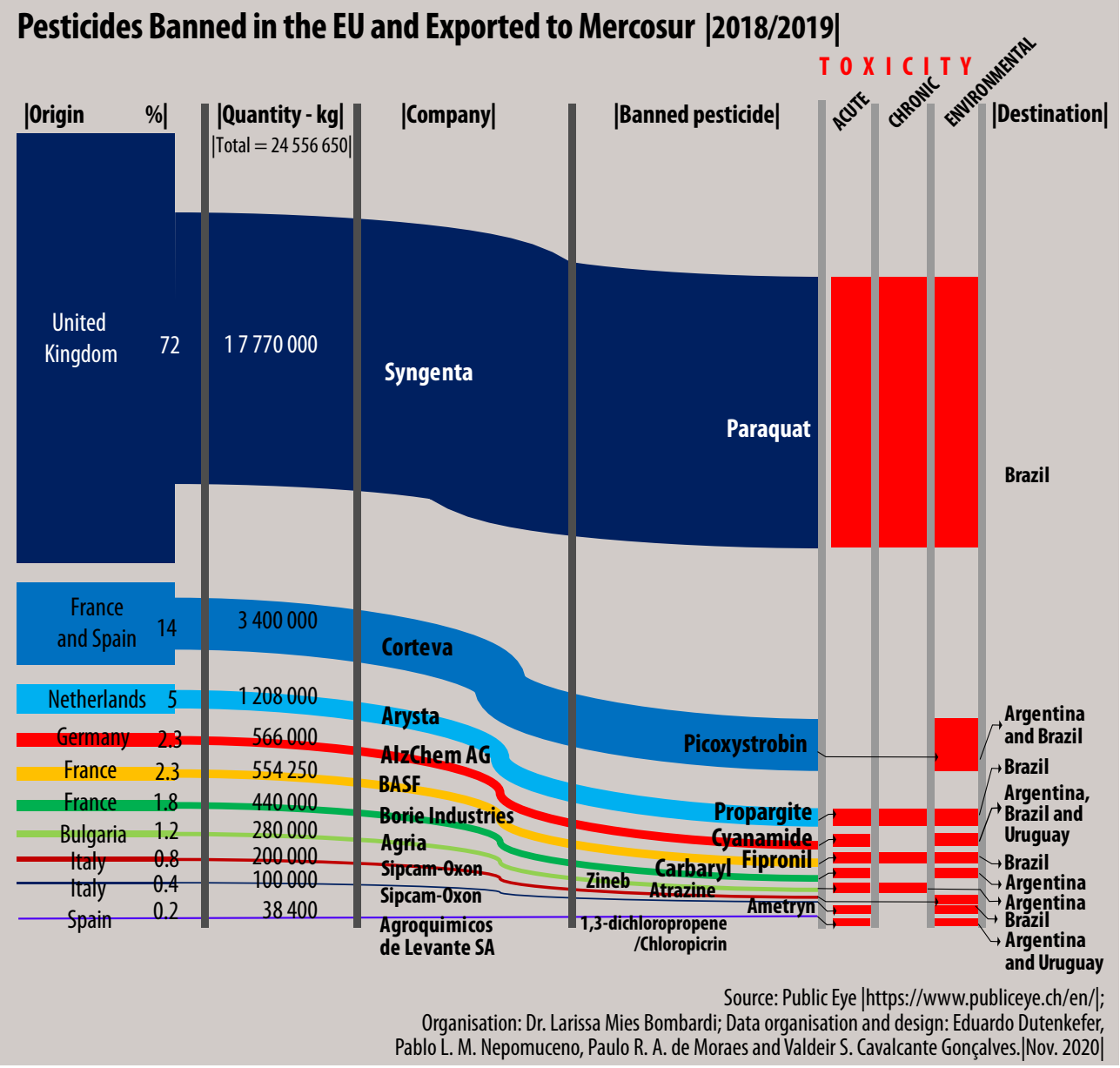
[3] https://www.pan-europe.info/resources/articles/2020/08/webinarhazardous-pesticides-and-eus-doublestandards and https://www.publiceye.ch/en/topics/pesticides/banned-in-europe and EU Health Commissioner chooses to protect the industry profit rather than the Health of Europeans and the environment | PAN Europe (pan-europe.info)

Graph 4 represents the sale to Mercosur in 2018 and 2019 of pesticides whose use is prohibited within the territories of the EU.

As **Map 19**, "Pesticides Banned in the EU and Exported to Mercosur," shows, in 2018/2019, the EU exported to Mercosur nearly 7 million kilos of pesticides whose use is prohibited within the EU's own territories.

Among the examples shown by the maps that compose the Atlas section of this publication, we will draw attention to two in particular.

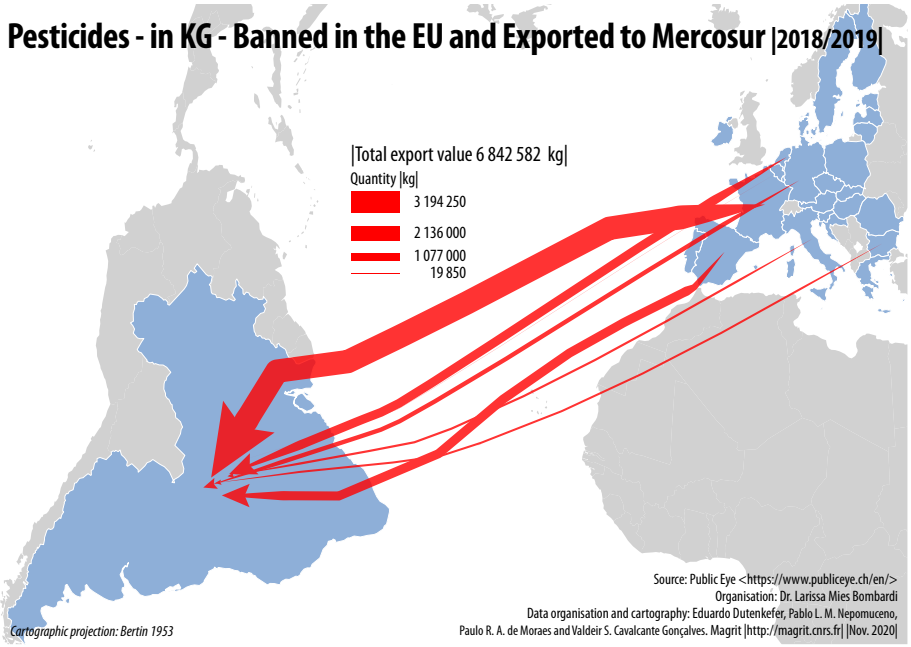
[Graph 4]



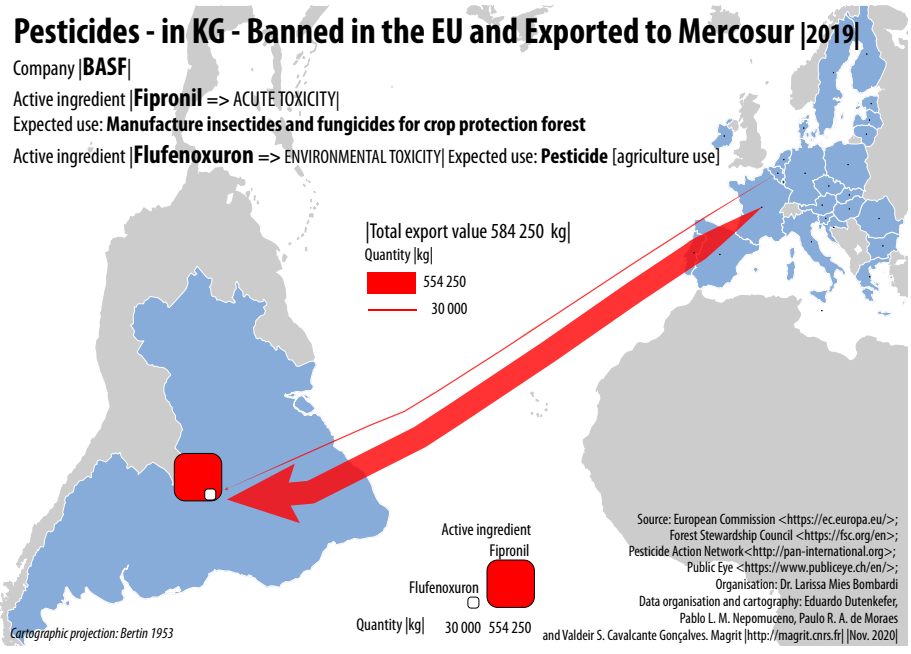
As shown on **Map 20**, "Pesticides in KG – Banned in the EU and Exported to Mercosur 2019 – BASF," in 2019, BASF alone exported to Mercosur more than 550 thousand kilos of the substance fipronil, which was prohibited in the EU in 2009, eleven years ago. This substance, known to cause both acute and chronic health problems in humans, has also been connected to the widespread death of bees, which means it poses a significant risk to the world's biodiversity, given that it directly affects pollinating insects [4].

In the other example, shown on **Map 21**, "Pesticides in KG – Banned in the EU and Exported to Mercosur 2019 – Arysta," the company Arysta exported to Mercosur in 2019 1 million 200 hundred thousand kilos of iprodione, a substance that causes chronic health issues [5].

[Map 19]



[Map 20]



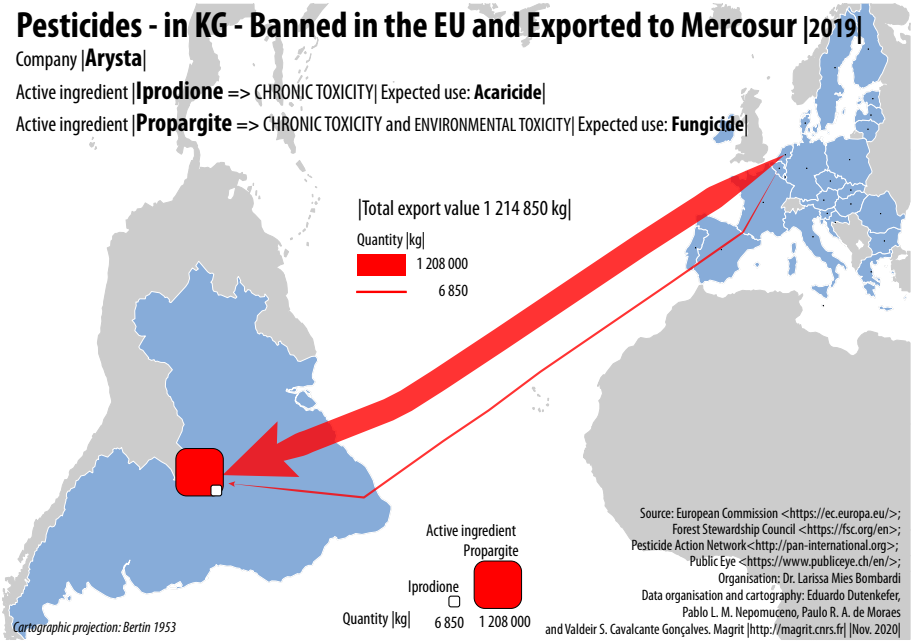
[4] https://link.springer.com/article/10.1007/s13592-019-00676-x and https://pubmed.ncbi.nlm.nih.gov/25703042/

[5] https://efsa.onlinelibrary.wiley.com/doi/full/10.2903/j.efsa.2016.4609

The double standard adopted by the EU concerning the use and export of pesticides is one more aspect of the asymmetrical relationship between the trade bloc and Mercosur that directly and negatively affects the health of both the natural environment and people of Mercosur member countries. This double standard amounts to a tacit agreement that the citizens of Mercosur are "second-class citizens", given that it is deemed permissible for them to be exposed to substances that are not tolerated in the EU.

In the majority of cases, the pesticides prohibited for use in the EU were banned for being linked to severe health issues, such as cancer, foetal malformations, and hormonal abnormalities, among others.

[Map 21]



Among the list of the top 10 pesticides most sold in Brazil are the substances acephate and atrazine, which were banned in the EU in 2003 and 2004, respectively, due to their enormously harmful effects on human health. The various harmful properties of acephate include its being both a cytotoxin and a genotoxin[6]. Atrazine has been linked to a variety of significant health issues, including different types of cancer, Parkinson's disease, and infertility[7].

The inequality that characterises the relationship between Mercosur and the EU with regard to pesticides is not only evidenced by the differences in standards related to substances prohibited in the EU and authorised for use within Mercosur, but also the differences regarding the levels of pesticide residues permitted in the food and water of the two trade blocs. That is to say that the quantity of pesticides potentially ingested by the population of Mercosur is higher than that ingested by the population of the EU.

[6] https://link.springer.com/article/10.1007%2Fs00204-016-1849-x

[7] https://link.springer.com/article/10.1007%2Fs00204-016-1849-x

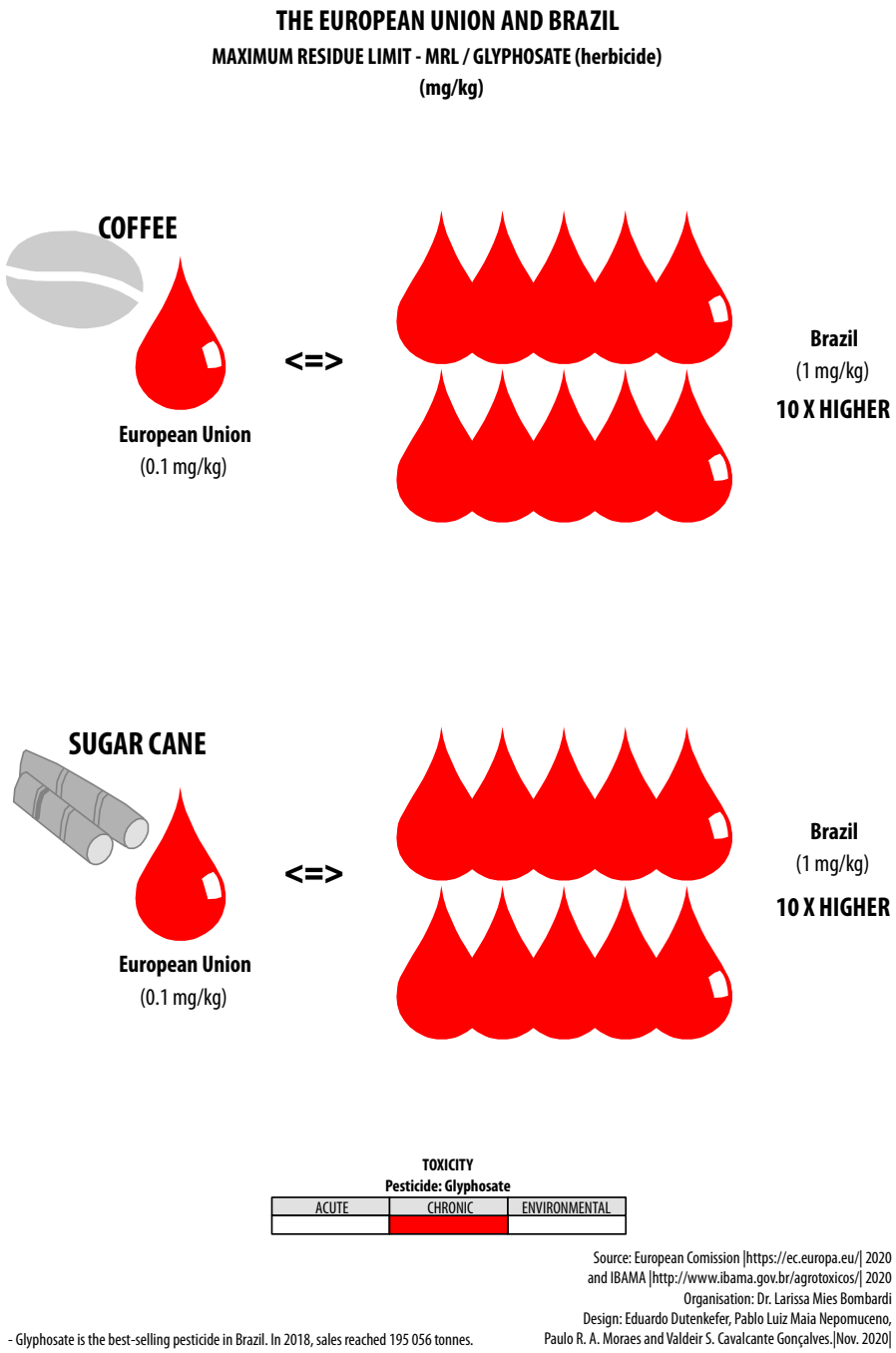
With some exceptions, represented in the infographics shown in the Atlas section, pesticide residue levels allowed in the food and drinking water of Mercosur can be double or triple the limits in the EU. However, in many cases, the limits can be up to dozens, hundreds, or even thousands of times higher in Mercosur.

Several infographics fully illustrate this asymmetry. Here we will cite several of the many examples: [**Infographic 1, 2, 3 and 4**]

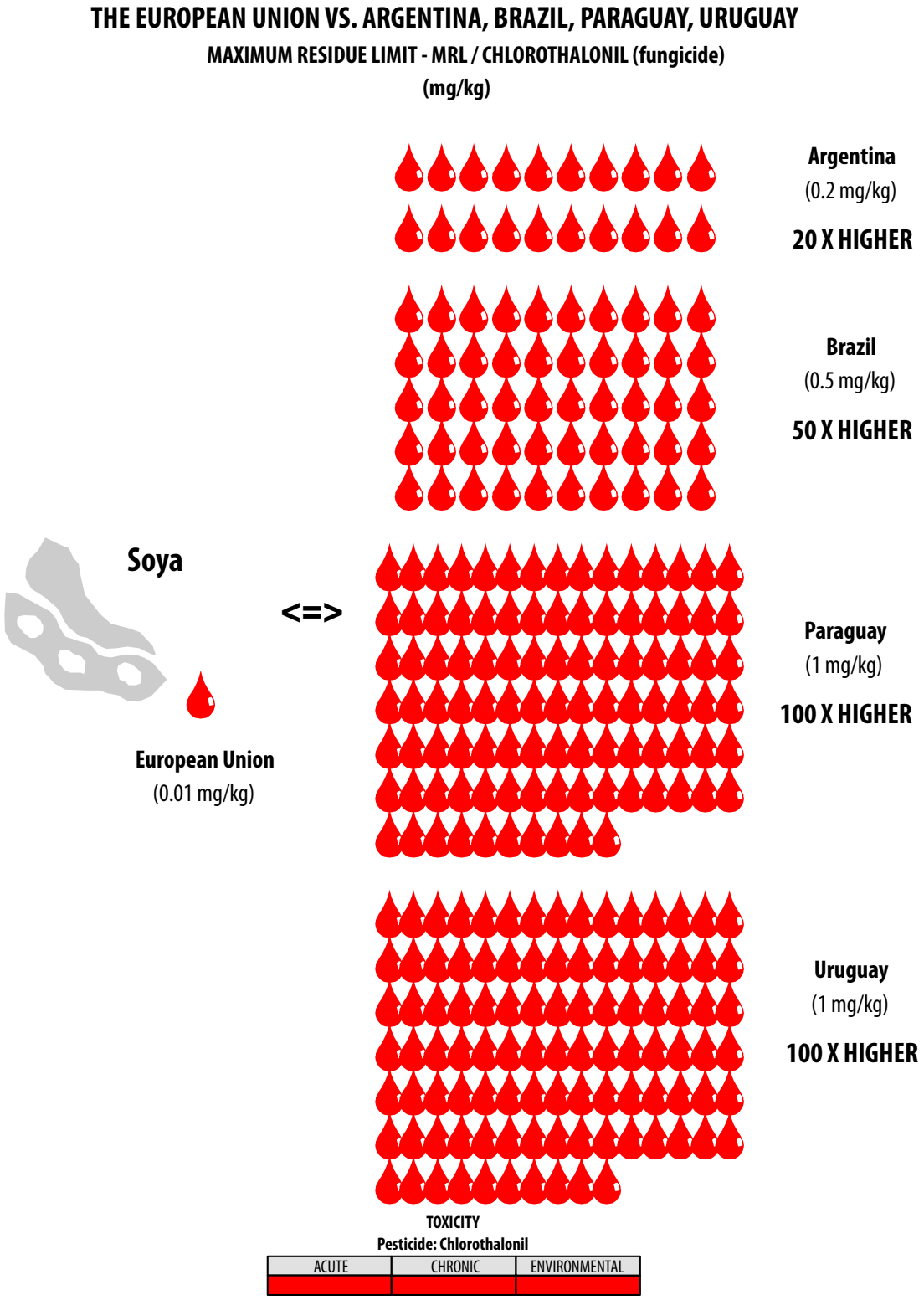
As can be seen, the level of glyphosate residue permitted in coffee and sugarcane in Brazil is 10 times the limit in the EU.

In addition to the substance having been prohibited for use in the EU in 2019, the allowed level of residue from the fungicide chlorothalonil for soya beans in Argentina is 20 times higher than what is permitted in the EU. In Brazil, it is 50 times higher. Finally, in Uruguay and Paraguay, the accepted levels of residue of this substance are 100 times higher than in the EU.

[Infographic 1]



[Infographic 2]

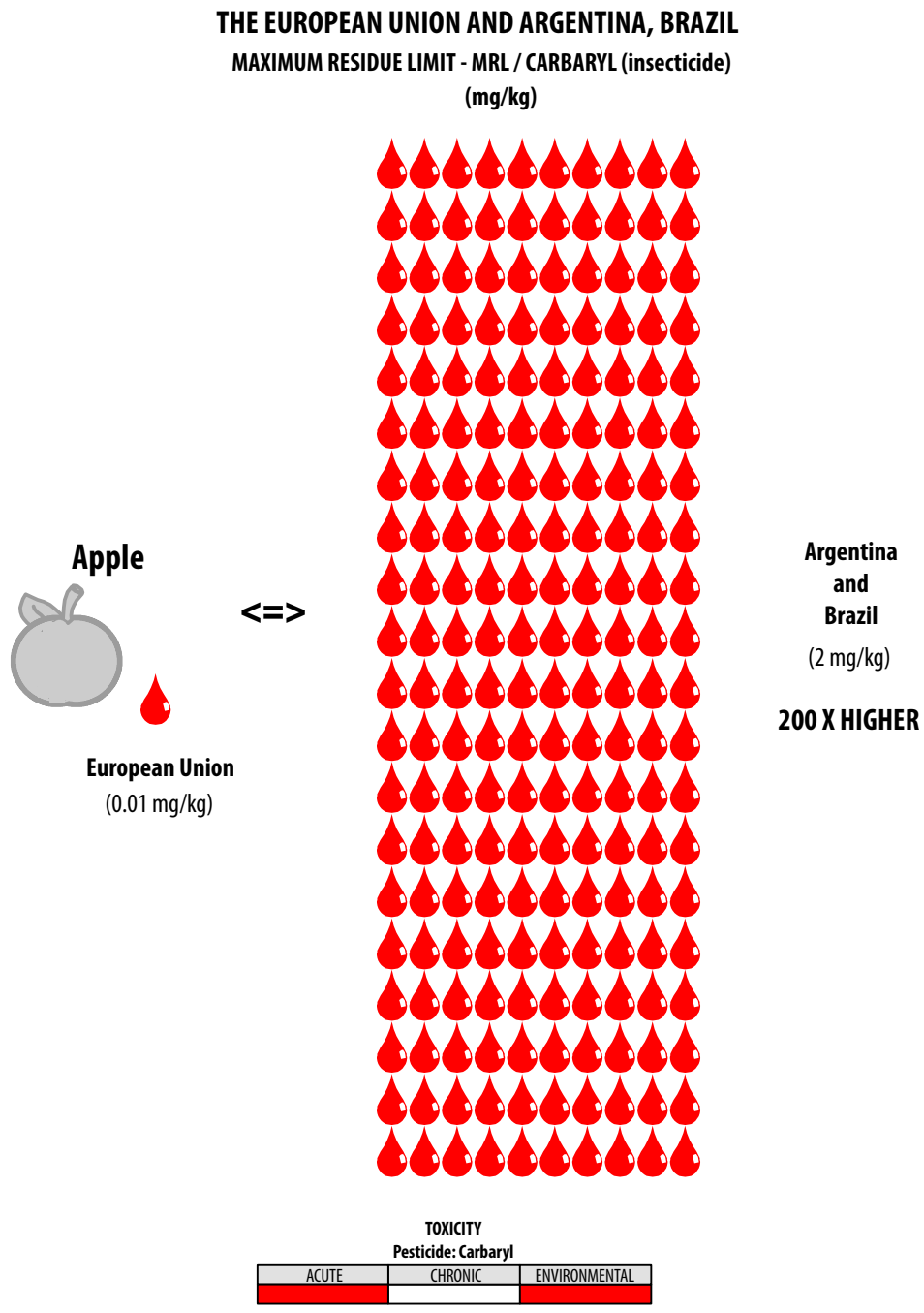


- Unauthorised use in the European Union according to Commission Implementing Regulation (EU) 2019/677 of 29 April, 2019.

Source: European Comission |https://ec.europa.eu/| 2020
and IBAMA |http://www.ibama.gov.br/agrotoxicos/| 2020
Senasa |https://www.argentina.gob.ar/files/lmrsjulio2020xlsx| 2020
and |https://capeco.org.py/limites-maximos-de-residuos/|
Organisation: Dr. Larissa Mies Bombardi / Design: Eduardo Dutenkefer, Pablo Luiz
Maia Nepomuceno, Paulo R. A. Moraes and Valdeir S. Cavalcante Gonçalves.|Nov. 2020|

The insecticide carbaryl was prohibited for use in the EU in 2007. Despite this being the case, the residue limit for this substance, as shown above, is 200 times higher in Argentina and Brazil than in the EU.

[Infographic 3]



- Unauthorised use in the European Union according to legislation 2007/355/EC: Commission Decision of 21 May, 2007.

Source: European Comission |https://ec.europa.eu/| 2020
and IBAMA |http://www.ibama.gov.br/agrotoxicos/| 2020
Senasa |https://www.argentina.gob.ar/files/lmrsjulio2020xlsx| 2020
Organisation: Dr. Larissa Mies Bombardi / Design: Eduardo Dutenkefer, Pablo Luiz Maia Nepomuceno, Paulo R. A. Moraes and Valdeir S. Cavalcante Gonçalves.|Nov. 2020|

The limit for glyphosate residue in "drinkable" water in Brazil is 5,000 times higher than the limit for this substance in drinking water in the EU. As many may know, the World Health Organization classified glyphosate as "probably carcinogenic to humans" in 2015 [8].

In summary, the vast disparities in pesticide residue limits between the two trade blocs constitute a concrete example of what is meant by the term "molecular colonialism."

[8] https://www.iarc.who.int/featured-news/media-centre-iarc-news-glyphosate/

[Infographic 4]

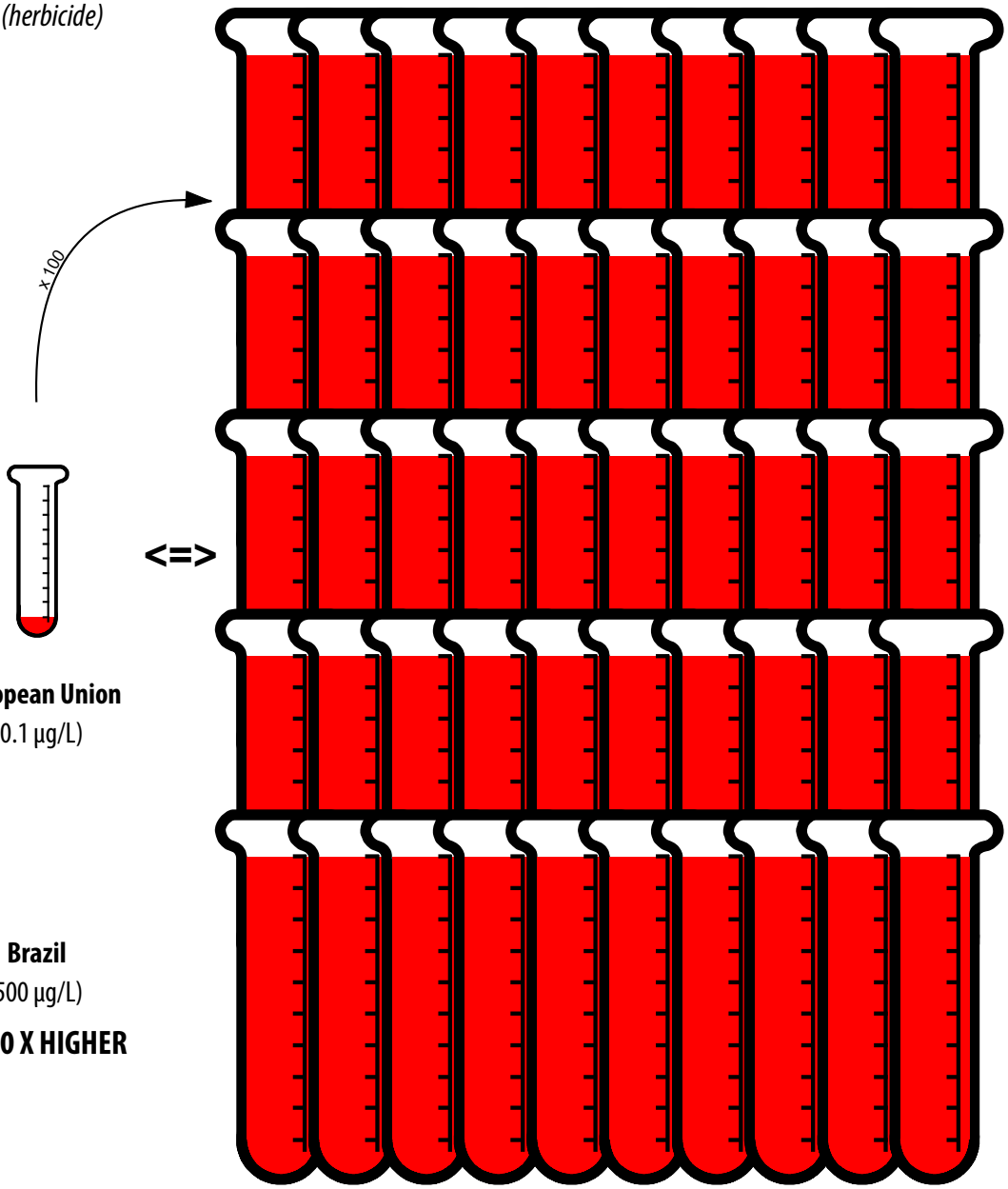
THE EUROPEAN UNION VS. BRAZIL

MAXIMUM RESIDUE LIMIT - MRL / DRINKING WATER

(µg/L)

GLYPHOSATE

(herbicide)



European Union

(0.1 µg/L)

Brazil

(500 µg/L)

5000 X HIGHER

TOXICITY

Pesticide: Glyphosate

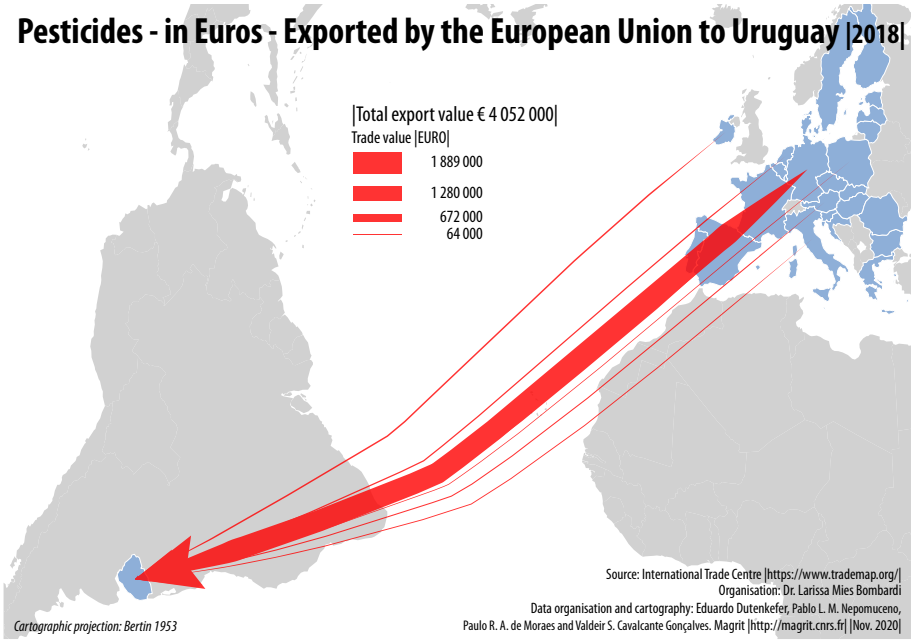
ACUTE	CHRONIC	ENVIRONMENTAL

- Glyphosate is the best-selling pesticide in Brazil. In 2018, sales reached 195 056 tonnes.

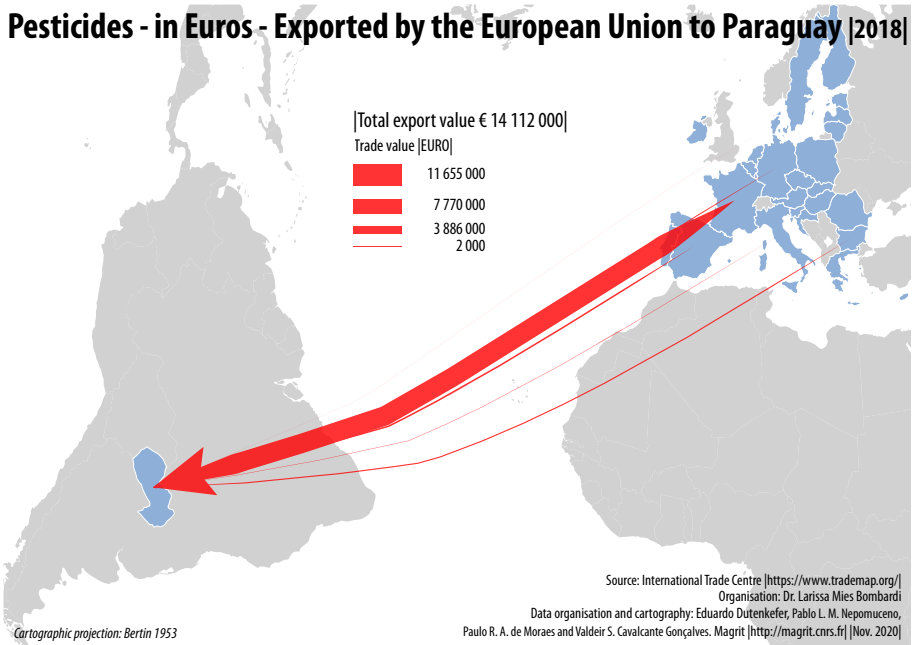
Source: European Comission |https://ec.europa.eu/| 2020
and IBAMA |http://www.ibama.gov.br/agrotoxicos/| 2020
Organisation: Dr. Larissa Mies Bombardi
Design: Eduardo Dutenkefer, Pablo Luiz Maia Nepomuceno,
Paulo R. A. Moraes and Valdeir S. Cavalcante Gonçalves.|Nov. 2020|

3. The vicious cycle of pesticides

[Map 22]



[Map 23]



Millions of euros in pesticides are exported from the EU to Mercosur every year.

In monetary terms, the EU exported to Uruguay more than 4 million euros' worth of pesticides (independent of whether their use was prohibited in the EU or not) in 2018, as shown on **Map 22**, "Pesticides in Euros – Exported by the EU to Uruguay in 2018."

To Paraguay, the EU exported over 14 million euros' worth of pesticides in 2018, as shown on **Map 23**, "Pesticides in Euros – Exported by the EU to Paraguay 2018."

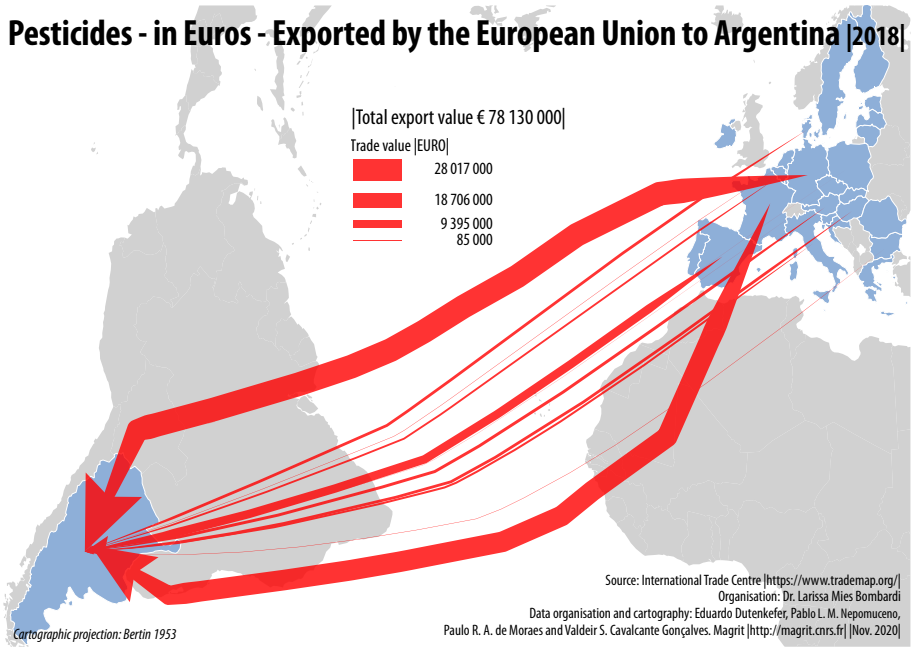
Also in 2018, the EU exported 78 million euros' worth of pesticides to Argentina, as seen on **Map 24**, "Pesticides in Euros – Exported by the EU to Argentina 2018."

And finally, the EU exported 446 million euros' worth of pesticides to Brazil in 2018, as shown on **Map 25**, "Pesticides in Euros – Exported by the EU to Brazil 2018."

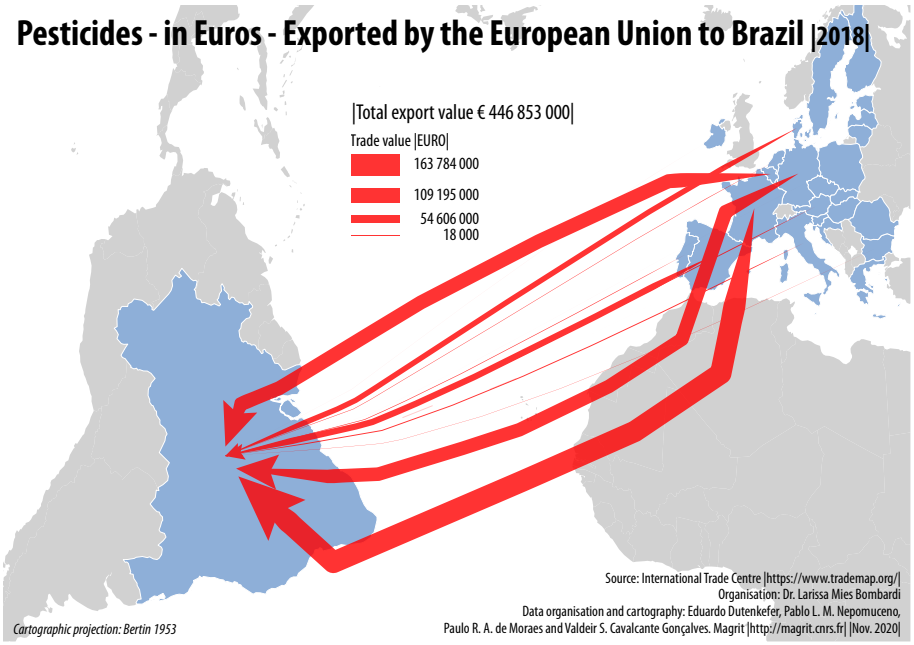
As shown on **Map 25**, in 2018 alone, the EU exported a total of over half a billion euros' worth of pesticides to Mercosur.

Conversely, Mercosur exported dozens of agricultural products to the EU, worth more than 21 billion euros. Furthermore, various of the very pesticides exported by the EU were possibly used in the production of these agricultural products.

[Map 24]



[Map 25]



Map 26 demonstrates this correlation.

The principal importers in the EU of agricultural products from Mercosur, as seen on **Map 27**, are, in descending order, as follows: Germany, The Netherlands, Spain, Italy, France, Poland, Belgium, Portugal, Finland, and Denmark.

Mercosur exported to the EU 1.3 billion euros' worth of fruits alone, as seen on **Map 28**.

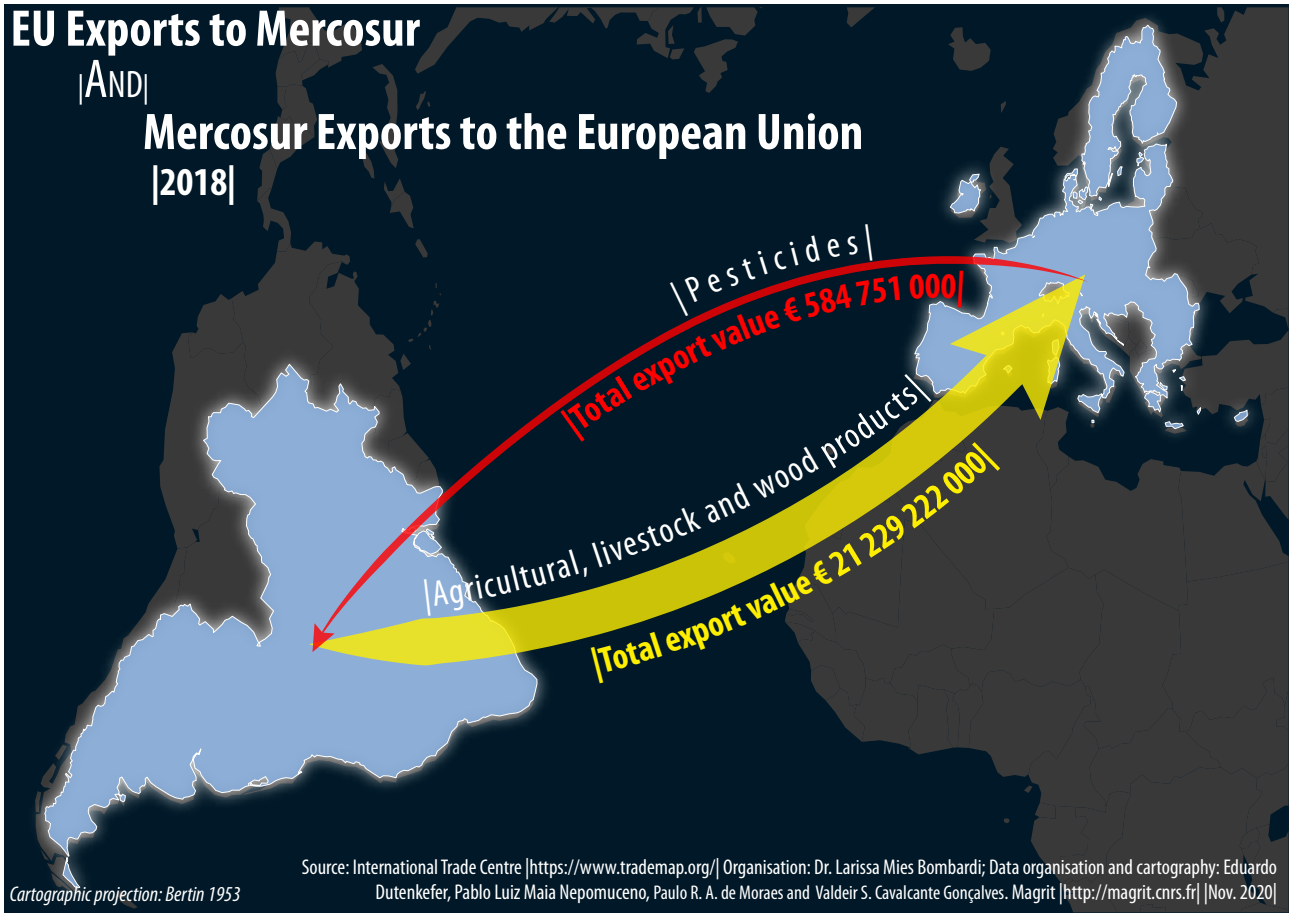
Mercosur also exported 2 billion euros' worth of coffee and tea to the EU in 2018, as shown on **Map 29**.

And, with regard to soybean meal and cornmeal, as well as other soya and corn derivatives, Mercosur exported 5 billion euros' worth of products to the EU in 2018, as seen on **Map 30**.

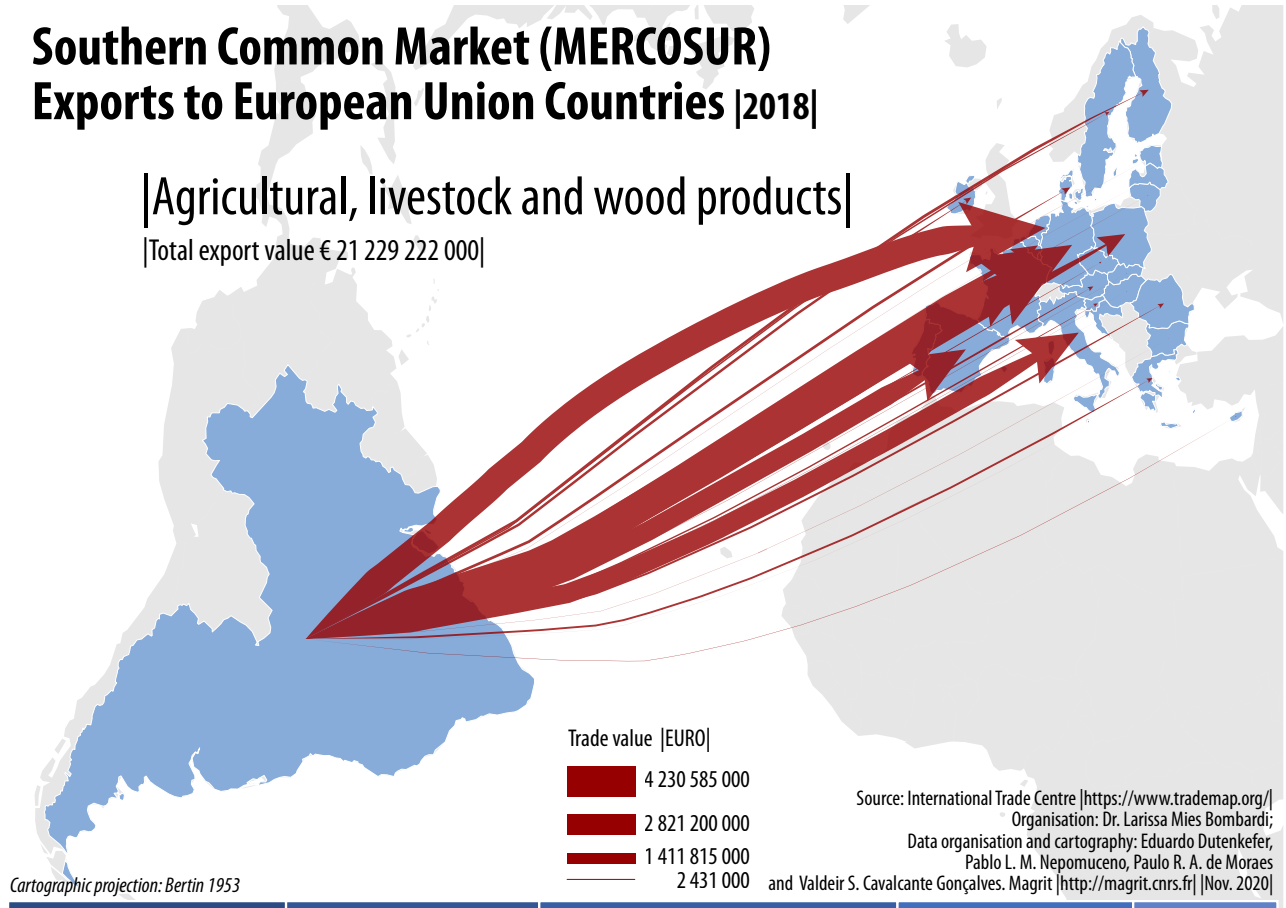
As previously noted, a variety of substances permitted for use in agriculture within Mercosur are prohibited by the EU. In Brazil, around 30% of the pesticides authorised for use on crops are prohibited in the EU.

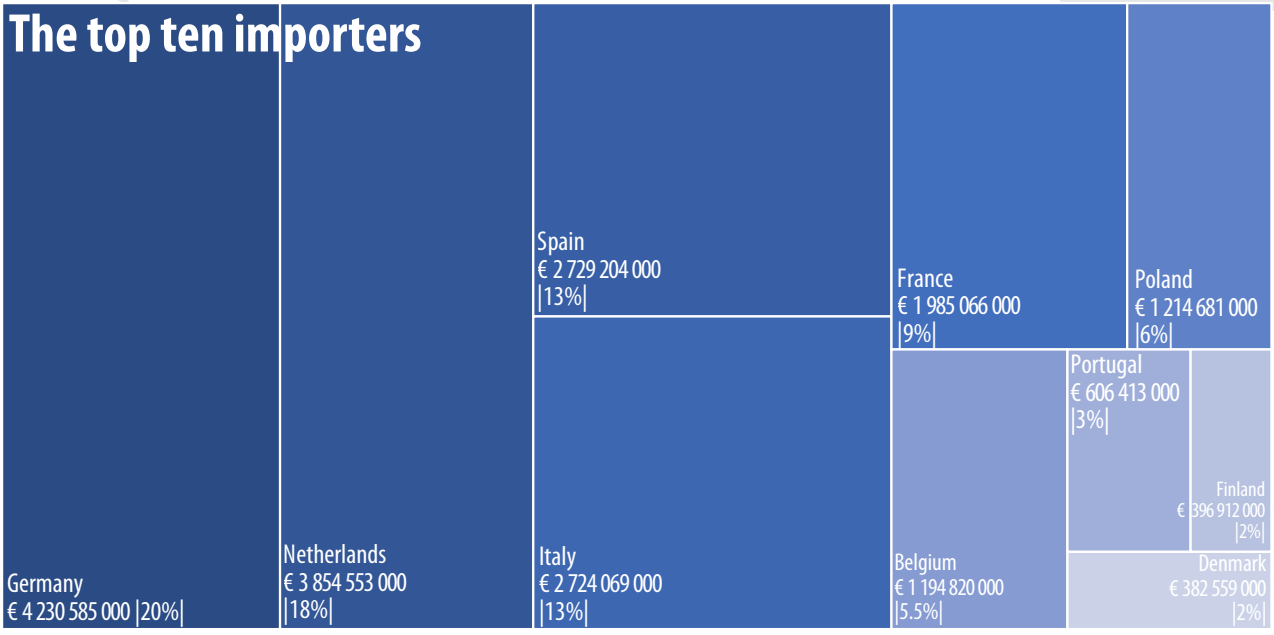
Several maps provided in the Atlas section of this publication present information about the pesticides prohibited in the EU and authorised for use on various types of crops within Mercosur.

[Map 26]

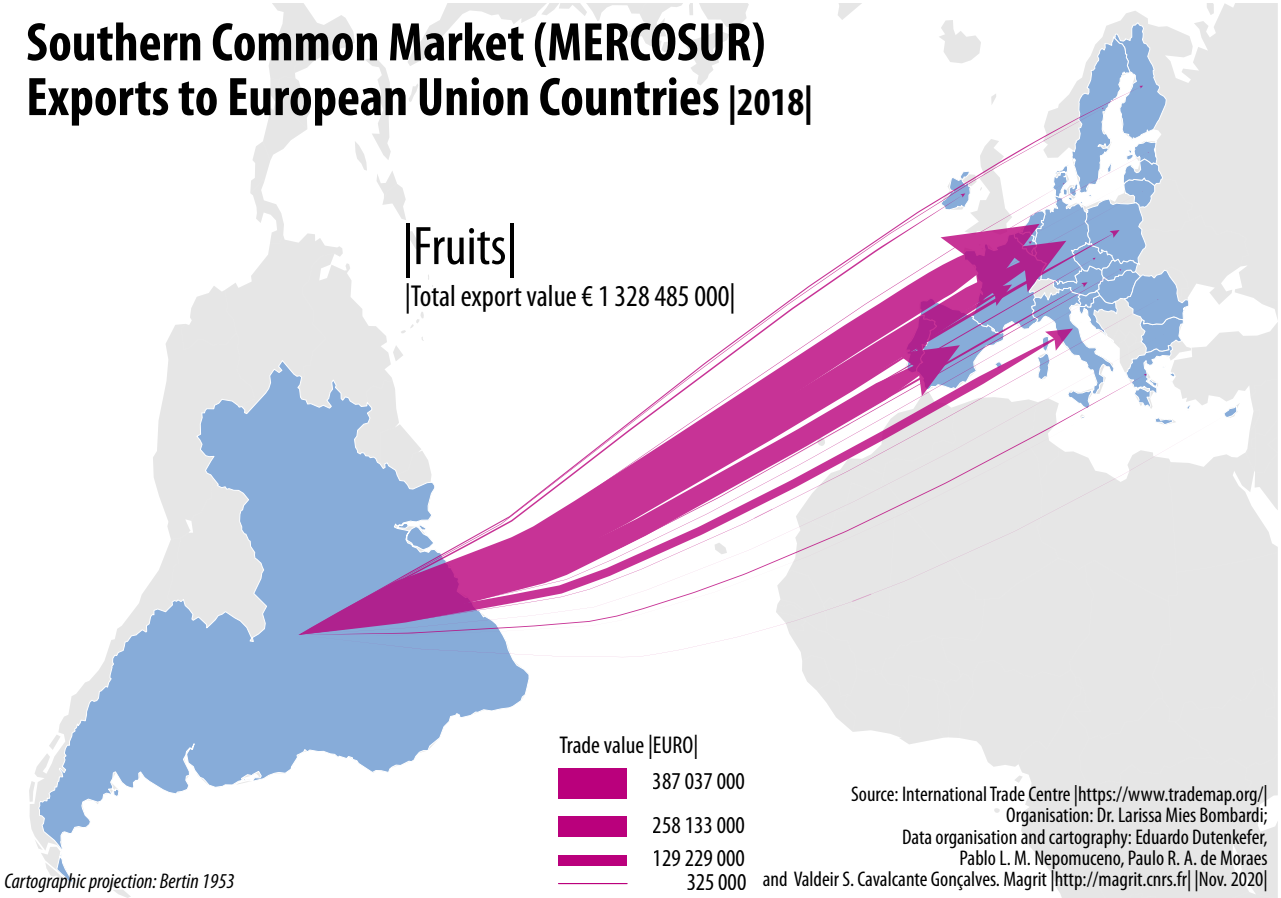


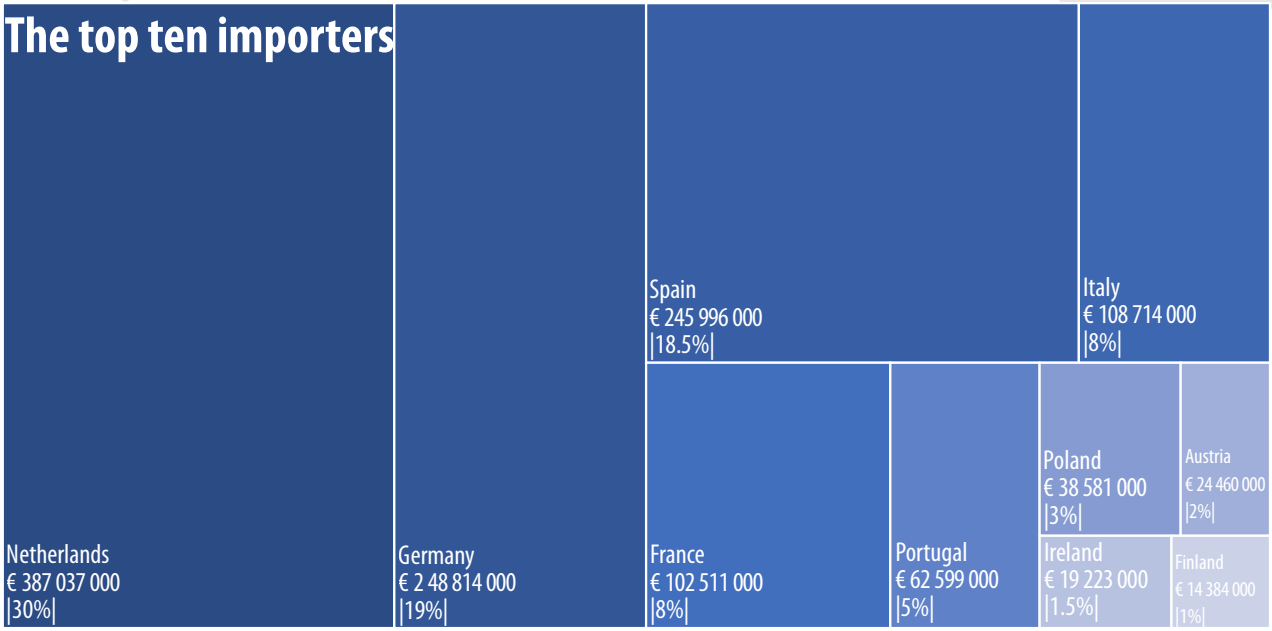
[Map 27]


Southern Common Market (MERCOSUR)
Exports to European Union Countries |2018|
|Agricultural, livestock and wood products|
|Total export value € 21 229 222 000|
Trade value |EURO|
4 230 585 000
2 821 200 000
1 411 815 000
2 431 000
Cartographic projection: Bertin 1953
Source: International Trade Centre |https://www.trademap.org/|
Organisation: Dr. Larissa Mies Bombardi;
Data organisation and cartography: Eduardo Dutenkefer,
Pablo L. M. Nepomuceno, Paulo R. A. de Moraes
and Valdeir S. Cavalcante Gonçalves. Magrit |http://magrit.cnrs.fr| |Nov. 2020|

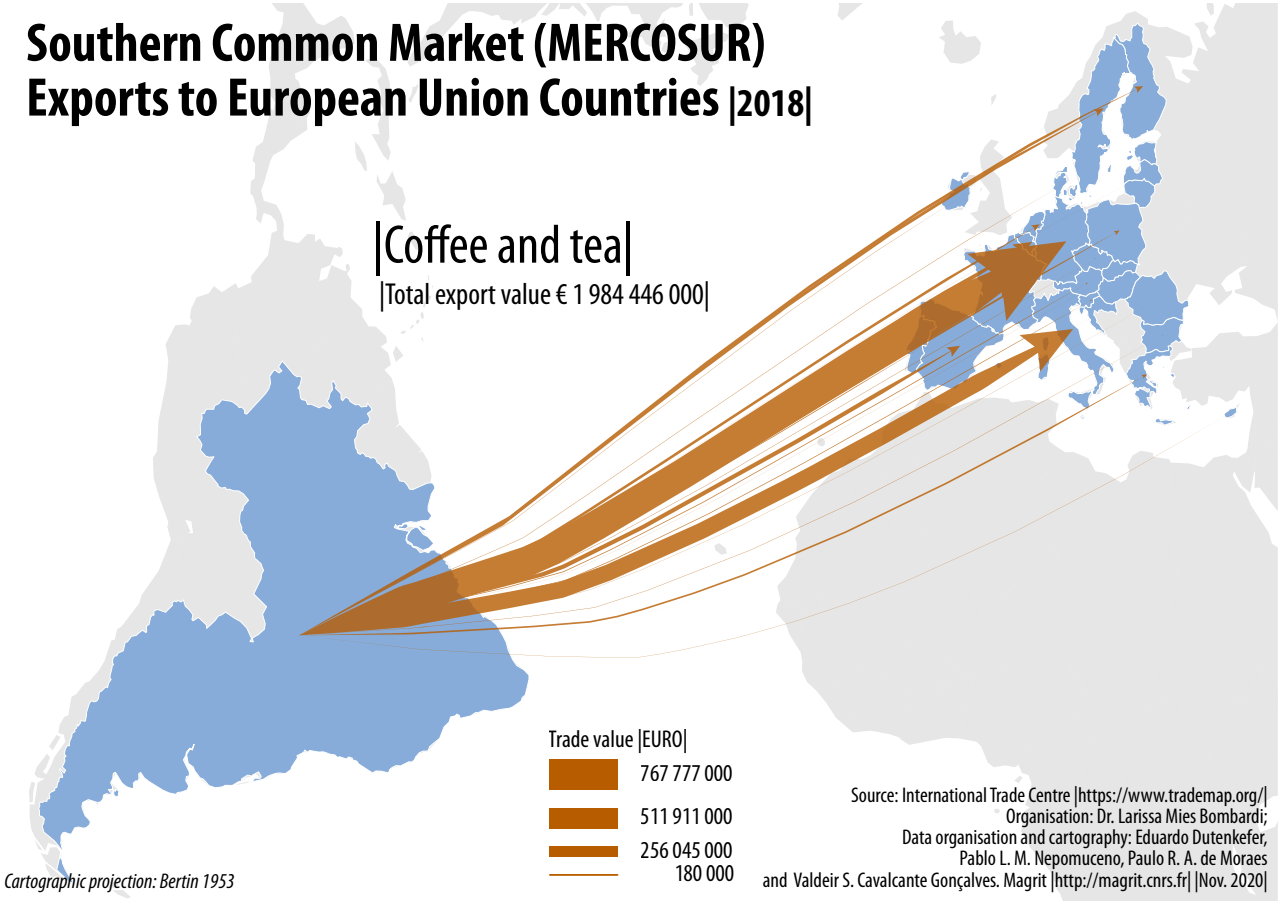

The top ten importers
Germany
€ 4 230 585 000 |20%|
Netherlands
€ 3 854 553 000
|18%|
Spain
€ 2 729 204 000
|13%|
Italy
€ 2 724 069 000
|13%|
France
€ 1 985 066 000
|9%|
Poland
€ 1 214 681 000
|6%|
Belgium
€ 1 194 820 000
|5.5%|
Portugal
€ 606 413 000
|3%|
Finland
€ 396 912 000
|2%|
Denmark
€ 382 559 000
|2%|

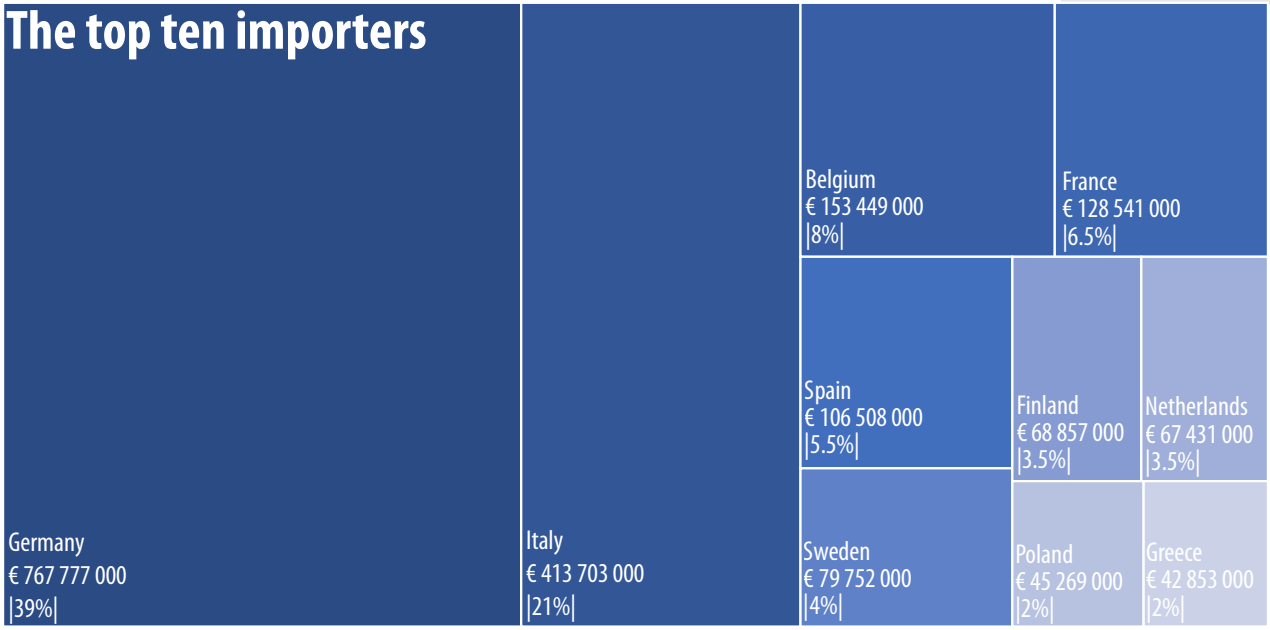
[Map 28]


Southern Common Market (MERCOSUR)
Exports to European Union Countries |2018|
|Fruits|
|Total export value € 1 328 485 000|
Trade value |EURO|
387 037 000
258 133 000
129 229 000
325 000
Source: International Trade Centre |https://www.trademap.org/|
Organisation: Dr. Larissa Mies Bombardi;
Data organisation and cartography: Eduardo Dutenkefer,
Pablo L. M. Nepomuceno, Paulo R. A. de Moraes
and Valdeir S. Cavalcante Gonçalves. Magrit |http://magrit.cnrs.fr| |Nov. 2020|
Cartographic projection: Bertin 1953

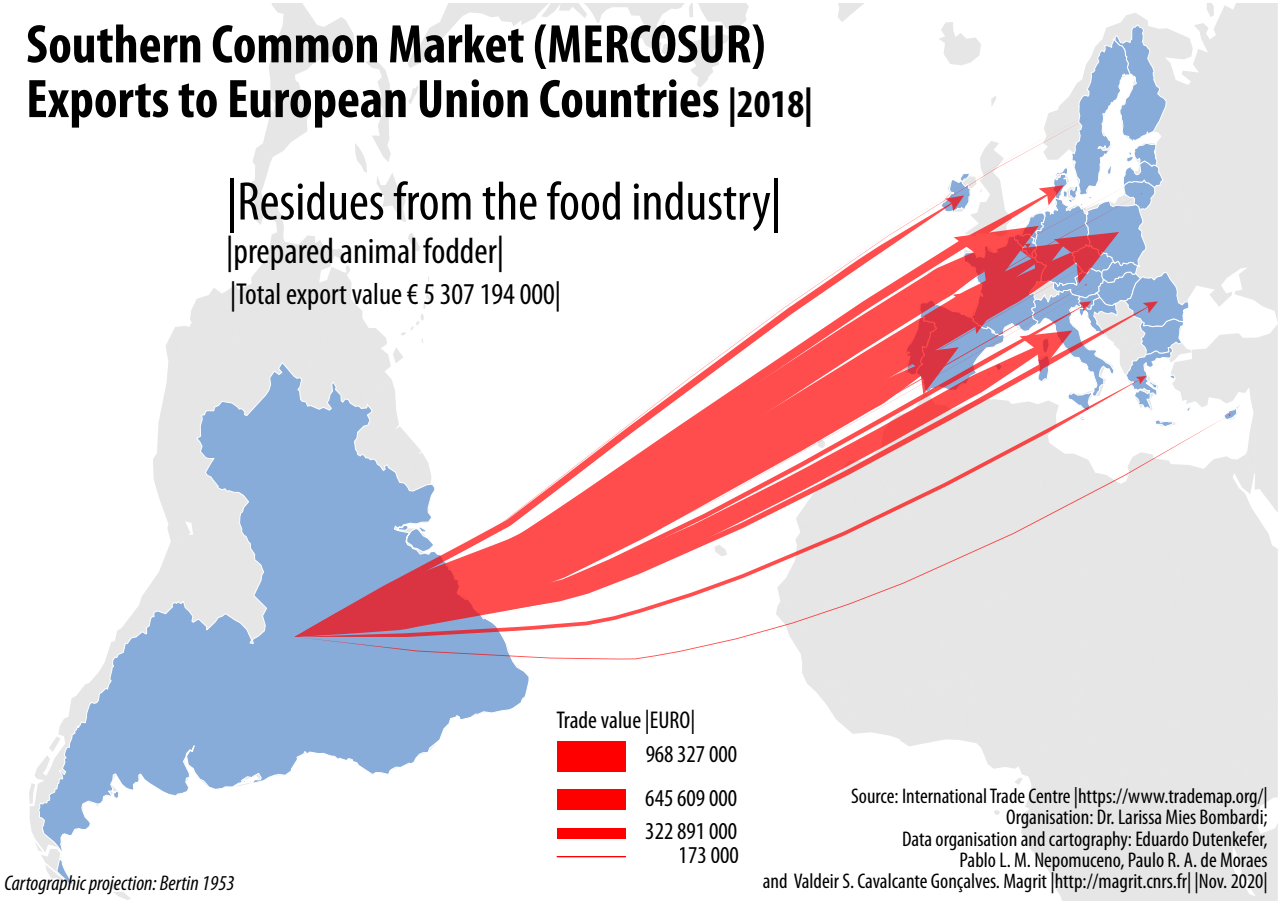

The top ten importers
Netherlands
€ 387 037 000
|30%|
Germany
€ 2 48 814 000
|19%|
Spain
€ 245 996 000
|18.5%|
Italy
€ 108 714 000
|8%|
France
€ 102 511 000
|8%|
Portugal
€ 62 599 000
|5%|
Poland
€ 38 581 000
|3%|
Austria
€ 24 460 000
|2%|
Ireland
€ 19 223 000
|1.5%|
Finland
€ 14 384 000
|1%|

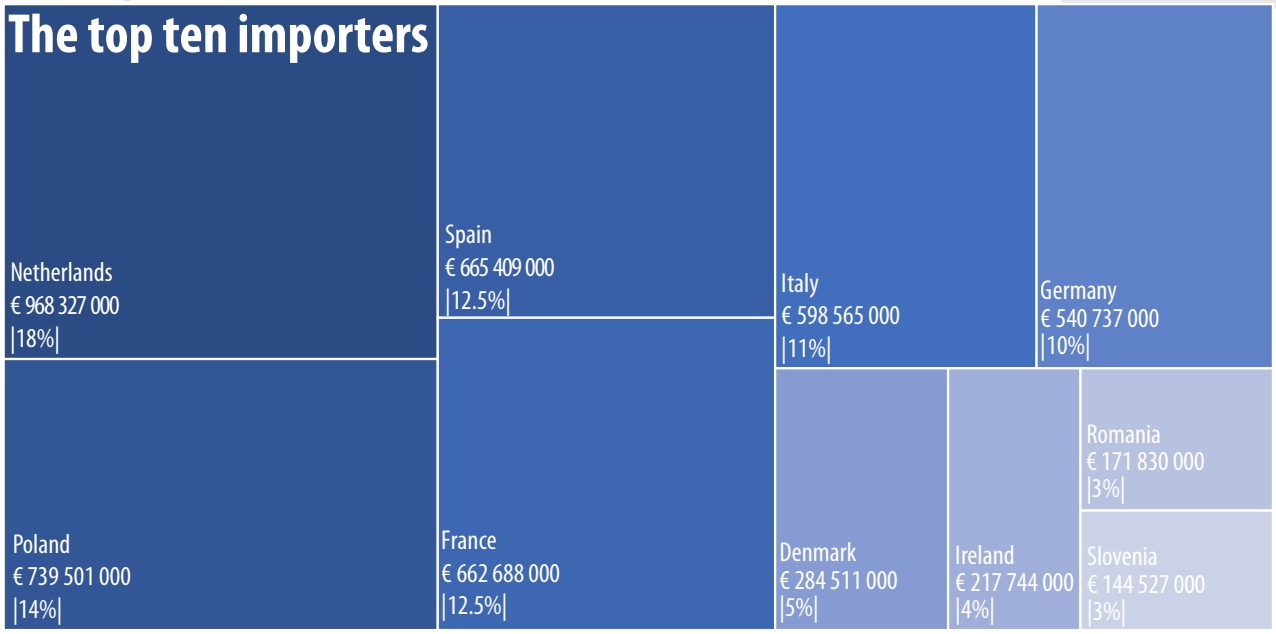
[Map 29]


Southern Common Market (MERCOSUR)
Exports to European Union Countries |2018|
|Coffee and tea|
|Total export value € 1 984 446 000|
Trade value |EURO|
767 777 000
511 911 000
256 045 000
180 000
Cartographic projection: Bertin 1953
Source: International Trade Centre |https://www.trademap.org/|
Organisation: Dr. Larissa Mies Bombardi;
Data organisation and cartography: Eduardo Dutenkefer,
Pablo L. M. Nepomuceno, Paulo R. A. de Moraes
and Valdeir S. Cavalcante Gonçalves. Magrit |http://magrit.cnrs.fr| |Nov. 2020|


The top ten importers
Germany
€ 767 777 000
|39%|
Italy
€ 413 703 000
|21%|
Belgium
€ 153 449 000
|8%|
France
€ 128 541 000
|6.5%|
Spain
€ 106 508 000
|5.5%|
Finland
€ 68 857 000
|3.5%|
Netherlands
€ 67 431 000
|3.5%|
Sweden
€ 79 752 000
|4%|
Poland
€ 45 269 000
|2%|
Greece
€ 42 853 000
|2%|

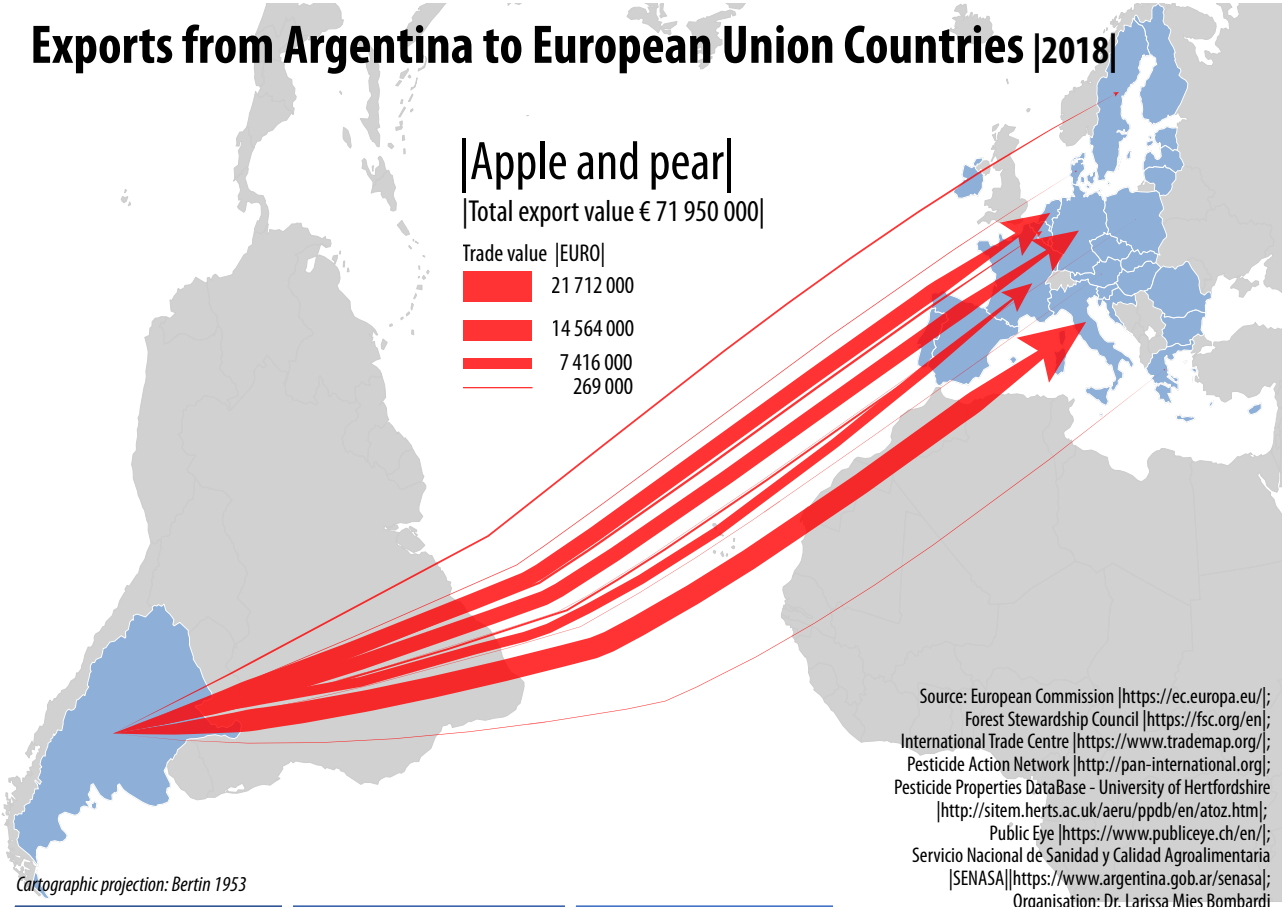
[Map 30]


Southern Common Market (MERCOSUR)
Exports to European Union Countries |2018|
|Residues from the food industry|
|prepared animal fodder|
|Total export value € 5 307 194 000|
Trade value |EURO|
968 327 000
645 609 000
322 891 000
173 000
Source: International Trade Centre |https://www.trademap.org/|
Organisation: Dr. Larissa Mies Bombardi;
Data organisation and cartography: Eduardo Dutenkefer,
Pablo L. M. Nepomuceno, Paulo R. A. de Moraes
and Valdeir S. Cavalcante Gonçalves. Magrit |http://magrit.cnrs.fr| |Nov. 2020|
Cartographic projection: Bertin 1953


The top ten importers
Netherlands
€ 968 327 000
|18%|
Spain
€ 665 409 000
|12.5%|
Italy
€ 598 565 000
|11%|
Germany
€ 540 737 000
|10%|
Poland
€ 739 501 000
|14%|
France
€ 662 688 000
|12.5%|
Denmark
€ 284 511 000
|5%|
Ireland
€ 217 744 000
|4%|
Romania
€ 171 830 000
|3%|
Slovenia
€ 144 527 000
|3%|

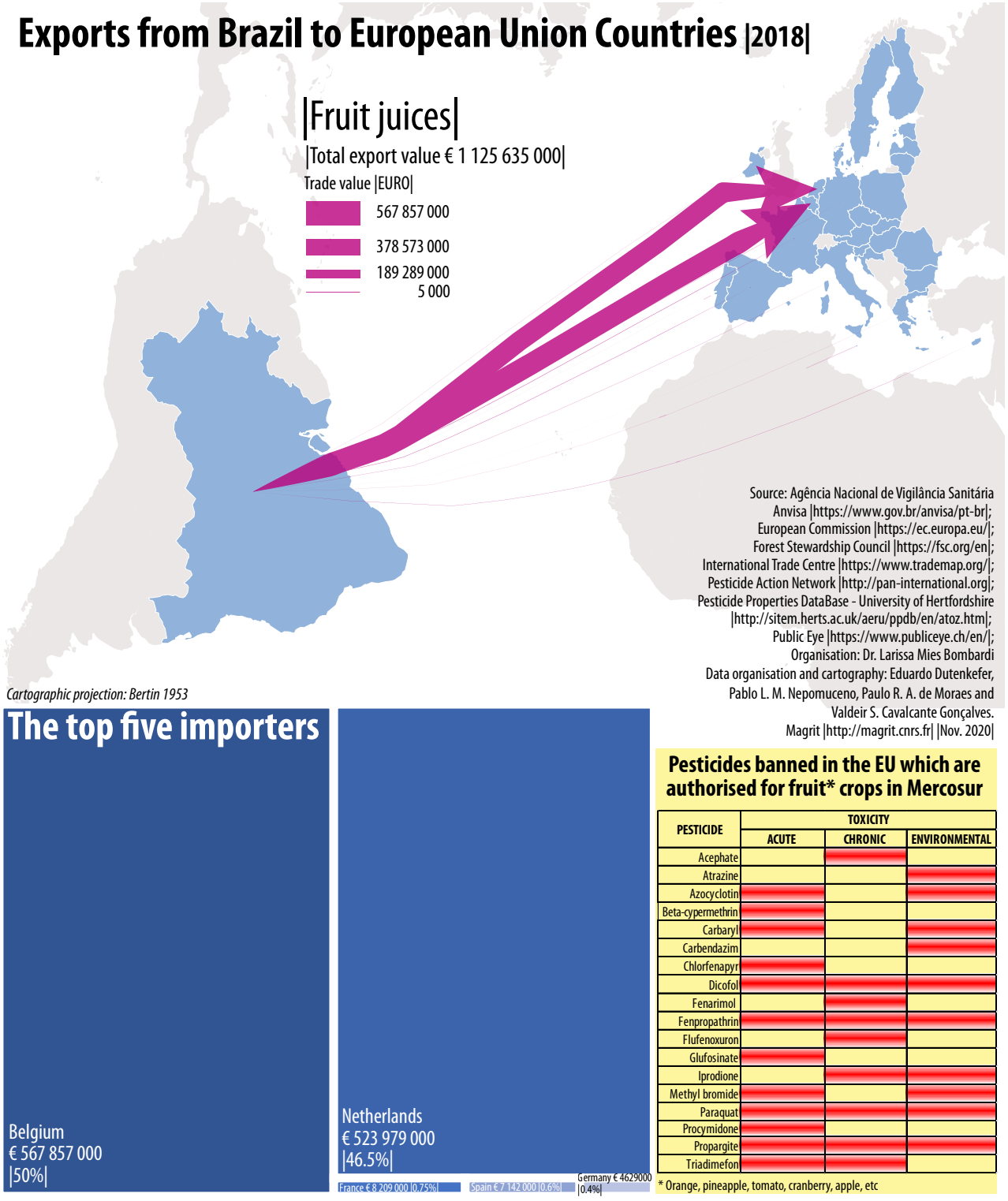
Argentina exported around 71 million euros' worth of pears and apples to the EU in 2018. Fourteen of the pesticides prohibited for use in the EU are used in the farming of apples and pears in Argentina, as seen on **Map 31**.

[Map 31]



Brazil exported more than 1 billion euros' worth of fruit juice to the EU in 2018. Of the chemicals authorised for growing fruit in Brazil, 18 are prohibited for use in the EU, as can be seen on **Map 32**.

[Map 32]



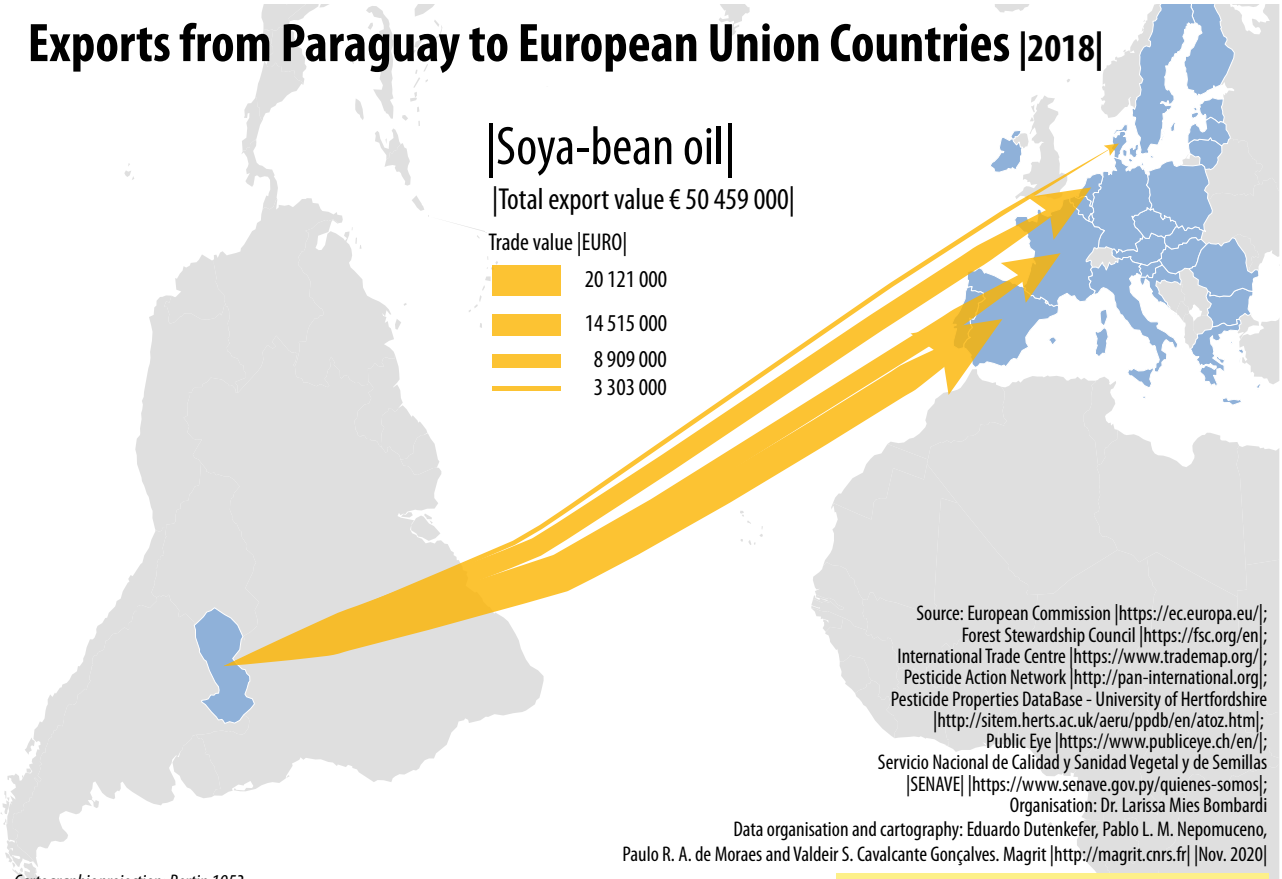
Pesticides banned in the EU which are authorised for fruit* crops in Mercosur

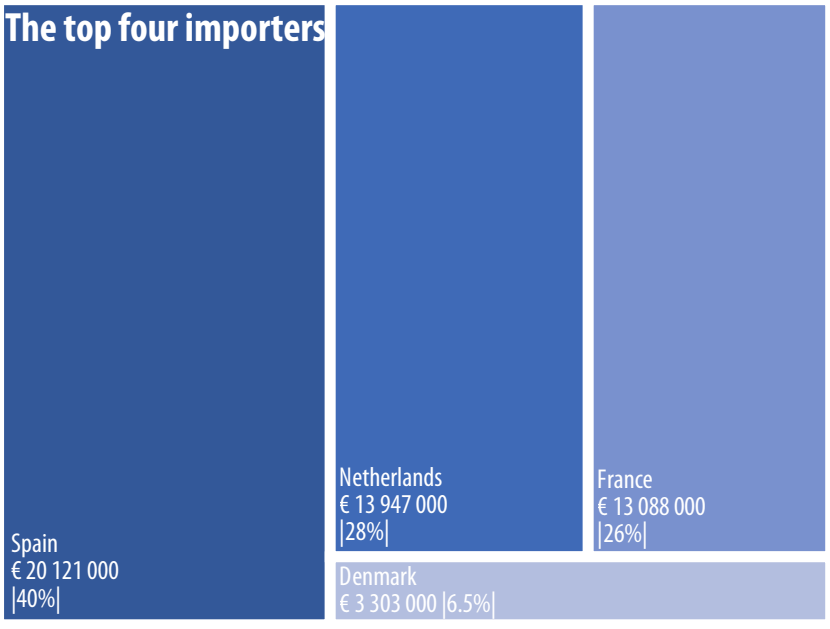
PESTICIDE	TOXICITY		
	ACUTE	CHRONIC	ENVIRONMENTAL
Acephate		■	
Atrazine			■
Azocyclotin	■		■
Beta-cypermethrin	■		
Carbaryl	■		■
Carbendazim			■
Chlorfenapyr	■		
Dicofol	■	■	■
Fenarimol		■	
Fenpropathrin	■	■	■
Flufenoxuron		■	
Glufosinate	■		
Iprodione		■	■
Methyl bromide	■		■
Paraquat	■	■	■
Procymidone	■		
Propargite	■	■	■
Triadimefon	■	■	

* Orange, pineapple, tomato, cranberry, apple, etc

Paraguay exported 50 million euros' worth of soya bean oil alone to the EU. Among the pesticides authorised for use on soy crops in Mercosur countries, 20 are prohibited for use in the EU, as shown on **Maps 33, 34, and 35**.

[Map 33]



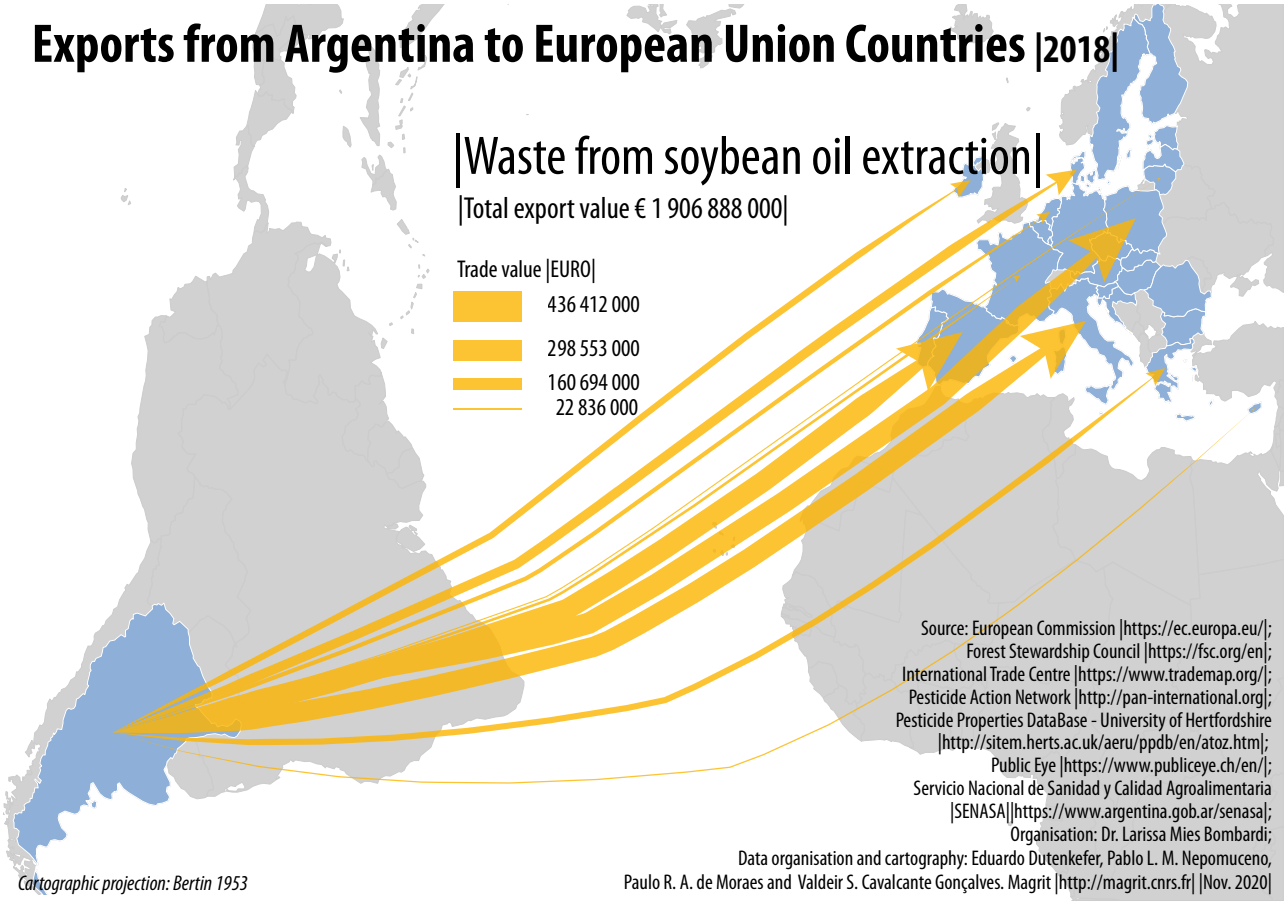


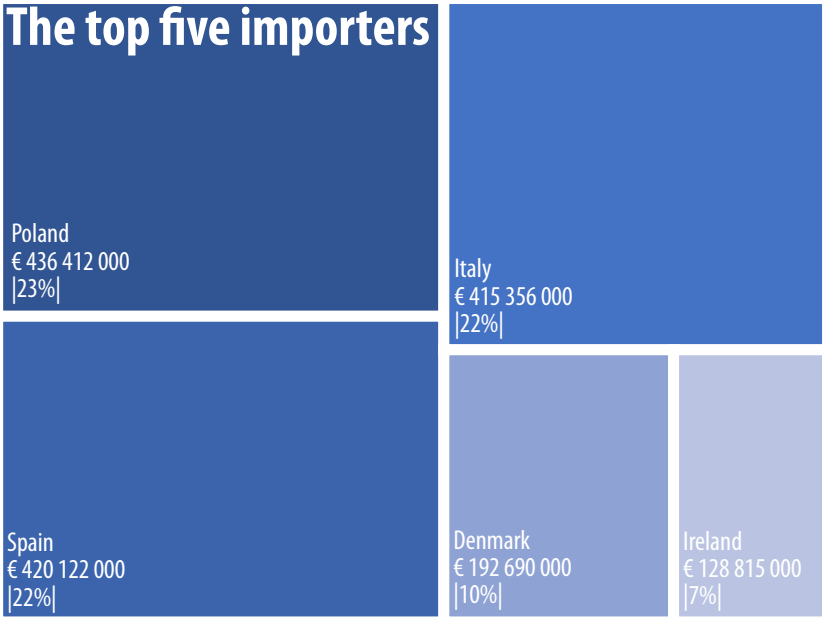
Pesticides banned in the EU which are authorised for soya crops in Mercosur

PESTICIDE	TOXICITY		
	ACUTE	CHRONIC	ENVIRONMENTAL
Acephate		■	
Acetochlor			■
Acifluorfen	■		■
Alachlor		■	
Beta-cypermethrin	■		
Carbendazim			■
Chlorfluazuron	■		
Diquat	■	■	■
Fenarimol		■	
Fenpropathrin	■	■	■
Fipronil	■	■	■
Flufenoxuron		■	
Glufosinate	■		
Linuron	■	■	■
Paraquat	■	■	■
Permethrin	■	■	■
Procymidone	■		
Profenofos	■	■	■
Thiodicarb	■	■	■
Trichlorfon	■	■	■

Argentina exported to the EU almost 2 billion euros' worth of "waste from soybean oil extraction," as seen on **Map 34**.

[Map 34]



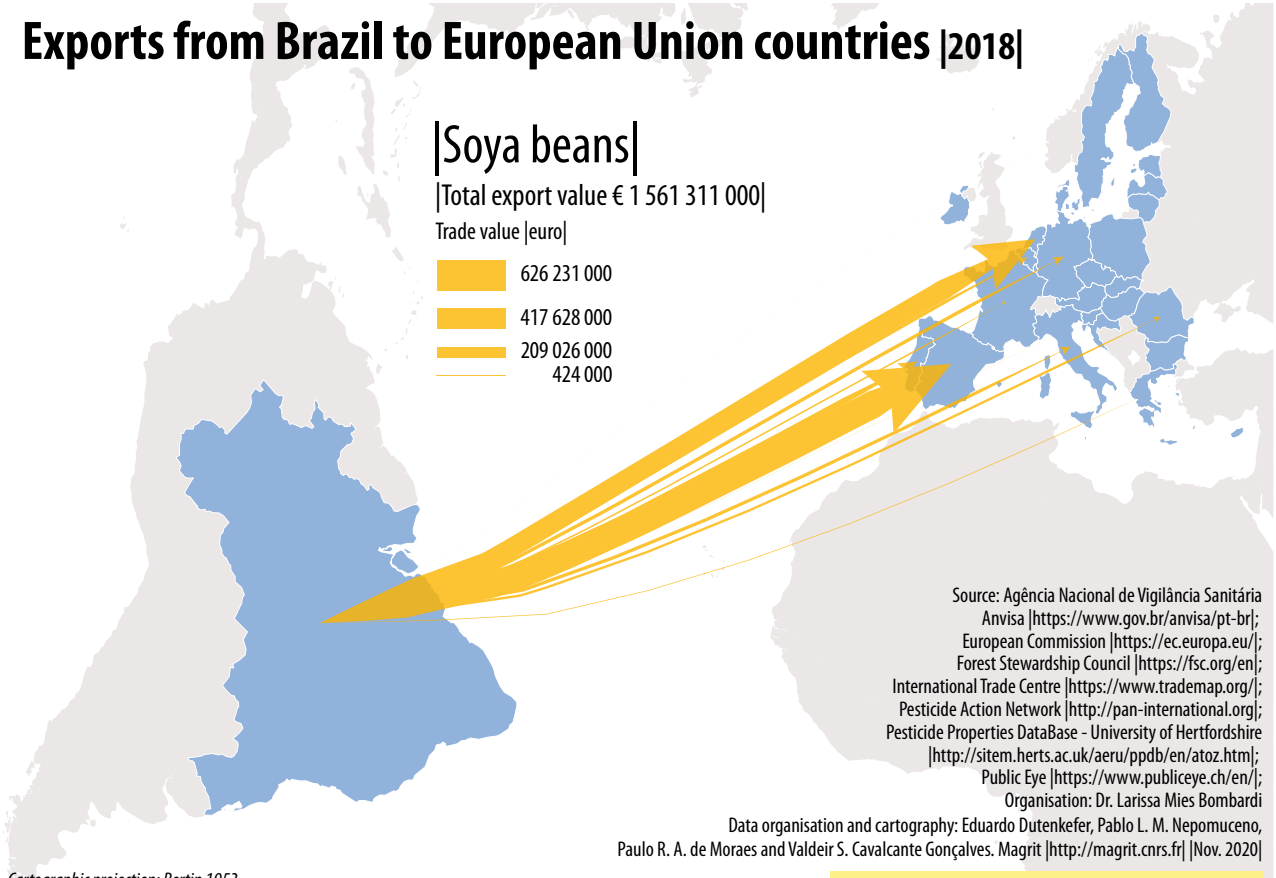


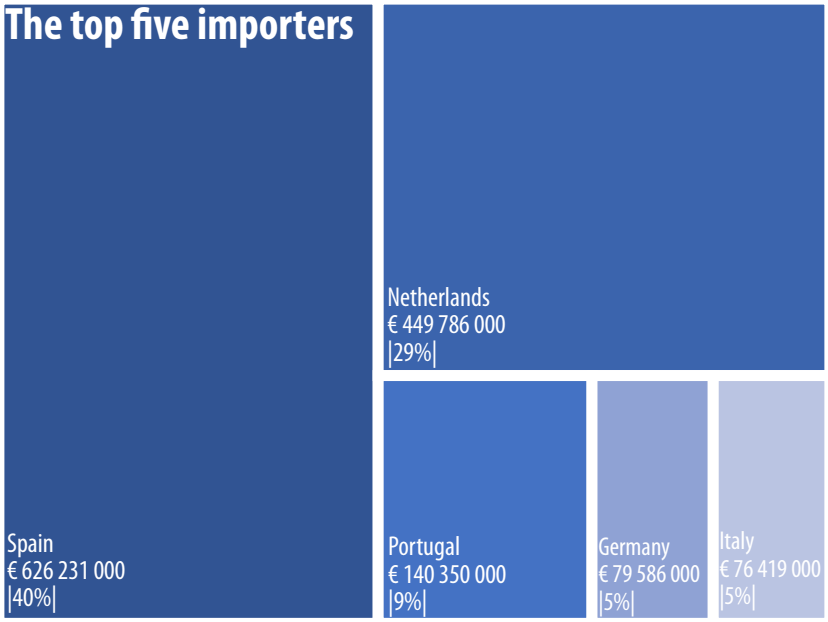
Pesticides banned in the EU which are authorised for soya crops in Mercosur

PESTICIDE	TOXICITY		
	ACUTE	CHRONIC	ENVIRONMENTAL
Acephate		■	
Acetochlor			■
Acifluorfen	■		■
Alachlor		■	
Beta-cypermethrin	■		
Carbendazim			■
Chlorfluazuron	■		
Diquat	■	■	■
Fenarimol		■	
Fenpropathrin	■	■	■
Fipronil	■	■	■
Flufenoxuron		■	
Glufosinate	■		
Linuron	■	■	■
Paraquat	■	■	■
Permethrin	■	■	■
Procymidone	■		
Profenofos	■	■	■
Thiodicarb	■	■	■
Trichlorfon	■	■	■

And finally, Brazil exported more than 1.5 billion euros' worth of soya beans to the EU, as shown on **Map 35**.

[Map 35]





Pesticides banned in the EU which are authorised for soya crops in Mercosur

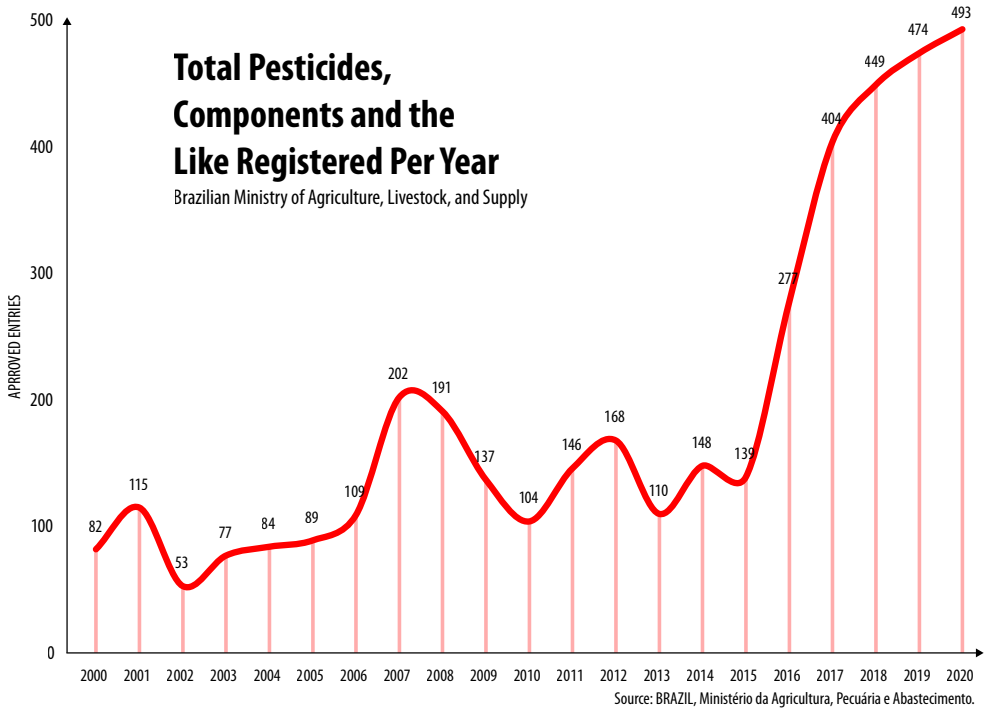
PESTICIDE	TOXICITY		
	ACUTE	CHRONIC	ENVIRONMENTAL
Acephate		■	
Acetochlor			■
Acifluorfen	■		■
Alachlor		■	
Beta-cypermethrin	■		
Carbendazim			■
Chlorfluazuron	■		
Diquat	■	■	■
Fenarimol		■	
Fenpropathrin	■	■	■
Fipronil	■	■	■
Flufenoxuron		■	
Glufosinate	■		
Linuron	■	■	■
Paraquat	■	■	■
Permethrin	■	■	■
Procymidone	■		
Profenofos	■	■	■
Thiodicarb	■	■	■
Trichlorfon	■	■	■

In 2019 and 2020, Brazil approved the use of more types of pesticides (for the production of commercial products) than at any other time in the country's recent history, as shown in **Graph 5**.

Among the active ingredients included in the composition of the pesticides authorised in 2019 and 2020, 37 are prohibited for use in the EU due to the acute and chronic health issues they can cause in humans or due to environmental hazards. Some of these substances can have all three types of harmful effects. Examples of such substances include dinotefuran, prohibited for use in the EU in 2009 and authorised for use in Brazil for the first time in 2019, as shown in **Table 3**.

Obviously, part of the food products the EU imports from Mercosur carry residue from the pesticides prohibited for use in the EU or residue from substances permitted in the EU but at levels above the limits. We refer to this phenomenon as the "circle of poison"[9]. This means that the EU produces and exports substances prohibited for use within its own territory that, in part, come back to the EU as residue in food goods imported from other parts of the world, such as Mercosur.

[Graph 5]



Source: BRAZIL, Ministério da Agricultura, Pecuária e Abastecimento. In:<https://www.gov.br/agricultura/pt-br/assuntos/insumos-agropecuarios/insumos-agricolas/agrotoxicos/arquivos/registros-concedidos-2005-2020-site-mapa.xlsx>, 2021.

[9] GALT, Ryan. Beyond the circle of poison: Significant shifts in the global pesticides complex 1976-2008, in Global Environmental Change, 18 (2008) 786–799, Elsevier Publication. https://escholarship.org/uc/item/1d88g9fw

[Table 3]

Pesticides Approved in Brazil in 2019/2020 and Banned in the EU

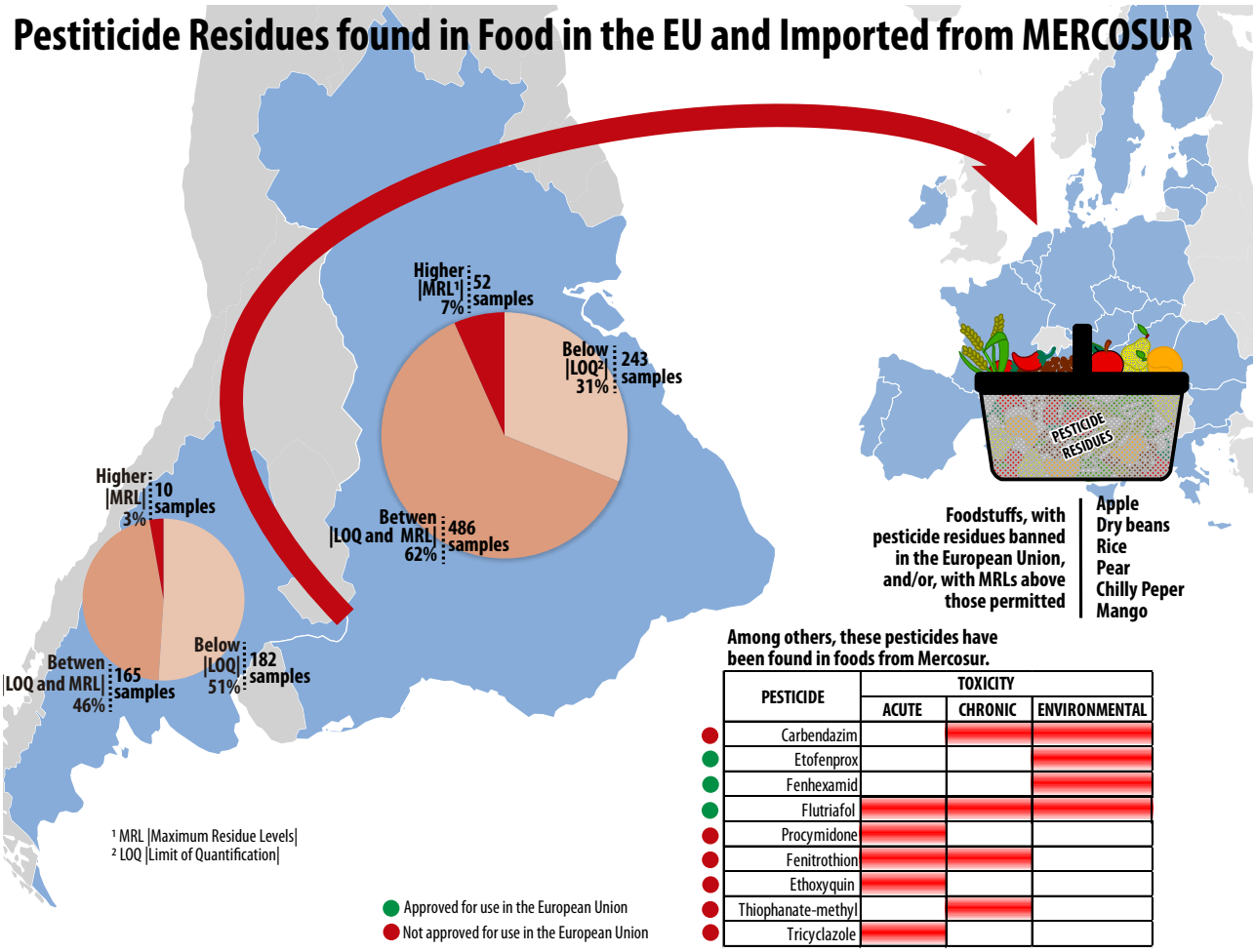
PESTICIDE	YEAR BANNED	CLASS OF USE	TOXICITY		
			ACUTE	CHRONIC	ENVIRONMENTAL
Acephate	2003	Insecticide and acaricide		■	
Ametryn	2002	Herbicide	■		■
Amicarbazone*	-	Herbicide			
Atrazine	2004	Herbicide			■
Bifenthrin	2009	Insecticide, formicide and acaricide	■	■	■
Carbendazim	2014	Fungicide			■
Chloransulam-methyl*	-	Herbicide			■
Chlorfenapyr	2001	Insecticide and acaricide	■	■	■
Cartap Hydrochloride	2002	Insecticide and fungicide	■	■	■
Chlorimurom-ethyl*	-	Herbicide	■	■	■
Chlorothalonil	2019	Fungicide	■	■	■
Chlorpyrifos	2020	Insecticide, formicide and acaricide	■		
Diafenthiuron	2002	Acaricide and insecticide			■
Diquat	2019	Herbicide	■	■	■
Dinotefuran*	-	Insecticide	■	■	■
Fipronil	2017	Insecticide, formicide and cupinicide	■	■	■
Fomesafen	2002	Herbicide			■
Glufosinate	2018	Herbicide and growth regulator	■		
Hexazinone	2002	Herbicide	■	■	■
Imazapic*	-	Herbicide	■		■
Imazapyr	2002	Herbicide	■		
Imazethapyr	2004	Herbicide	■		■
Indaziflam*	-	Herbicide	■		■
Lactofen	2007	Herbicide	■	■	■
Lufenuron	2019	Insecticide and acaricide			■
Methomyl	2019	Insecticide and acaricide	■		■
Novaluron	2012	Insecticide			■
Permethrin	2000	Insecticide and formicide		■	
Picoxystrobin	2016	Fungicide			■
Profenofos	2002	Insecticide and acaricide	■	■	■
Propanil	2011	Herbicide	■		
Propiconazole	2019	Fungicide		■	
Simazine	2004	Herbicide	■		■
Sulfentrazone*	-	Herbicide	■		■
Tebuthiuron	2002	Herbicide	■		■
Thiamethoxam	2019	Insecticide	■		■
Thiodicarb	2007	Insecticide	■	■	■

* Never notified and authorised in the EU

Source: Agência Nacional de Vigilância Sanitária - Anvisa |https://www.gov.br/anvisa/pt-br|; European Commission |https://ec.europa.eu/|; Forest Stewardship Council |https://fsc.org/en|; Pesticide Action Network |http://pan-international.org|; Pesticide properties DataBase - University of Hertfordshire |http://sitem.herts.ac.uk/aeru/ppdb/en/atoz.htm|; Organisation: Dr. Larissa Mies Bombardi; Data organisation and design: Eduardo Dutenkefer, Pablo L. M. Nepomuceno, Paulo R. A. de Moraes and Valdeir S. Cavalcante Gonçalves. |Nov. 2020|

The reality of this circle of poison is shown clearly on **Map 36**, presented below:

[Map 36]



Among others, these pesticides have been found in foods from Mercosur.

PESTICIDE	TOXICITY		
	ACUTE	CHRONIC	ENVIRONMENTAL
Carbendazim		■	■
Etofenprox			■
Fenhexamid			■
Flutriafol	■	■	■
Procymidone	■		
Fenitrothion	■	■	
Ethoxyquin	■		
Thiophanate-methyl		■	
Tricyclazole	■		

Source: EFSA, 2020a. European Food Safety Authority. National summary reports on pesticide residue analysis performed in 2018. TECHNICAL REPORT. 2020.|https://efsa.onlinelibrary.wiley.com/toc/23978325/2020/17/4| EFSA, 2020b. European Food Safety Authority. National summary reports on pesticide residue analysis performed in 2018. SCIENTIFIC REPORT. 2020|https://efsa.onlinelibrary.wiley.com/doi/full/10.2903/j.efsa.2020.6057| European Commission |https://ec.europa.eu/|; Forest Stewardship Council |https://fsc.org/en|; PAN, 2020. Pesticides Action Network. BANNED AND HAZARDOUS PESTICIDES IN EUROPEAN FOOD. Brussels, 2020. |https://www.pan-europe.info/sites/pan-europe.info/files/Report_Banned%20pesticides%20in%20EU%20food_Final.pdf|; Pesticide properties DataBase - University of Hertfordshire |http://sitem.herts.ac.uk/aeru/ppdb/en/atoz.htm|; Organisation: Dr. Larissa Mies Bombardi; Elaboration: Eduardo Dutenkefer, Pablo L. M. Nepomuceno, Paulo R. A. de Moraes and Valdeir S. Cavalcante Gonçalves|Nov. 2020|

As can be seen, according to data from the “European Food Safety Authority” (EFSA), of the 357 food samples from Argentina that it analysed, 165, or 46%, were found to carry residue of identified pesticides, but within the maximum limits established by the EU, and 10 samples (3%) had residues above the permitted limits in the EU.

With regard to the samples from Brazil analysed, the data is even more worrying.

Of the total 781 samples, 486 had residue from an identified pesticide (within the maximum limits established for the EU), which corresponds to 62% of the samples. Nonetheless, 52 samples, around 7% of the total samples, were found to have residues above the EU’s limits.

According to the EFSA, in 2018, the percentage of food samples from goods produced within the EU (along with Iceland and Norway) in which pesticide residue was found to be above the EU’s allowed limits (above the MRL—Maximum Residue Level) was 3.1%. (The 2018 European Union report on pesticide residues in food – 2020 – EFSA Journal – Wiley Online Library)

However, of the food samples from goods imported by the EU, that is, from food produced by outside countries, analysed in 2018, 8.3% were found to have residue from pesticides above the MRL established by the EU.

Thus, we can see that the number of samples of food coming from outside the EU found to have pesticide residue was 2.5 times higher than food produced within the EU itself.

Furthermore, as can be seen in the table shown in the right lower corner of Map 36, residue from six substances banned for use within the EU was found in food samples from Mercosur: carbendazim, procymidone, fenitrothion, ethoxyquin, thiophanate-methyl, and tricyclazole.

The Map 36 illustrates clearly and definitively what is meant by the “circle of poison.”

Based on all the information presented above, it is clear that we can say that the commercial relations between Mercosur and the EU have been characterised by an unjust asymmetry, molecular colonialism, and a circle of poison.

Any deal between both regions should deeply correct those relations, instead of still worsening them, as the currently negotiated text of the EU-MERCOSUR FTA would do.

São Paulo, May 8th, 2021

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