

Glyphosate Associated With 503 Infant Deaths Per Year in Brazil – Study

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Researchers find deterioration in health conditions at birth in areas downstream from intensive GM soy production

by [GM Watch](#)

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The following is a slightly shortened version of a BBC Portuguese-language [report](#) on a carefully conducted study published in 2020, which has been largely overlooked till now. The study shows that glyphosate contamination of water, driven by expanded GM soy production, leads to a large increase in infant mortality, as well as a higher probability of low birth weight and a higher probability of premature births.

Glyphosate is the most popular pesticide in Brazil. It represents 62% of the total herbicides used in the country and, in 2016, sales of this chemical in thousands of tons were higher than the sum of the seven other pesticides most commercialised in the national territory.

Used on GM glyphosate-tolerant soybeans, the herbicide contributed to Brazil becoming the largest producer of the grain in the world, surpassing the United States.

As a result, the GDP (Gross Domestic Product) of soy-producing states has grown far above the economy of the country as a

whole in recent decades. And the income generated by agricultural activity has stimulated other economic sectors in the producing regions.

But the new [study](#), carried out by researchers at the universities of Princeton, FGV (Fundação Getulio Vargas) and Insper, reveals that this generation of wealth has a high cost. According to the study, the spraying of glyphosate on soybean crops led to a 5% increase in infant mortality in southern and central-western municipalities that receive water from soybean regions.

This represents a total of 503 more infant deaths per year associated with the use of glyphosate in soy production.

“There is great concern about the effects of herbicides on populations that are not directly involved in agriculture, who are not directly exposed to pesticides,” Rodrigo Soares, full professor at the Lemann Foundation Chair at Insper and one of the authors of the study, alongside Mateus Dias (Princeton) and Rudi Rocha (FGV), told the [BBC](#).

“Although these substances are present in the body of more than 50% of the western population, we do not know if this is harmful or not,” added the researcher.

“Our article is one of the first to credibly show that this should indeed be a concern, as it demonstrates contamination through watercourses in areas far from the areas of use, in a way that has never been done before.”

Bayer, owner of Monsanto since 2018 – the company that launched glyphosate on the market in 1974, under the trade name Roundup – assesses the study as “unreliable and poorly conducted” and says the safety of its products is the highest priority of the company.

Aprosoja (Brazilian Association of Soy Producers), in turn, states that “the conclusions pointed out in the study do not

seem to be supported by the scientific facts and reality found in the practice of Brazilian agriculture”.

Finally, CropLife Brasil, which represents the pesticide sector in the country, said that “for more than 40 years, glyphosate has undergone extensive safety tests, including 15 studies to assess the potential toxicity to human development and 10 studies to assess potential reproductive toxicity”.

“Regulatory authorities in Brazil, Europe, the USA and around the world have reviewed these studies and concluded that glyphosate does not pose a risk to human development or human reproduction,” said the organisation.

The use of glyphosate in Brazil

The most widely used herbicide in the world today, glyphosate was discovered by Monsanto in 1970. The pesticide is used to eliminate weeds in agriculture, acting by blocking an enzyme that is part of the synthesis of essential amino acids for plant development.

Glyphosate is a non-selective herbicide – that is, it kills most plants. Because of this, it became widely used on crops genetically modified to resist the chemical, such as GM soybeans, marketed by Monsanto under the name Roundup Ready. Glyphosate herbicides were first sold by the company under the name Roundup. In 2000, however, the glyphosate patent expired, and the product is currently offered by several manufacturers under different trade names.

Genetically modified soy was first marketed by Monsanto in the United States in 1996.

In Brazil, a first authorization for use was granted in 1998, but was almost immediately suspended by the courts. In 2003, the government granted a temporary marketing authorization, which required the incineration of the remaining seeds to prevent their reuse in the following year.

In September of that year, a provisional measure allowed producers to reuse the seeds and, in October 2004, the temporary sale concession was renewed. Finally, in March 2005, the Biosafety Law permanently authorized the production and sale of transgenic soybean seeds.

The use of genetically modified soy has spread rapidly in Brazil since 2004, representing 93% of the grain-planted area in the mid-2010s, according to data from the United States Department of Agriculture (USDA), cited by the study of researchers from Princeton, FGV and Insper.

Along with the productivity gain of the soybean crop, the use of glyphosate grew strongly in the country, more than tripling in volume between 2000 and 2010, from 39,500 tons to 127,600 tons.

Differences between Brazil and other countries

In the European Union, since 2015, there has been a wide debate about the possibility of banning the use of glyphosate, after a report by the International Cancer Research Agency (Iarc) that year classified the substance as “probable human carcinogen”, that is, as a possible cancer-causing agent.

In the United States, Bayer has already disbursed billions of dollars in deals to settle lawsuits over allegations that glyphosate causes cancer.

“In the European Union, unlike Brazil, the registration of pesticides is always for a finite time. Here, when a pesticide is registered, this registration is eternal, until it eventually comes to be questioned”, explains Alan Tygel, member of the coordination of the Permanent Campaign Against Pesticides and For Life.

In Europe, currently, the authorization for the use of glyphosate is valid until December 2022. Austria became the first country in the region to ban the product in 2019, while

Germany plans to do without the herbicide from 2024.

Another important difference, according to the activist, concerns the maximum allowed value of concentration of the pesticide in water, so that it is considered suitable for human consumption.

“Brazilian water can be considered potable containing up to 500 micrograms of glyphosate per litre, while water in the European Union can have a maximum of 0.1 micrograms of glyphosate,” said Tygel. “So, the Brazilian limit is 5,000 times higher than the European Union limit.”

If these existing regulatory differences were not enough, Brazilian agribusiness has been pressing in recent years for the approval of the Bill of Law 6,299/2002, which eases the rules for inspection and application of pesticides.

In addition, within the federal government there has been a change in the correlation between forces opposed to and in favour of the use of pesticides.

“Until 2016, there was within the government a certain balance of forces between agribusiness, family farming and public policies to encourage agroecology,” said Tygel.

“From that year on, one of the first actions of the Michel Temer government [MDB] was to end the Ministry of Agrarian Development, which developed these organic agriculture policies. Since then, we have seen an exponential increase in the number of pesticide registrations,” he said.

In 2020 alone, Brazil approved the registration of 493 pesticides, the largest number ever documented by the Ministry of Agriculture, which has compiled this data since 2000.

Glyphosate and infant mortality

The authors of the study “Down the River: Glyphosate Use in Agriculture and Birth Outcomes of Surrounding Populations” say

that they decided to study the relationship between pesticide and infant mortality due to the heated debate over the use of genetically modified seeds and their combination with herbicides.

“We thought the debate was very passionate and very uninformed,” says Rodrigo Soares, from Insper. “Then we realized that the expansion of GM soy in Brazil, mainly in the Midwest and the South, as it was very fast and very marked after the introduction of the GM seeds, could be an interesting context for analysis.”

The regulatory change that allowed the use of transgenic soybean seeds in Brazil has generated what is called in economics a “natural experiment” – an event brought about by external causes, which changes the environment in which individuals, families, companies or cities operate, and that makes it possible to compare groups affected and not affected by this event.

“One concern that existed is that there could be water contamination, since toxicological studies in the United States, Argentina and Brazil detected the presence of glyphosate in rivers, but in a one-off, non-systematic way,” says Soares.

“To evaluate this, we used information about the hydrographic basins in the country and the relative position of the municipalities – above or below areas of intensive use of glyphosate,” explained the researcher.

“It was a way of understanding how the expansion of the use of transgenic soy and glyphosate in a given municipality could affect the municipalities that receive water that passes through that region where pesticides are used.”

What the researchers did then was to analyze, for the period between 2004 and 2010, when the greatest expansion of transgenic soybean production occurred in Brazil and the use

of glyphosate tripled, the birth statistics of these municipalities “downstream” from areas of use intensive herbicide.

“What we have shown is that there is a deterioration in health conditions at birth in these municipalities downstream from the municipalities that expanded soy production,” said the professor at Insper.

Within this deterioration in health conditions at birth are: a higher probability of low birth weight, a higher probability of premature births and – the most serious – an increase in infant mortality.

“We have also produced a series of other empirical analyzes to show that this was in fact associated with water and that this in fact appears to be associated with the expansion of soy.”

Isolating the effect of glyphosate

For example, comparing data from municipalities “downstream” with municipalities “upstream” – which therefore do not receive water that has passed through areas of use of glyphosate – the researchers find that municipalities “upstream” are not affected by this worsening of birth statistics.

The researchers also demonstrate that the negative effects on health outcomes at birth are particularly strong for pregnancies most exposed to the period of application of glyphosate, which in Brazil typically occurs between October and March, since soybeans are planted in the country between October and January.

The worsening of birth data is also greater when it rains more in the glyphosate application season, which the researchers showed by crossing health statistics with rainfall data. This finding is in line with the idea that more of the product reaches the rivers when soil erosion by rain is most

significant.

Mateus Dias, a doctoral student at Princeton University and coauthor of Soares in the study, explained the researchers' decision to analyse municipalities downstream and upstream, instead of the municipalities that apply the glyphosate itself.

"Glyphosate use has an impact on soybean productivity, and this may end up affecting child mortality in that municipality in other ways – for example, higher productivity can generate higher income and this will reduce child mortality," he said.

The researchers also assessed whether the expansion of soybeans affected soil erodibility due to the advancement of agriculture over forested areas.

"We showed that this did not happen, because these areas that started to plant soy seem to have been pastures before, so there was no radical change in vegetation and consequently, there was no significant change in soil erodibility," says Dias.

Study results may contribute to better regulation

According to the researchers, the objective of the study is not to "demonise" glyphosate, but to contribute to an improvement in public policies to regulate the use of pesticides in the country.

"We know what the use of agricultural substances in general has meant throughout human history – fertilizers, herbicides, pesticides. They have indeed enabled a revolution in terms of agricultural production and, in the net result, I believe that the effect was very positive," said Soares, from Insper.

"We only have the production we have today, with its impact on the price of food and on the populations involved in agriculture that benefit from productivity gains, because of these substances," he adds.

“This does not mean that we should not be aware of the potential negative effects,” he said, defending changes in the regulations for the use and management of pesticides and the protection of water courses and water tables.

Alan Tygel, of the Permanent Campaign Against Pesticides and For Life – created in 2011 and composed of more than a hundred social movements, trade unions and class entities, NGOs, cooperatives, universities and research institutions, has a more radical opinion.

“We believe that the central objective is in fact to end the use of these substances, especially since today there is no doubt about the technical capacity to produce food without the use of chemical and synthetic pesticides,” the activist said.

According to him, the campaign’s proposals are contained in a bill (PL 6670/2016), which institutes a National Pesticide Reduction Policy, with measures that range from the ban on aerial spraying, through state support for agroecology, to the ban on pesticides banned in their countries of origin and the end of tax exemptions for pesticides.

“We will fight for every small gain that we may have, because we know that each percentage less of pesticides used results in lives saved,” says Tygel.

“But we know that there is no possible coexistence between organic production and the massive use of pesticides. The path that we envision is a production model that can be adopted nationally and is totally free of pesticides and transgenics.”

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The study:

Down the river: Glyphosate use in agriculture and birth outcomes of surrounding populations

Mateus Dias, Rudi Rocha, Rodrigo R. Soares

Latin American and the Caribbean Economic Association

Dec 2020

http://vox.lacea.org/files/Working_Papers/lacea_wps_0024_dias_rocha_soares.pdf

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