ADVANCES IN SCIENCE

Universidad del Rosario

War in the eyes of a woman

Tracing the tracks of "El hambre de los otros"

Are protected areas actually protecting our biodiversity?

The hyperconnected generation

Special Report

MIGRATION IN COLOMBIA:

THE CHALLENGE OF INTEGRATION

Universidad del **Rosario**

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ADVANCES IN SCIENCE

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SUMMARY

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A CALL FROM ACADEMIA

By Juan Felipe Córdoba Restrepo
Director
Universidad del Rosario Publishing House

Photos Leonardo Parra, Milagro Castro

Since the first issue of Advances in Science, our readers have been able to appreciate that our commitment is to deliver the results of the different researches conducted at Universidad del Rosario, which we frame in seven major topics: inclusion, environment, national problems, transdisciplinary studies with a social focus, technological innovation, and the life and work of those who dedicate their lives to the noble exercise of research. In addition, we seek to publish a special offprint with a current topic in each issue.

We understand that the phenomenon of migration is a topic that is more present today than ever in the world. The need to mobilize diverse groups of people is due to multiple factors such as hunger, wars, fleeing violence, reuniting with family, the search for decent employment and persecution, among many others.

It is important that from academia, particularly from the university, we listen to the voices that allow us to find keys to understand this problem. Together we can think about how we can be part of the possible solutions, such as developing empathy for the migrant population as well as understanding that they are a population subject to rights—especially human rights—raising awareness in society so that we understand that it is everyone's problem and not just the authorities and those who are migrants. These reflections are the basis of our special issue for this issue of our journal. By way of motivation, we share with you a verse from the poem *Exilio* by Pablo Neruda:

"Exile is round:
A circle, a ring:
It changes the direction of your feet, you cross the land,
It is not your land,
You are awakened by the light, and it is not your light,
The night has arrived: your stars are missing,
You find brothers: but they don't share your blood.
You are like a ghost ashamed
of not loving other than those that love you so much,
And it still feels strange that you are missing
the hostile thorns of your homeland,
the harsh helplessness of your people,
the bitter affairs that await you
and which will bark you from the door..."

In this issue, as with previous ones, we offered articles that encourage reflection and action, beyond mere reading. From the point of view of inclusion, we analyze war and women, microlending as a barrier to microenterprise, prostitution in the country and care, and the guarantee of rights for those who work in this industry. With regard to the environment, we discovered how well we are protecting our country's biodiversity and how committed we are to our responsibility to contribute to combating climate change.

With regard to issues on the national agenda, we review the value of Colombia's 1991 Political Constitution; how hunger and malnutrition are worsening in the region; and the role of competition law in the country's progress. We examine the impact of diabetes on eye health, a study of great importance for global health.

In the next section, we share stories that mix different perspectives. We begin with an analysis to try to understand the relation between crime and student dropout, we continue with the little-known but highly dangerous fungal infections in healthcare facilities, and we close with the tension between microbial communities in our body and the indiscriminate use of antibiotics.

In our section dedicated to digital innovation, we approach a proposal to predict computer viruses through mathematical algorithms that resemble the equations of microbiology to continue with a topical problem such as that of a generation that remains hyperconnected through the extensive use of smartphones.

We close with a mathematical look at how we form an image of other people (sometimes, the first impression is less important).

Thinking about the need to provide innovative resources for the evolution of education in the deaf population, memory as a right, and moving to a larger reflection such as hunger and nutrition policies are topics included within the themes of leadership and social innovation.

In *Vida y obra* dedicated to research, we pay a heartfelt tribute, with heartfelt thanks, to our friend and colleague Israel Cruz Velandia (1965–2022). Professor and researcher Cruz Velandia dedicated his life both to pedagogy in academia—particularly in his discipline, physiotherapy—and to successfully raising the scientific rigor of this discipline nationally and internationally. This is shown by his determined participation in projects designed to think of the body as a whole, a physical element crossed by thoughts and emotions, or to make known the language of movement and the emotions as tools for understanding conflicts. Naturally, we miss Israel a lot, and all we can say is thank you very much for everything, Isra! ◙

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Inclusive Research

Migration in Colombia: The challenge of integration

"Thank you, Lord, for these open doors. May they never close under any circumstances." This is how Gabriel García Márquez's speech ended on October 22, 1982, after receiving the Order of the Aztec Eagle in Mexico City, a distinction created to honor foreigners who have taken prominent actions to support the Mexican community or humanity in general. García Márquez thanked the country that welcomed him so many times over the course of his life in different circumstances and always with open arms.

The Colombian government has opened one of those doors with the creation of the Estatuto de Protección Temporal para Migrantes Venezolanos (Temporary Protection Statute for Venezuelan Migrants, ETPV by the acronym in Spanish), which will offer legal protection to migrants, access to rights, and an opportunity to plan a personal future. The decision has been described as generous by governments and international associations, as it is the first major step toward the integration of this population into the social, political, cultural, and economic fabric of Colombia. But, more importantly, it is the first step to allow Venezuelan migrants to enjoy and exercise their rights.

The integration of the migrant population is the next great challenge that all Colombians must face since its success depends not only on local authorities. Based on data from the Study of Perception of Migrants in Colombia, carried out by the Universidad del Rosario, the Konrad Adenauer Foundation, and *Time*, 62 percent of the Venezuelan migrants who are in Colombia want to stay in the country and around 50 percent have already begun to apply for the Statute.

In this issue of *Advences in Science*, we have two articles that address the phenomenon from very different, but complementary and necessary, perspectives to understand the mark left by migrants and how critical it is that we receive and integrate them. The research from Professor Julia Seithner at the Faculty of Economics will tell us about the impact that migration has in their countries of origin. The research coordinated by the director of the Human Rights Research Group of the Faculty of Law, María Teresa Palacios, describes a series of good practices carried out in various Latin American countries, which can help us to prepare for the reception, management, and integration of migrants.

Notably, the humanitarian crisis in the neighboring country is far from over. Furthermore, 72 percent of those surveyed say they do not want to return to Venezuela. Despite the reopening of the borders and the economic respite Venezuela is experiencing this year, there is no reason to believe that the economic and social situation in the country will change in the near future. Thousands of Venezuelans continue to leave their country and many more remain in transit to their destination. We cannot avoid this reality and must support all efforts for management and integration.

In his speech to the Mexican authorities, García Márquez respectfully pointed out the obvious that he cannot represent anyone and that he is not a so-called typical immigrant. Neither he nor the small percentage of migrants from all over the world who have found those doors open can, since there are millions who still find them tightly shut. But their plea is a common denominator for all. Many continue walking, resisting, and most likely praying to find those open arms that will allow them to live with dignity.

Migration from a human rights perspective: Good practices in managing the Venezuelan crisis

Not everything has gone wrong in managing Venezuelan immigration. The study coordinated by María Teresa Palacios describes a series of good practices carried out in various Latin American countries so that we can make the best of each experience and offer integration based on human rights.

On March 10, 2022, U.S. President Joe Biden received President Iván Duque at the White House. In his welcome speech, the American thanked Colombia for its leadership on key issues for the region, such as the fight against the pandemic, the promotion of health security, and, in particular, for receiving refugees from Venezuela and "working for an orderly, safe, and secure way of life."

We cannot know for sure, but the reason for this congratulations may have been in the national government's publication 10 days before this meeting, of Decree 216 of 2021 that approved the Temporary Protection Statute for Venezuelan Migrants (ETPV), a legal mechanism that intends to generate information on migrants, create a complete registry of them,

using biometric identification, and offer them protection under the country's laws. The ETPV provides Venezuelans with documentation and access to rights, which is basic to have the opportunity to integrate into the country for the next 10 years. According to reports from Migración Colombia, its application has reduced the irregularity of this migrant population by 70 percent between 2021 and 2022.

"Colombia's response has been a milestone in terms of the development of the temporary protection status system, something that has provided the possibility for people to leave the chaotic situation," said Simone Schwartz Delgado, Deputy Representative of the United Nations High Commissioner for Refugees (UNHCR), during the presentation

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There are currently 281 million people displaced from their places of origin in the world. Only by acting together will countries be able to respond to this reality.

of the The Integration challenge report. Challenges and opportunities of migrant management in Colombia 2022-2026, an event organized by the authors of the report, the Venezuelan Observatory from the Universidad del Rosario, and the Konrad Adenauer Foundation (KAS), on November 24.

As rarely happens, the government then decided that the most correct and humane way to manage the high number of migrants entering the country was to offer options for them to plan a life within our borders. It did so, like many other countries in the region, without having previously experienced a migratory flow of such scale, for which it had to count, register, issue visas, and begin the asylum process for all migrants. Other countries such as Argentina and Peru established mechanisms to regulate the migrant population, but they were not as broad and did not affect as many migrants.

The report of the Venezuelan Observatory indicates that from 2016 to August 2022, 6,805,209 Venezuelans have left their country, 72 percent of them corresponding to the eco-

nomically active population. Colombia is the country that has received the most: about 2.475 million (72.44 percent between 2018 and 2019); followed by Peru (1.286 million), Ecuador (508,935), Chile (448,000), and the United States (394,000). Added to this is the serious problem the country has with displaced persons. Data from the UN Office for the Coordination of Humanitarian Affairs (OCHA) record that 70,267 people in Colombia have been victims of forced displacement between January and October 2022, 6 percent more than that in the same period of 2021.

Actions such as those of the national government are necessary not only because of the extremely complex management of such a large number of migrants but also because respect for human rights must be at the center of political decisions. For this reason, researchers Maria Teresa Palacios Sanabria, director of the Research in Human Rights Group of the Faculty of Law at the Universidad del Rosario; Beatriz Londoño Toro, emeritus professor at the Universidad del Rosario; and attorney Nathalia Hurtado Diaz decided to focus not only on the negative of the immigration approach but also on the positive. Their interest was to understand and describe the good things that had been done, locally, regionally, and nationally in the main receiving countries of the Venezuelan diaspora in South America.

"In 2015, when the wave of emigration began, and in 2018, when the largest flow occurred due to the closure of the borders, Colombia had no experience in managing immigration nor did it have the legal resources or the institutional structure to manage it," Palacios explains. "There is still a regulatory weakness regarding the accessibility of rights not only for Venezuelans but also for all foreigners in the country; the debt to all is historical. However, at the local, regional, and national levels, there were responses and initiatives that served to advance an effective and humane management of these migratory flows.

The results of this study were summarized in the study Experiences in migration: good local practices in South American cities, published in 2021 in *PUCP Law* journal, from the Universidad Católica de Peru. Here we will share the details of the research and why it is so important to apply its findings to achieve country collaboration in migration management.

This aspect is the basis of the Global Compact for Safe, Orderly, and Regular Migration (GCM), a document signed in December 2018 by all UN member states (except the United States). The pact, which is non-binding, is

→ In 2017, the UN stated that good practices can be adapted within each country but must be fully in line with international human rights treaties.

structured around 23 major objectives, and the good practices of this work respond to several of the needs raised by these objectives.

The basis of the study

"In the fieldwork we conducted, we arrived at this research on good practices in the absence of regulations and the barriers that people expressed in terms of access to their rights," says the professor. She adds that "each city began to do what it could to manage this situation, and that is where we discovered these desirable procedures or good practices.

The basis for this research arose from two other projects coordinated by Palacios. "The first of these showed that during the management of migration, there were very heterogeneous responses of the regional institutions to migration," she says.

Working to integrate migrants

Latest measures taken by the Colombian government for the management of Venezuelan migrants:

- Temporary Protection Statute for Venezuelan Migrants (ETPV), in operation since March 2021.
- Permit for Temporary Protection (PPT) for the validation of academic titles
- Venezuelan R Visa for migrants with at least 5 years with ETPV, available digitally as of June 2023
- Recognition of the PPT by the Directorate of National Taxes and Customs (DIAN) to obtain the Unique Tax Registry (RUT)

"This was due to the fact that in the national focus, there was no law that would unify the answer; there was only Law 1465 of 2011, which provides only some provisions alluding to Colombians living abroad and a complement to the Law of Return to facilitate the immigration of Colombians to the national territory. There is no talk of the migrants' rights.

In the first project, titled Regional assessment of migration in Colombia with a focus on human rights: 2014-2018, 24 universities and 43 researchers collaborated to characterize the immigrant population in five regions of the country (Antioquia, Centro, Costa Caribe, Eje Cafetero, and Nororiente) from a Human Rights perspective, that is, seeking to identify the challenges that migrants must face to effectively recognize the rights that any other person has: to work, to be healthy, to have an education, and to access justice.

Among other results, they found many constitutional and regulatory weaknesses in the country, which prevented any successful integration initiative from being deployed.

Immediately afterward, Palacios and her team analyzed the role of migrant women from Venezuela in the project called Feminization of Venezuelan migration in Colombia: regional analysis with a human rights approach 2014-2018. The results show that migrant women are at greater risk of suffering violations of their rights and that there is greater vulnerability as women: inequalities prevailing in their own countries and inequalities entrenched by the patriarchal system continue and are magnified by their new status as migrants, making them more vulnerable to dangers such as human trafficking and smuggling, labor exploitation, and violation of their rights.

Here we refer not only to Venezuelan women but also to Colombian women who are returning to the country. This return is a recent phenomenon in the migratory processes in Latin America. The International Organization for Migration (IOM) states that migrants usually move to countries with higher levels of development, but the flow is reversed when there are economic crises in the host countries or, as we saw recently, because of the barriers imposed by countries to contain the COVID-19 pandemic. This further complicates the situation of migrant women.

In these two projects, the researchers found that, both at the regional level in the interior of Colombia and at the national level, along with the other countries, the institutions in each place implemented and proposed positive, effective solutions with great short-, medium- and long-term impacts on the migrant and host populations.

The path taken with these two studies prepared them to study the issue of **good practice** (**GP**). But it was the exchange with foreign researchers, during an analysis of Venezuelan immigration in several countries of the region, which allowed them to learn, for example, about more mature legislative developments. At the same time, they implemented more restrictive measures, as was the case of Peru and Ecuador: while these countries curbed entry by enacting strict requirements, Colombia did not require anything.

For the study, they analyzed the migration policies of Argentina, Peru, Ecuador, and Colombia between 2014 and 2018, seeking to find the lines of action that sought to improve migrants' rights. These countries were chosen because they receive the majority of Venezuelan migrants and are also those where the State and society have implemented actions to ensure these rights.

In addition, each country has its own experience and tradition in migration management, and this is an important factor that helps define whether or not a measure will be successful. Argentina, for example, has received migrants since the 19th century and has developed regulatory frameworks. Currently, 4.9 percent of its population is of foreign origin, and in Buenos Aires, it is 12.8 percent. According to 2019 data from the IOM, 70 percent of the migrants received by this city come from Venezuela and the country hosts around 145,000 Venezuelans in its country. It should be noted that Argentina has led the adoption of the Response Plan for Refugees and Migrants from Venezuela (RMRP), a plan coordinated by the Interagency Coordination Platform for Refugees and Migrants from Venezuela (R4V), made up of more than 200 organizations, for migrant support in 17 Latin American countries.

Meanwhile, in Colombia, migration flows have been much smaller and at the time of the large Venezuelan diaspora, the country did not have clear constitutional support or regulations to enforce the few existing laws or structures to deal with the huge number of migrants.

In addition, the lack of contact with migrants means that demonstrations of racism, unequal treatment, abuse, and mistreatment

of migrants are much greater compared with those in other countries with more experience dealing with foreigners. Traditionally, Colombia has been a country where the emigration rate tends to be higher than the immigration rate. For Venezuela, our neighbors have a long history of managing and including Colombian migrants.

Good practices (GP)

Researchers define good practices (GP) in their study as the "development of coordinated actions with a focus on human rights, carried out by state authorities, international organizations, or civil society that are replicable, adaptable, that can

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be documented, and that seek to facilitate or promote access to the rights of foreigners."

In 2017, the UN stated that GPs can be deployed domestically by each country but must always be in accordance with obligations under international human rights treaties.

Therefore, the researchers studied the actions based on two aspects: the first was to see who did what since in the absence of clear regulations, both the State and civil society can carry out actions. The State can perform actions already included in the country's legal

regulations, the **"Good Regulatory Practices."** It may also take emergency or temporary actions that produce, among others, "coordinated proposals for work or new ways of attending to the migrant population, which are combined with bolstering social services in host communities," as stated in the study. These are denoted as **"Good Administrative Practices."**

The purpose of these is to enable all members of society, at the local, regional, and international levels, to work together to guarantee migrants' rights. Thus, they analyzed the actions that the State had deployed and those that had been implemented by civil society and international organizations (such as UNHCR, IOM, ILO, and the Church). A clear example can be seen in Lima (Peru), where the Jesuit Refugee Service has created four Support Centers for Refugees to date (Caremi).

The second aspect was to see at what level this action had an impact and at what moment this support was provided.

1. GP in emergency relief: this is the first contact with the migrant population when the aim is to "meet the immediate needs of migrants and ensure their survival." These actions include delivering food, water, hygiene kits, vaccinations, and temporary shelters. Its application is intended to reduce the vulnerability of these people in risky trips to their final destination. For example, the Ecuadorian Red Cross activated in various provinces 15 points of care and provided 7,794 medical and dental first aid services as of June 2019.

2. GP in humanitarian aid: this is complementary to emergency aid and provides support for food, clothing, lodging, and listening to migrants. These are temporary measures since it is assumed that the next step would be to offer more solid responses that would grant, for example, a residence or work permit, family reunification processes, or any others that would allow these people essential projection.

3. Pedagogical GP: many of the migrants are unaware of their rights and the routes they should follow to obtain institutional support. Such support includes creating care guidelines and clear and safe information outlines, care routes, and contact channels using different communication channels as well as providing information points along the integration route for these people, with an approach that considers diversity and difference. Furthermore, it satisfies the needs raised in Objective 3 of the PMM ("provide accurate and timely information at all stages of migration"). In Argentina, the capital promoted the Buenos Aires Lives Together program, with the goal of "reflecting on the practices of coexistence that occur in different areas of the city from a multicultural perspective, ensuring equal treatment and respect."

4. GP of reception actions: their objective is to guarantee human rights and offer dignified reception at borders, respectful of the rights of persons and with a differential approach to give priority attention to pregnant women, unaccompanied children (many parents often die in the process), the elderly, those who need special attention, the disabled, refugees, and returnees. The ease with which such access to information is provided will depend to a large extent on the language used to

communicate the information. Here, law enforcement, public officials, and competent authorities are essential in providing timely and adequate care to the most vulnerable groups.

5. GP for social integration with guaranteed rights: this is the most important point in which Colombia is currently immersed. While the Santos administration was in charge of deploying humanitarian action, Duque's administration took on the registration of migrants, and now, Petro's administration will have to address inclusion in society, the integration. To achieve this full social inclusion, it is essential to support educational actions that help fight against discriminatory and xenophobic processes. Emphasis should also be placed on identifying occupational profiles, enabling and encouraging access to work (perhaps through cooperatives and entrepreneurship actions), as stated in Objective 6 of the PMM. Some examples of these are the dialogues between immigrants and the local population promoted by the North Santander Governor's Office Department of Borders, an action that was part of the "Connecting Paths for Rights" program, in collaboration with the United States Agency for International Development (USAID).

Human Rights, always at the center of the debate

Every country faces its own reality. Immigration is an international problem, as stated in the Global Compact. By 2020, the number of migrants will reach 281 million, 3.6 percent of the world's population, and only by acting together will countries be able to meet the needs of migrants and take advantage of the positive impact of these flows.

Professor Palacios comments that "in Colombia, we also have internal displacement, another modality of human mobilization, which we have not yet resolved in terms of humanitarian assistance, return or socioeconomic stabilization of people displaced by the armed conflict. Despite the Victims Law, the Displaced Persons Law, and all the other laws and rulings of the Constitutional Court, despite having all the tools at our disposal, we still have not been able to solve this terrible problem."

The expert continues with a forceful reflection: "When Venezuelans started to leave their country in large numbers, we were not prepared to receive them despite the fact that we had been alerted to the problem and that those flows already existed, although not to that magnitude. Therefore, the State had to take action on this situation, and in this context, these actions had a common characteristic: they were designed for the short term, as if immigration were going to last for a short time. And this did not happen even with the pandemic because, although many people went back to their countries, after the economic opening in September 2020, they left again—known as remigration—and in many cases, they brought their families with them."

Measures with a medium- and long-term impact were taken later, in 2021, such as the ETPV and the definition, principles, and guidelines for the regulation and orientation of the Comprehensive Migration Policy (PIM) of the State of Colombia. It is great progress, "but for now, the issue of rights continues to be resolved through the constitutional judge. It is the

legal protection that tells citizens where the right is because, although the rights remain indelible in the national Constitution, there is no clear and easy regulation that tells public officials what migrants are entitled to," the expert points out.

The pandemic brought a halt to the actions that were being taken. Restrictive measures, compulsory isolation, and halted economic activity caused a rebound in the flow of migrants. As a result, fewer people left Venezuela and many returned to their homes when the worst happened. The report indicates that, according to

IOM's Displacement Tracking Matrix, the flow of Venezuelan citizens decreased in March and April 2022 compared to the same months in

Challenges proposed by the report

The "Integration Challenge: Migration management challenges and opportunities in Colombia 2022-2026" was carried out by the Observatory of Venezuela at the Universidad del Rosario and the Konrad Adenauer Foundation (KAS), and coordinated by Professor Ronald F. Rodriguez. In addition, in order to provide an overview of the migration issue, the report offers 12 challenges and 57 recommendations to manage and integrate migrants, written by Observatory researchers Francesca Ramos Pismataro (director) and Maria Clara Robayo Leon, together with journalist Txomin Las Heras Leizaola. These are the challenges:

1   Strengthen the institutional framework and migration management from an integration approach.
2   Continue the implementation of the Temporary Protection Status for Venezuelan Migrants (ETPV).
3   Strengthen and expand public policies with a gender approach.
4   Establish a comprehensive policy for returning Colombians.
5   Strengthen the protection system for refugees.
6   Strengthen health care for the migrant population.
7   Guarantee access, continuity, and promotion of migrant children and adolescents in the educational system.
8   Prioritize care for migrant children and adolescents.
9   Achieve the socioeconomic and productive integration of migrants.
10 Strengthen territories and local governance of migration.
11 Address xenophobia and citizen security from a rights-based, non-discriminatory approach.
12 Strengthen the migration issue on the Colombian foreign policy agenda.

2021, showing an apparent slowdown in the migration flow. Therefore, the report warns that the conditions of these migrants are far from being stable and solid, and that the vulnerability of people continues to exist.

Meanwhile, each country took its own measures. For example, Colombia closed river and land border crossings with Venezuela in March 2020. Peru also closed its borders and sought to provide health coverage to all those in the country, regardless of their nationality or migratory status. Ecuador implemented the COVID-19 Ecuador Humanitarian Response Plan, which prioritized measures to assist vulnerable populations in the country's interior. And Argentina also closed borders and extended expiration dates "of temporary, transitional, and uncertain residences," as well as suspended the terms of validity of the residences granted.

Responses were also diverse in controlling migration in these countries. "They were only done on a medium and small scale," explains the professor. "The Iván Duque administration, with Carlos Holmes at the head, claimed that the Lima Group (a multilateral agency dedicated to solving the Venezuelan crisis)

will work to generate something like a 'regional governance' of the migration issue. But it was nothing more than a diplomatic order; there was no impact in terms of joint measures," he notes.

The challenge facing Colombia and all other countries in the region is to enable the integration of migrants into the country's social fabric. UNHCR representative Schwartz Delgado recently stated at the Venezuela Observatory event that "so far there are approximately 1.5 million people who have received temporary protection, so it is necessary to continue to make progress, make them visible, and allow them to contribute to the host community."

During the presentation of the *The challenge of integration report. Challenges and opportunities of migration management in Colombia 2022-2026,* the representative of the Konrad Adenauer Foundation in Colombia, Stefan Reith, stated that "Colombia has made a very generous decision with the temporary protection statute. Now we have to achieve local recognition, so that the public, companies, and society know about it and know that the people who benefit from it can work and become integrated." That is the great challenge of the Petro administration.

The official also pointed out that it is necessary to coordinate regional policies with those of the central government, so that there is a better information flow among migrant communities, and thus open the doors to opportunities for education, employment, and access to health care.

What the work of these researchers seeks to do is to provide a basis for a minimum exchange that will make it possible to generate a standardized public policy at the international level. "It does not have to be the same, but in terms of rights and access to this policy, it is necessary to identify and collect them to improve all public policies. The next aspect is that the practices could be shared to generate more humanized processes in migration matters," says Palacios.

What we all need to do together is to consider migration as a humanitarian need. In other parts of the world, where migration processes are older and more established, migration is promoted as a basis of service or a profitable opportunity. Germany, for example, created the Immigration of Skilled Workers Act in early 2020 to cover their needs in the fields in which they lack professionals, technicians, or technologists.

"Despite the Victims Law, the Displaced Persons Law, and all the other laws and rulings of the Constitutional Court; despite having all the apparatus, with all this, we have not been able to solve this terrible problem," explains María Teresa Palacios, professor at the Faculty of Law at URosario.

On another scale of values, and as another example, for several years, we have been able to observe the link between migrants' involvement in construction projects for the infrastructures of the World Cup in Qatar 2022.

"It is important that we have a broad characterization of migrants to identify the profiles that can help the country with certain activities. Such characterization should be valid and lawful and should help us create good policies. But that is only one way of understanding migration as an opportunity. I believe that this should not be the State's sole objective; we cannot see migrants from a purely utilitarian point of view. That is why it is necessary to put their rights at the center of the decisions that are made." concludes Professor Palacios.

Distribution of Venezuelans in Colombia by Department

Distribution of Venezuelan migration by department. Data taken from Migración Colombia as of February 2022, by the authors of the Report of the Venezuela Observatory of the Universidad del Rosario and the Konrad Adenauer Foundation.

0.00%
San Andres y Providencia

5.45%
La Guajira

3.26%
Magdalena

7.07%
Atlantico

3.79%
Bolivar

2.61%
Cesar

0.65%
Sucre

0.74%
Cordoba

10.25%
Norte de Santander

0.14%
Choco

13.89%
Antioquia

4.44%
Santander

2.23%
Arauca

0.72%
Caldas

1.49%
Boyaca

0.92%
Casanare

1.69%
Risaralda

0.40%
Vichada

0.83%
Quindio

6.21%
Cundinamarca

7.81%
Valle del Cauca

0.95%
Tolima

19.99%
Bogota D.C.

1.41%
Meta

0.27%
Guainia

0.88%
Cauca

0.51%
Huila

0.07%
Guaviare

0,77%
Nariño

0.07%
Caqueta

0.00%
Vaupes

0.48%
Putumayo

0.01%
Amazonas

Legend:
- More than 100,000
- 50,000 to 100,000
- 10,000 to 50,000
- 1,000 to 10,000
- Less than 1,000

Source: Adapted from Distribution of Venezuelans in Colombia as of February 2022. Colombian Migration

Migrating for the good of the country: Social remittances

Economic remittances comprise invaluable income for developing economies. But there is another type of remittance that generates a deeper and longer-term impact: social ones. Researcher Julia Seither explains its importance.

The development of all human civilizations has had migration as a key protagonist. They have been the reason—and also the cause—for the birth of many societies and have always profoundly shaped and influenced politics and world order. They now impact people's economies and participate in global geopolitical decisions.

But these macro-level transformations generated by the flow of people across borders originate at the individual level, from the person who decides to leave their country to seek a better future in another, to the family that completely abandons what was once their home because of a violent conflict. The reasons are endless and each one is unique, specific to each reality. As a result, the impact of this displacement is observed both in the new place of destination and in the place of departure: the destination is part of the migrant's present and future, and the origin is part of their past. However, thanks to

migrants, these two spaces coexist, interact, nourish, and, of course, transform each other.

"I was always interested in knowing what was happening in the place of origin of the people who migrated. They always talk about the migrant's experience since they leave their house or home, but I didn't know what was happening with the place they left." These are the words of Julia Seither, a professor at the Faculty of Economics at the Universidad del Rosario. Among other topics, Seither studies the effects of migration on the development of social regulations and their impact on economies.

In recent years, she has published two important papers on this topic, in which she analyzes the behavioral dynamics of

the migrant population of Cape Verde and Mozambique, both countries with deep migratory traditions. Both are characterized by a different type of migrant, with specific motives. Still, they can shed light on migratory behavior in other parts of the world and, in particular, on the impact of these migrations on the countries of origin.

"I began to study how migrants can become actors in the development not only of small groups, but also of entire countries, and not only from the economic aspect, but also from aspects of idiosyncrasy such as political attitudes or decisions about fertility and education among the family group," Seither explains.

From an economic point of view, the impact is easy to see. One of the driving forces behind migration is the need to achieve a better financial status. According to the World Bank, migrants' incomes increase three to six times when they move from low-income countries to high-income countries. And those gains also impact the migrant's countries of origin.

Let's look at the example of Colombia. 2020 data from the Ministry of Foreign Affairs teaches that the number of Colombians abroad is close to 5.5 million. In other words, almost 10% of Colombians live outside the country. In 2021, the remittances that these people sent to the country totaled 8.597 billion dollars, 24.4 percent more than in 2020, in accordance with the data compiled by the Bank of the Republic. This corresponds to 2.5 percent of the country's total GDP for that year. By 2022, it is expected to reach 10 billion dollars.

But migrants do not only produce monetary or material remittances; they also transfer new knowledge, practices, and civil norms to their countries of origin, known in the special-

ized literature as **"social remittances"** of various kinds: a greater appreciation for education and health, a greater demand for political responsibility, an exchange of information that modifies conceptions, trends or decisions about fertility (how many children they have per family group, or whether or not they decide to have children), and better organizational and entrepreneurial skills.

From homes to governments

"Contact through both virtual and physical social networks enables the exchange of ideas, leading to significant transformations in the country of origin. For example, suppose people go to countries with stronger political institutions or more complex social structures that work. In that case, the people who live this reality value them and pass them on to their places of origin," Seither continues. In fact, migration can affect the strengthening of democratic institutions in various ways, particularly, in improving governance and promoting political participation.

In 2019, Seither, together with Catia Batista and Peter C. Vincente from the Universidad Nova de Lisboa (Portugal), published the study Do migrants' social networks shape the political attitudes and behaviors in the home? (World Development, 2019), which analyzed surveys conducted in 1,766 households in Mozambique around the time of the 2009 national elections. Migrants from this country move mainly to South African mines and farms, and it has one of the lowest rates of political participation in the southern part of the continent. It ranks 178th out of 187 countries on the Human Development Index (Colombia ranked 83rd in 2019) and for its development, the country has historically been dependent on international aid. In 2013, economic remittances to the country rose to 1.5 percent of its GDP, which was 16.7 billion dollars that year, according to the World Bank).

Mozambique's migrants are mostly young men in search of better income-earning jobs, and the preferred destination for 86 percent of them is neighboring South Africa, a typical example of South-South migration. "The men go for nine-month periods to work in the mines; perhaps they return for a month and leave again," suggests the researcher, who adds that "they usually live together with migrants from other countries in the same town or camp, and this frequent exchange allows them to discuss ideas and talk about political participation, among other issues."

The results of the study suggest that political attitudes and behaviors may be learned and valued more at home by people who are in contact with the migrants. "We found that family is important, but contact with immigrants through informal discussions, such as those with friends, has a greater impact on political decision-making and influences political participation," he explains.

Who has more influence, the migrant abroad or the returnee?

One of the ideas that comes to mind when we talk about emigration is that the country loses something when its nationals leave. The concept of "brain drain" is often cited and is often thought to be detrimental to the country if those who leave are, at the same time, the most capable, the most educated, and the most experienced. This fact can also regulate investments in the country because if people emigrate, they will certainly not invest in their territory or participate in demo-
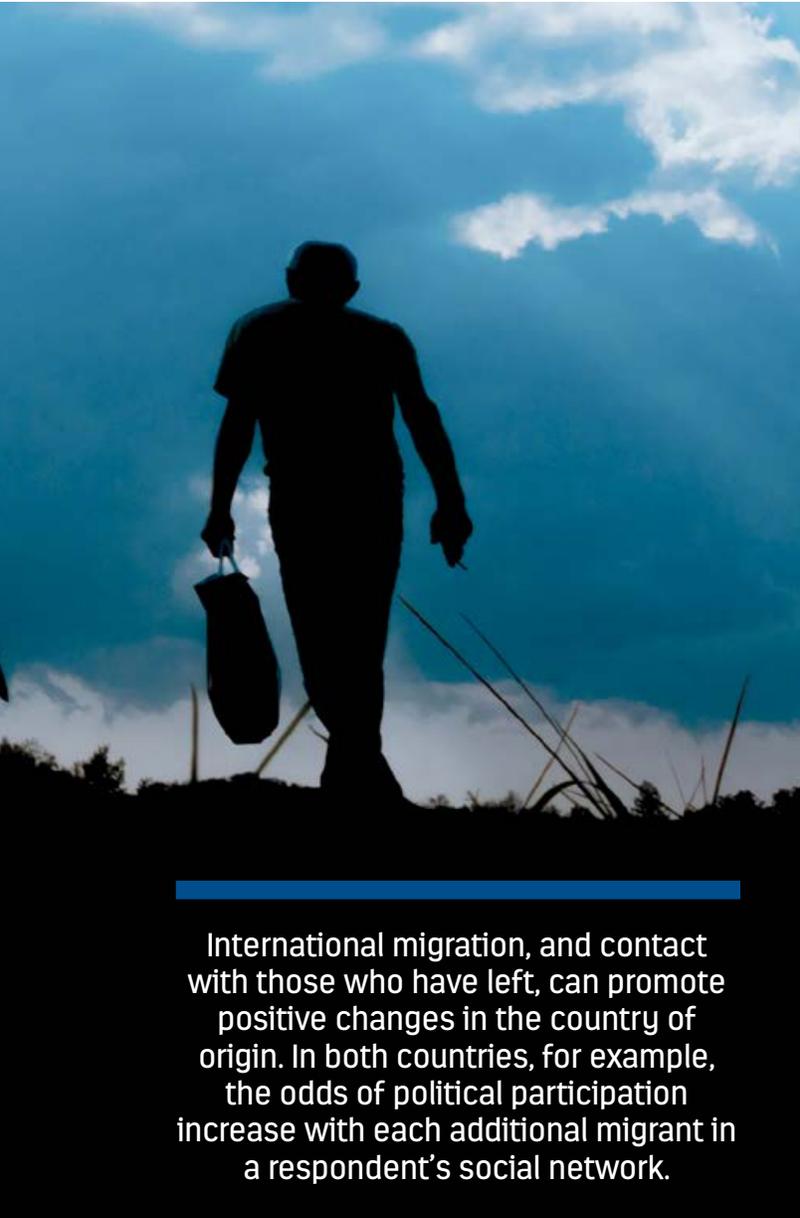
International migration, and contact with those who have left, can promote positive changes in the country of origin. In both countries, for example, the odds of political participation increase with each additional migrant in a respondent's social network.

cratic institutions. In this sense, emigration is harmful to the country.

However, international migration can promote institutional improvements by creating positive supply-side effects through return migration and communication between migrants and their contact groups at home. Cell phones and social networks have played an immense role in this aspect, allowing intense and constant contact between people, which has created an effect of dilution of borders and reducing distances. Therefore, thanks to continuous contact from abroad and returning migrants, migration is good for the country.

Based on these reflections, the researchers wondered whether returning migrants were as efficient in transmitting new values as those who remain abroad. They compared the effects of international migration between the political institutions of Cape Verde and Mozambique.

The results were published in the book Economic Globalization and Go-vernance (2021).

Cape Verde, an Atlantic archipelago of nine islands to the west of Mauritania, is also a former Portuguese colony like Mozambique. Although, its population does not exceed 600,000, there may be twice as many Cape Verdeans living abroad, with approximately 260,000 in the United States and some 100,000 in Portugal. The country ranks 126th on the Human Development Index, and remittances exceed any other foreign investment.

The researchers analyzed 6,145 surveys conducted between 2005 and 2006 in Cape Verde and 5,354 in 2009 in Mozambique. A high proportion of Cape Verdean migrants (62.4 percent) had studied up to primary school, while in Mozambique, it was only up to literacy (31 percent).

"Emigration from Cape Verde is characterized by a relatively skilled exodus to Portugal and other countries belonging to the Organization for Economic Cooperation and Development (OECD), while emigration from Mozambique is mainly due to unskilled labor flows to South Africa," the authors explain. They add that "the results we analyzed show that international migration substantially increases political participation in both scenarios."

On the one hand, foreign migrants are more effective in transmitting ideas and promoting political and social changes in the countries of origin because they still live their day-to-day lives in that "different world," with the constant influence of "those different institutions." However and despite the ease of communication that now exists, the geographic distance between the two countries still weighs heavily, and this factor dilutes the influence of migrants.

On the other hand, returning migrants have in their favor a closer contact with the locals, and a more significant opportunity for physical encounters and face-to-face dialogue. But with each passing day, the political institutions of the country where they lived become blurred or weakened, and their impact on that person is less and less.

In Cape Verde, in particular, the conclusions of the study reveal that the impact of returnees on political institutions is greater. They are, therefore, more effective in fulfilling this purpose than those who remain abroad.

But in Mozambique, this was different. Instead, the greatest impact was through the exchange and direct contact between those who migrate and those in the country of origin.

In both countries, the likelihood of political participation increases with each additional migrant in a respondent's social network.

"Our results show that the more an individual is exposed to better social norms regarding political participation, the more likely they are to act as a result. We have seen that small differences in the governance structures of these countries are relevant to promoting democracy and migration. Even if it occurs within the African continent, it can go a long way toward achieving it," concludes Professor Julia Seither. ◘

War in the eyes
of a woman

Although war has been mainly told by men, the truth is that this is not the only vision that should be acknowledged by law and history. Lawyer Alma Beltrán y Puga highlights the need to give a voice to female ex-combatants in transitional justice bodies.

By Amira Abultaif Kadamani
Photos Ximena Serrano Milagro Castro,
Alberto Sierra, Juan Ramírez

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"Women have also battled at war or have been victims thereof, but their stories are not commonly found in the official narrative."

Although the XY and XX combinations are fundamental for genetics, they are not for our own perception, for life in society, and for the history told thereof. Male history has been prevalent for centuries, especially in the public area, and has relegated the female history of facts and lives to the land of intimate memory and to the strictly family-related or micro-community environments. War has been the natural scene for this reality. To counterbalance this situation, the academic research by Mexican lawyer Alma Beltrán y Puga has contributed to the debate on the intersections and disagreements of war, law, and gender.

From this dedication, her most recent paper, La guerra sí tiene rostro de mujer (War Does Have a Woman's Face), an es-

say in which Beltrán y Puga (who has been a professor at the School of Law at Universidad del Rosario for the past seven years) analyzes the work by writer [Svetlana Aleksievich](#) to help understand the narrative of war from the experience of women. The acclaimed Belarussian writer, winner of the [2015 Nobel Prize in Literature](#), interviewed dozens of female Soviet veterans from the Second World War and gathered their memoirs in War Does Not Have a Woman's Face (1983).

The work of Beltrán y Puga is part of the book [Abogados de ficción: libros que hablan del derecho y el derecho en la literatura (Fictional Lawyers: Books on Law and Law in Literature)](#), a collection of texts by academists from Rosario with the aim of approaching literature to explore how it can propose tools to understand the legal phenomena. The literary stories assessed with a legal perspective "are useful to exemplify concepts or legal terms or to delve and debate on the relationship between legal and literary matters," as summarized in the book edited by [Lina Céspedes](#) and Ana María Ferreira.

This interview with Beltrán y Puga is within this reference framework. She is a feminist interested in building bridges between transitional law and the victims–specifically, women and diverse gender collectives–whose war stories oftentimes lose sense and humanity when translated by the law. Hence, synergies may be created between law and literature to achieve narratives that go beyond just enriching law enforcement by adding other elements for making decisions (such as aggravating and mitigating facts) to understand situations that, in spite of not being typified as crimes, can initiate a discussion.

Advances in Science (AS): In your opinion, gender is a useful category for transitional justice. Why?

Alma Beltrán y Puga (ABP): Gender speaks about social roles played by men, women, and non-binary people (including LBGTIQ+ people). It includes all social mandates we find in culture and that shape the characteristics and activities understood as "masculine" or "feminine." Many of those mandates are normative, stereotypes that become ingrained not only within culture but also within law. Gender is a useful category to analyze how these roles are shown in the narratives within justice bodies. Alexievich's conclusion is that war told by female ex-combatants is told in a different way, and that amid this dire task, there are other daily survival tasks, landscapes, and feelings usually hidden in the official history of conflicts.

"In Latin America, there is a trend for legislation, particularly criminal legislation, to be specific in its content. Thus, we not only have sexual violence as a crime but also have feminicides."

(AS): Is law manifested differently regarding gender?
(ABP): Yes, because it is a way to regulate our social behaviors. Legislation and codes prescribe human behavior. For example, a civil code may define marriage as an affective union between a man and a woman, thereby excluding LGBTQI+ people. When legislation includes gender matters or social roles within the normative and prescriptive mandates, we have problems because legislations try to regulate the general behavior of a society. It turns out that society is very diverse. Thus, the law must provide general mandates that acknowledge the differences between people and do not reinforce discrimination.

(AS): By having a gender approach, wouldn't one actually be biased?
(ABP): We can think that instead of a bias, it is a claim of the invisible stories of women in war, untold because the bias has always been male. What we think of as a "gender bias" is actually

a consideration of how there has been a hegemonic male construction of–in this case– war, which has always been understood as an act of male bravery where there are battles, heroes, characters fighting in combat, but who do not seem to experience ordinary life that would actually make them human. It seems that war is only a butchery where men are the great characters in the history of humankind. What gender tries to do is to rescue the stories hidden by this official narrative that portrays a certain–male–way to understand war.

(**AS**): **So, masculinity represents a bias and femininity represents a claim?**
(**ABP**): Yes, because the story has always been told from the same hegemonic version, built upon the rather exclusionary masculine look. Women have also participated in wars, either battling or becoming victims, but their stories are generally absent from the official narrative.

(**AS**): **How do you understand feminism?**
(**ABP**): It is the practice and policy that makes us think how to build a more egalitarian world, and that implies fostering uncomfortable conversations focused on the question by oppression. It is a way to transform these hegemonic and exclusionary visions. Feminism first questions and then proposes other ways to understand the world. The idea is to realize exactly where these biases are. In the case of war, it is necessary to include the female stories of victims and female ex-combatants.

(**AS**): **The texts telling these stories usually focus on sexual violence. Is this all the scope of a gender narrative?**
(**ABP**): The text I wrote is related to sexual violence because it happens in a disproportionate way towards women. It is one of the main expressions of gender violence in armed conflicts, maybe the most shown in transitional justice bodies, and the most documented expression. In fact, in Colombia, the Jurisdicción Especial para la Paz (JEP, Special Jurisdiction for Peace) is wondering whether to open a macrocase of sexual violence. But this is not the only war crime against women—there's also forced displacement, land dispossession, disappearance, forced sexual work, and torture.

(**AS**): **What is a macrocase?**
(**ABP**): As the history of the Colombian conflict is rather long, each case cannot be specif-

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"There is a big discussion on whether we need specific laws that show issues pertaining to women or other groups that have been historically discriminated. The answer of the feminist movement was positive, and this is why sexual violence appears as a war crime in the Rome Statute, which gives competence to the International Criminal Court." Alma Beltrán y Puga

ically addressed. So, what we do is to find an iconic case that reflects the patterns of systematic violence of most of these cases. The iconic cases end up in international courts, as happened with Jineth Bedoya's, a Colombian journalist who was kidnapped, tortured, and sexually assaulted by paramilitaries when working on an interview at the Cárcel La Modelo in Bogotá. Sexual violence has always been around transitional justice, and this is why I talk about it in particular, but it is not the only crime against women. There is a lot of feminist criticism about this being the only story. It has been the focus on gender applied to The TruthCcommission, and this is rather questionable.

(**AS**): **How convenient is it to create gendered crime classifications to generate equity and reconciliation?**
(**ABP**): There is a big discussion on whether we need specific laws that show issues pertaining to women or other groups that have been historically discriminated. The answer of the

A highlighted truth

Listening to a war testimonial and giving it a voice is the first step to dignify the person who tells it. It also opens a social space to ponder upon what happened and prevent their drama from repeating. With this commendable intention in mind, thousands of victims and aggressors of war in Colombia were heard. Among them, women, diverse-gender collectives and ethnic communities received a special treatment, as evidenced by the recently published final report from the Comisión de la Verdad (Truth Commission), a non-judicial body created in 2017 in the context of the Peace Agreement between the Colombian government and the Farc-EP to contribute to the clarification of facts, promote the acknowledgement of people hurt, and foster a peaceful coexistence in the territories involved.

Of the several volumes of the report, two are exclusively dedicated to telling the conflict from the logic and vision of these population groups. Why? "Because although the ethnic and gender approaches are ingrained throughout the whole research work, it was of utmost importance to amplify their voices before the need to build a more equal and reconciled society," explains Karim Ganem Maloof, publishing director of the report.

The lawyer and journalist, together with a 30-people team, was responsible for the narrative synchrony, providing style and register guidelines and supporting the construction of "the biggest non-fiction work of the last century in Colombia: a great document that, in spite of its niche nature, would attract the widest public possible through moving, flowing, seductive, true in-context and well-argued narrations."

For this, he called experienced journalists, novelists, publishers, specialists in historiography, politics, and social sciences and based the work on methodologies and tools from both literature and journalism. "We appealed to data verification, to information triangulation, to the inclusion of multiple voices and to the capacity to build scenes, characters and narratives to create texts that are lovingly charming to read even though they are telling atrocious stories; that is the paradox of good writing."

It should be noted that, although literary strategies were used, no story in the work was a product of their imagination—rather, it is the collection of several stories told gracefully to build a truth that, incidentally, is not juridical (for it to be, it should be subjected to judicial expertise) and is not used as evidence within the processes initiated at the Jurisdicción Especial para la Paz (JEP).

"We know that memory is gruesome, fallible, changing, and interpretative, and that emotions give it an inherent difficulty when compiling these stories. Actually, this is why, within our report, we have not included attributions of responsibility that point towards certain people. However, thanks to the synergy of the particular cases, we could create explanatory contexts to present a solid and robust story about the 60 years of conflict in our country."

feminist movement was positive, and this is why sexual violence appears as a war crime in the Rome Statute, which gives competence to the International Criminal Court. In Latin America, there is a trend for legislation, particularly criminal legislation, to be specific in its content. Thus, we not only have sexual violence as a crime but also have feminicides.

(AS): Gabriel García Márquez said that "Life is not what you lived, but what you remember, and how you remember to tell it." How legitimate and legal is it to appeal to memory to find truth and make amends?

(ABP): When one reminisces, one relives the memories, and according to psychoanalysis, this is a way to also open up the subconscious to explore traumas. Memory has this lumi-

nosity that is like a chiaroscuro—the memory will not be reliable, but it will capture lights and shadows. Then, the question is how truth commissions can enable people to tell these traumas without becoming a victim again.

(**AS**): **Given that emotions are the main characters of human life, how does law translate these stories into juridical processes that can turn into sentences, knowing that they are rather permeated by these emotions that veil facts?**

(**ABP**): Making a complaint and entering a lawful process means legalizing a story that will acquire a legal character. Because of this, to deal with people's emotions, the law requires evidence. Testimonials from victims are an important part of the evidence, but there are surveys and other testimonials from people close to those stories to check versions. The law has a level of emotion verification, which is why there is a "juridical truth." Beyond retribution (a penalty in which someone receives a punishment), transitional justice aims to restore social links and that includes emotional links. I criticize the way law is taught because lawyers are trained to listen to the stories, translate them into a lawsuit and argue based on juridical texts but not to tell stories. Transitional justice is about telling atrocious stories and giving them a juridical framework.

(**AS**): **One thing is to use narrative tools to create literature, but a different thing is to use fiction and translate them into facts to be trialed. Isn't that walking on a very dangerous line, when we talk about people that will be guilty of or exonerated from crimes?**

(**ABP**): My point is that literature provides tools to build a narrative that faithfully tells facts. Literature opens the mind and the imagination for a person to have methodological tools to face the real world.

→ Alma Beltrán y Puga, professor at the Facultad de Jurisprudencia (Faculty of Law), feminist and interested in building bridges between transitional law and the victims.

(AS): **In your essay, you say that "Transitional Justice Courts, being collegiate bodies, usually involve negotiations between what is subject to justice and what is not." Why can't we at least tell those facts that are not subject to justice?**

(ABP): Transitional justice has several aims: truth, justice, and reparation. But they end up being negotiable among each other because if you want people to acknowledge responsibility over certain facts and tell the truth, you will need to re-elaborate the concept of justice to impose restoring sanctions that imply a dialogue between the victims and those who violated their human rights, as happens in Colombia. If responsibility is accepted, instead of going to prison, these sanctions are imposed to restore the social network. For some people, this is not justice.

(AS): **What is the sense of war for women?**

(ABP): Regarding the stories from female ex-combatants, war is an inhumane task that transforms the person that performs it: atrocity brings about emotional and psychical transforma-

tion. What women say is "I never thought I could do it, yet I did it." It's a context in which we are de-humanized, and we have to make moral decisions that we wouldn't need to make in a regular situation.

They never speak about who won the war and who lost it or about the most important event. They say that it is a struggle not to be de-humanized in the process.

(AS): **And couldn't we apply this to men as well?**

(ABP): Yes, but men have not told those stories yet. They haven't unearthed them because of the cultural constructions on masculinity based on strength and courage. If you ask them what the war meant, they will likely tell you about their victories and defeats, how many people they killed, and the atrocities they committed but not about how they felt while they were doing that.

(AS): **Are there women who truly want to go to war and are attracted by war roles?**

(ABP): There surely are, and in that case, they are women with bigger problems to be included and be promoted because it has always been a very masculine world: a woman saying she wants to become a soldier is a strange thing for our current society. ◻

Microcredit: A promise that fails to meet expectations

They were created to favor microentrepreneurs, but it turns out that when the Central Bank of Colombia lowers the interest rate, it is the only product in which this correction is not reflected. The effect is completely different than expected.

By Claudia Jasmín Flechas
Photos Milagro Castro, Juan Ramírez, Ximena Serrano
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"I got a microcredit to buy a coffee maker, but then I did the math and I ended up paying like 5 times more. It was not a good decision," says Aurora Martínez, a user of this financial product.

What about the interest rates on microcredits? Do they actually achieve the goal of strengthening entrepreneurship, improving income levels, and, especially, being a financial solution for microentrepreneurs?

At Universidad del Rosario, the Formal and Inclusive Economy Alliance (EFI Alliance), made up of 18 stakeholders (including international partners, higher education institutions, and productive sector entities) and financed by the government initiative Colombia Científica, studies the phenomenon of informality from different perspectives. A specific line of *Project 7, Social Laboratory: Tools for the Management and Appropriation of Knowledge for the Design of Public Policies and Dissemination of Scientific Knowledge* specializes in access to credit. There, a group of researchers conducted an exercise that yielded interesting findings.

"One of the functions of the Banco Central de la República (Central Bank of Colombia) is to manage the country's monetary (inflation control) and financial policy," says Aglaya Batz Liñeiro, a professor at the School of Management of Universidad del Rosario, a member of the group of authors involved in the research study and a researcher for the EFI Alliance program. "When modifying its rates, it establishes minimum values so that the so-called usury rate is not exceeded. So, when the Central Bank lowers rates, one would automatically expect all financial product rates to go down. The question is as follows: How long does it take for banks to correct the rates of their financial products, or rather, how long does it take for the market to react to changes in bank rates? Most financial products end up correcting themselves after 3, 6, or 12 months, but this is not the case for microcredits," she points out.

This is information that should be available to those seeking access to microcredit, but which most people ignore and which would certainly influence their decision making.

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For the people who, for example, sell juices or arepas at a small scale, revolving funds or other products should be created to foster the scaling up of their activity.

Result of a thorough observation exercise

The research work entitled Analysis of the transmission of the monetary policy interest rate on the microcredit interest rate in Colombia: Discussions of independence (2021) examined people's access to credit, especially of informal workers, based on the reasons for applying for such credits:

- Based on knowledge and seeking the greatest personal benefit; although sometimes the decisions made are detrimental to their interests due to ignorance on how the financial sector works.

- Based on the geographic location of the banking entities, cooperatives or institutions authorized to give credit.

- Based on the ease of the formalities required to access these credits.

"When we began to investigate the academic support to validate these three hypotheses, we asked ourselves about the impact of the moderation effect exerted by the Central Bank on these financial products, especially microcredits," continues Batz Liñeiro. "We realized that when the Central Bank lowers interest rates because it needs more people to access credit, the banks that grant microcredits keep them high. The effect is completely different than expected, and it is the only product that behaves this way."

To reach this conclusion, the researchers analyzed the records for the past 10 years of the Superintendencia Financiera de Colombia (Financial Superintendence of Colombia), the entity that controls and manages the official information, both of the rates set, and the disbursements made by the financial institutions. Furthermore, they reviewed the rates set by the Central Bank of Colombia in the same period of time.

With this information, they correlated and analyzed the data and found the behavior of the rates for microcredits.

Why are microcredit interest rates soaring?

The theories considered in the study focus on these three reasons:

1. The Central Bank lowers the rate because demand is much higher. A perfect example is what happened as a consequence of the COVID-19 pandemic: the bank lowered the rate considering that many more people

→ The purpose is to help microentrepreneurs to improve their working conditions and wellbeing so that they grow from survival ventures to transformational undertakings.

would need access to loans. But as the demand for financial services grew, especially microcredits, the banks and cooperatives decided not to lower the rate because demand rocketed.

José Orlando Montes de la Barrera, co-author of the study and an EFI Alliance researcher, stated that they found that the higher demand for microcredits is consistent with higher interest rates.

2. The people who access this type of products are those with a higher risk as marked by the financial system or who are much more likely to fail to make the required payments to settle the debt. Therefore, given a greater risk of this happening, microcredits do not lower the rate. Most people ignore that consumer loans are much more likely to have a lower interest rate than microcredits.

Disbursements are higher at those microcredit establishments with higher interest rates, which does not make much sense, according to Montes de la Barrera.

3. The major opponents of microcredit compete under the illegal modality known as "drop by drop" and through informal financing (loans from friends, neighbors, and others).

In practice, therefore, microcredits operate at rates that may even be close to usury (see box below).

Another approach and importance of microfinance institutions

For Andrés García, professor of Economics at Universidad del Rosario and researcher of another line of the EFI Alliance, access to these financial instruments is very important for microentrepreneurs, "firstly, because it facilitates growth and investments in any business; secondly, because it is a mechanism to mitigate impacts or shocks that may affect them, as it occurred during the pandemic."

In his opinion, it is necessary to have a more specific offer of financial products for microcredit. "Microfinance companies have made great progress in this respect, and it is already a fully consolidated segment that also offers support

Some basic concepts

A microcredit is a financial instrument designed and regulated for microentrepreneurs and self-employed individuals. In Colombia, there are essentially two microcredit types: personal and for businesses.

In both cases, the microcredit must not exceed 120 minimum legal salaries in force (SMLV, by its acronym in Spanish).
Those who define or design financial products are banks, cooperatives, and entities authorized and regulated by the Colombian financial system.

"Drop by drop" are informal loans offered by individuals to cover an urgent consumption need. They are not supervised by a State supervisory entity, so they operate illegally with very high interest rates and constitute a socioeconomic problem that grows in the midst of informality and low banking penetration.

The problem of interest rates on microloans: COVID-19 case, a clear example

When the Central Bank of the Republic intervenes, it does so to regulate consumption. During the pandemic, this institution lowered the interest rate three or four times.
At that time, people were unemployed and needed credit. The Central Bank of the Republic usually lends to financial institutions at a certain rate, for example, 2%; thus, they set their rates at 2.3%. Later on, the Central Bank of the Republic decided to leave it at 3% because it did not want there to be so much consumption, either because there was enough demand or because the market stabilized again. According to our example, at that time, banks started to lend at 3.2% or 3.5%.

These corrections are not made automatically because there is already money circulating at a different rate. Banks, then, begin to correct their products progressively, after three or six months or even a year.
But the only product in which this does not happen is microcredit. When the interest rate falls, the opposite happens, i.e., the microcredit rate rises because there is greater demand, and that is when it begins to compete with the "drop by drop."

during the loan term, which is highly beneficial for the user. However, although there are good products, there is still room for improvement in this area," he says.

Regarding the phenomenon observed in this article and the interest rates, Professor García assures—bearing in mind that the credit market is characterized by its lack of homogeneity and by considering the level of risk as a priority—that banks always look for the best clients, those who have better payment capacity. In the case of microcredits, it is normal to find people with no credit history, which is very valuable information for the bank to evaluate the default risk of each client. Thus, many people cannot access these debt and investment mechanisms, or if they do, the bank's ignorance about their payment capacity translates into high interest rates.

"This means that on many occasions, even if rates go down and the market introduces flexibility to the cost of credit, this inability to profile clients very well means that this is not reflected in the interest rates of microcredits," García explains. "Thus, this implies the importance of microfinance companies, which focus on specific credit profiles to provide them with an adequate interest rate."

All this contradicts the main purpose of microcredit, which is to support the most disadvantaged microentrepreneurial population, and in the end, those who end up receiving the credit are those with the best conditions and who usually do not need it most.

Dissociation between banking and the real world?

"We are a highly unequal country characterized by a part of the population that concentrates a lot of money and works for the financial system, another great part that is neglected," says Montes de la Barrera. "So, ideally, we should gain an understanding of reality and create products and services that respond to the actual needs of a country like Colombia in its entirety."

To understand these consumers who are neglected by banks and by the State itself, the researchers warn that it is urgent to propose different products for them:

- **Migrants:** A latent problem in Colombia; it is extremely difficult for this group to access microcredit. There are no financial products to help them start their businesses. In

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There are other alternatives for people to access credit through a model similar to that of Grameen Bank, a microfinance and community development institution organized in Bangladesh. This model allows to manage loans ranging from USD 100 to USD 500 for low-income people, without a co-debtor, just by means of referrals.

the meantime, migrants are absorbed by the "drop by drop" or by applications that are not a real solution.

- **Survival Entrepreneurs.** For people who, for example, sell juice or *arepas*, but on a small scale, revolving funds or other products should be created to support the scaling up of their activity.

- **Financial Education.** Educating microcredit consumers is a pending task since they do not always make the best decisions but are acquiring credit at quite high rates without being aware of it. Therefore, it is necessary to put in place education mechanisms that include easily accessible platforms wherein they can make comparisons, see in real time which institutions offer them a more favorable rate, where they have fewer requirements, and payment terms, among others.

The Near Future

Within the social laboratory of the EFI Alliance, the challenge was to build a social laboratory to observe the phenomenon of informality. The idea is to continue this goal once the Alliance ends (September 2023) so that the joint efforts made by Universidad del Rosario and the other partner institutions are aimed at continuing to observe this phenomenon.

The purpose is to help microentrepreneurs improve their working conditions and wellbeing so that they can evolve from survival enterprises to transformational enterprises, i.e., they can follow the business curves and achieve significant economic growth.

Some external elements have developed significantly in recent years, such as mobile applications for making transactions (Nequi, TransfiYa, and Daviplata), which have enabled many informal workers to access a bank account or transfer money. This is a major milestone that will definitely allow for new and different actions.

Furthermore, some companies are investigating blockchain and cryptocurrency technologies for the design, execution, and monitoring of credits and to boost the traceability and transparency of their processes.

Finally, there are other alternatives for people to access credit through a model similar to that of the Grameen Bank, a microfinance and community development institution organized in Bangladesh. This model allows to manage loans ranging from USD 100 to USD 500 for low-income people, without a co-debtor, just by means of referrals. In Colombia, Fintech-based ventures can (and are already doing it) change or supplement the Colombian financial sector since, by reaching these unbanked populations and developing new financial products or services, they offer more alternatives to develop these populations that need a small boost to create value in our economy. ◘

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"We realized that when the Central Bank lowers the interest rate because it needs more people to access credit, the banks that grant microcredits keep them high. The effect is completely different than expected, and it is the only product that behaves this way," explains Aglaya Batz, researcher at the Management School of Universidad del Rosario.

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Andrés García, professor of Economics at Universidad del Rosario and researcher of the labor market and urban economy of the EFI Alliance, assures that "banks always look for the best clients, those who have better payment capacity. In the case of microcredits, it is normal to find people with no credit history, which is very valuable information for the bank to assess the default risk of each client."

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José Orlando Montes de la Barrera, co-author of the study and also a researcher at the EFI Alliance, comments as follows: "We are a highly unequal country characterized by a part of the population that concentrates a lot of money and works for the financial system, another great part that is neglected."
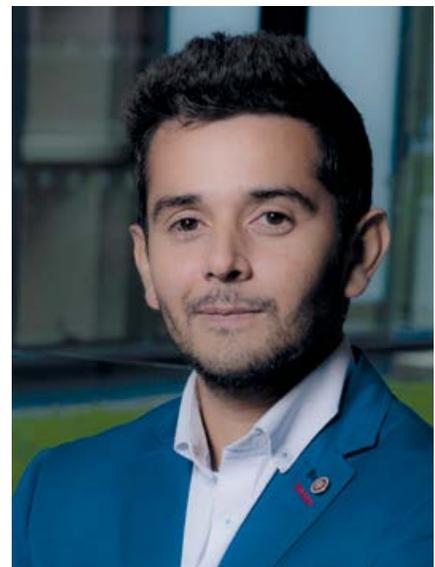
Urgent action to support people engaged in prostitution

Colombia has a historical debt with this population. The Public Actions Group (GAP, by its acronym in Spanish) of the Universidad del Rosario filed a public action of unconstitutionality against the Colombian Police Code.

By Claudia Jasmín Flechas
Photos 123RF, Milagro Castro.

The case: the *Pro Gender Equity* collective went to the Public Actions Group (GAP) of the Faculty of Law at the Universidad del Rosario in search of advice on protecting people engaged in prostitution. They find that how articles 43 (partial) and 44 (partial) of Law 1801 of 2016, which creates the National Code of Police and Coexistence, are presented discriminates and imposes additional charges, such as fines and police abuse on these people, since it is not clear if the responsibility for compliance falls on them or on the establishments where they work.

The mission: to demonstrate to the Constitutional Court, through a public action of unconstitutionality, why it should eliminate from the legal system the articles of the aforementioned code, which are contrary to the Magna Carta, since when the policy is applied, the rights of people engaged in prostitution are violated. For this purpose, national and international public and private academic institutions and social organizations were consulted. The action was constructed with contributions from different organizations and signed by three members of Congress.

The result: while the ruling of the Constitutional Court was inhibitory, a pronouncement was made that constitutes a protection of the rights of people engaged in prostitution. Ruling C-293/19 limits the possibility of assigning duties and imposing sanctions on those who are in such a situation and, in addition, establishes the applicability of restrictions and duties to those who seek services or engage in such practices.

The added value: the Constitutional Court recognizes that there must be an in-depth analysis by the Colombian State to approach and try to resolve the issue of prostitution as well as admits that these individuals are subject to special protection because they are exposed to various types of violence and systematic discrimination. In short, it validates that the State is indebted to them.

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While Colombian law has ruled and some measures have been adopted within the legal framework, there is still no in-depth debate to address the problem in a comprehensive manner.

Prostitution: a complex problem

Prostitution is a highly complex social phenomenon with severe human rights impacts and economic, moral, cultural, and personal implications that greatly affect those who engage in it. Physical and psychological violence, sexual abuse, pornography, forced consumption of psychoactive substances, and mental health repercussions (including psychiatric clinical conditions) are just some of the adverse effects or risks of this work.

However, in legal terms, it is not clearly regulated in this country. While Colombian law has ruled and measures have been adopted within the legal framework, such as ruling T-594 of 2016, which prohibits discrimination against sex workers, a substantive debate to address the problem in a comprehensive manner has yet to occur.

In the world, the panorama ranges from countries in which this practice is recognized as a formal job, which is regulated, to others in which models are applied that support its prohibition and total abolition.

In Colombia, prostitution is not prohibited for persons of legal age and for those who engage in it voluntarily, but there is no clarity regarding the obligations that apply to these people, to those who promote it, and to those who seek the services.

The Congress of the Republic and the Constitutional Court have only taken a stance on very specific issues, such as the promotion of health measures and the territorial planning aimed at establishing zones for prostitution and making it a crime to induce another to engage in prostitution. But not so much in labor matters, since doing this work is not subject to the protection of the rights of access to healthcare and social security.

In this sense, all persons, regardless of whether they have a formal job or work, have access to the social security system in terms of healthcare through the subsidized system, and most of the people in prostitution are in the subsidized health system and not as contributors. With regard to the social security system in terms of pensions and occupational risks, few prostitutes are self-employed and would therefore be covered by the system; however, in practice, this is all too uncommon.

The truth is that Law 1801 of 2016, sanctioned by the President of the Republic on July 29, 2016, creates the National Code of Police and Coexistence, which entered into force in January 2017 and in which a section is dedicated to "Engaging in prostitution." It recognizes that the voluntary practice of

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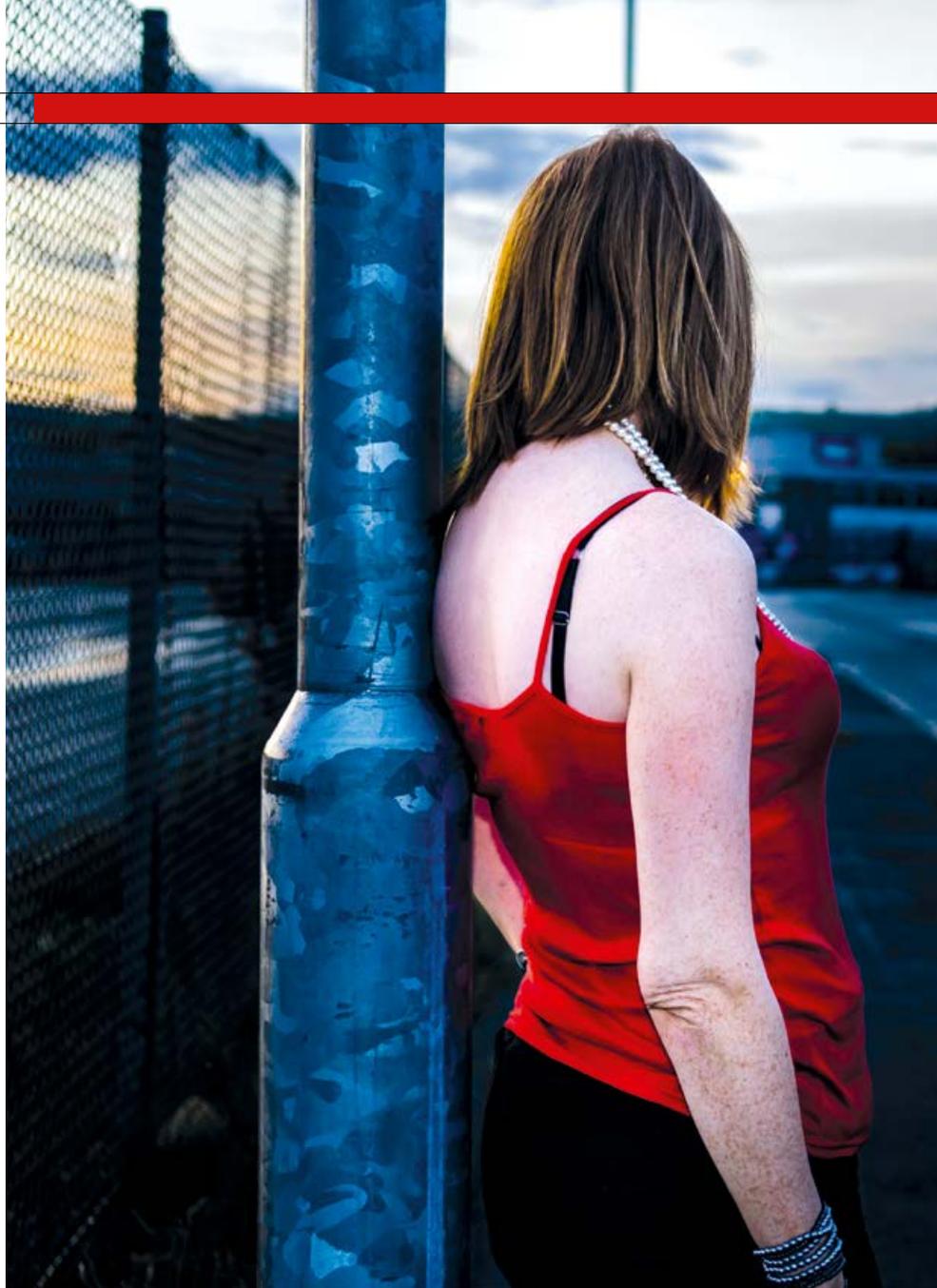
In Colombia, working in prostitution is not prohibited for those of legal age and for those who do the work voluntarily, but there is no clarity regarding the obligations that concern these people, those who promote it, and those who seek the services.

prostitution by adults does not give rise to the application of corrective measures, although it does specify restrictions and sanctions for this work that restrict rights such as freedom of movement, equality, non-discrimination and, in general, the right to protection of the vulnerable population.

It was while reviewing this legal compilation that the idea of advancing this research arose: Deuda histórica del Estado colombiano frente a las personas en situación de prostitución: acción de inconstitucionalidad en contra del Código de Policía. [Historical debt of the Colombian State toward persons in prostitution: unconstitutionality action against the Police Code]

"The GAP is a legal clinic created 22 years ago and made up of 8th and 9th semester students in the legal office and by a supervisory team. Its objective is to defend the public interest and human rights within the framework of students' professional training.

According to the court ruling, the fines stipulated in the Police Code that could apply to a person engaged in prostitution can only be imparted on the establishment that allows them to conduct the activity.

"The GAP is a legal clinic created 22 years ago and made up of 8th and 9th semester students in the legal office and by a supervisory team. Its objective is to defend the public interest and human rights within the framework of students' professional training. The Pro Equidad de Género collective learned about our work and contacted us," says Paola Marcela Iregui Parra, research leader, professor at the Rosario Faculty of Law.

The *Pro Gender Equity* collective learned about our work and contacted us," says Paola Marcela Iregui Parra, research leader, professor at the Faculty, and supervisor of the GAP.

The scope of this research was purely legal, and its objective was to analyze how the regulation, based on how it was issued, is not correct since it opens the door for National Police agents to exercise abusive controls (unjustified fines, searches without a clear reason, etc.) as well as physical, verbal, and psychological abuse. "For this reason, they opted for a public action of unconstitutionality, given that, in their opinion, the regulation from the Police Code is contrary to the constitutional text and should not be in the legal system," adds Iregui.

Who should be fined?

Chapter 3 of the Police Code regarding working in prostitution refers to the rules for three key instances: establishments where prostitution is conducted, persons engaging in prostitution at will, and those who seek the service. "Articles 43 and

44 place burdens, such as fines and warnings, on people in situations of prostitution because they are not clear in identifying who is responsible for non-compliance with the regulation," says Iregui.

Article 42 refers to persons engaged in prostitution and states that they are subject to special protection and are potential victims of violence.

Article 43, on the other hand, talks about the owners, holders, or administrators of real estate establishments or places where prostitution is conducted, as well as the personnel who work in them. That is, it covers those who work in tasks such as surveillance, cleaning, and administrative operations.

Article 44 refers to behaviors related to engaging in prostitution that affect coexistence and that should not be carried out by persons engaged in prostitution. Several behaviors are listed such as engaging in the activity outside the established areas and hours, or without adequate protective measures, and the law states that if the guilty parties—without spec-

ifying—are found guilty, they will be subject to corrective measures or fines.

"This helped us to show the Court that it should clarify whether these fines can be imposed on anyone who works in this place or if they are exclusive to the owners or administrators of the establishments," says Iregui.

The Police Code addresses prostitution as a public health issue; however, this approach, in the opinion of the experts participating in the GAP initiative, does not solve the problem. It only identifies that there is a problem that impacts public health and does not go beyond that. "This is worrying because it infers that the State has no interest in dealing with the problem in depth and, like the Constitutional Court, makes decisions that, in our opinion, are precarious, tangential, and do not provide solutions to the various problems involved in the practice of prostitution," says the researcher.

What does the Ombudsman say?

It is important to note that the study includes pronouncements not only from international organizations but also from institutions such as the District's Secretariat of Health, the Cundinamarca Secretariat of Health, the Cali Municipal Public Secretariat of Health, and the Ombudsman's Office, which provided the Constitutional Court with their perspective on the lawsuit.

In the opinion of the Ombudsman's Office—to cite one of these institutions—it is not equitable that those who engage in prostitution assume the burden of obtaining the healthcare certificate issued by the Secretariat of Health, of providing or distributing condoms, among others. In addition, it is a disproportionate treatment to require them to comply with the requirements established for properties where prostitution is conducted.

As for measures that seek to safeguard the physical health of those who work in prostitution, such as conducting awareness and education campaigns on sexual and reproductive rights, the Ombudsman's Office recognizes that they are in line with a constitutionally valid purpose. However, it believes that while these campaigns are important, they are not sufficient to guarantee rights due to the vulnerability of the people who conduct this work.

In summary, the purpose of the unconstitutionality action was fulfilled because
- According to the Court's ruling, the fines stipulated in the Police Code that could be applied to a person engaged in prostitution can only be imposed on the establishment that accommodates them to conduct this work.

- The problem exceeds the analysis that the Constitutional Court can offer, but it assured that they are subject to special protection, that they are in a serious situation of vulnerability, and that therefore the State has an obligation to promote spaces for discussion that include this population and the collectives that work with and for them.

On this occasion, the Court's statement was related to public health, but it is necessary to delve deeper and cover all aspects of this group's reality.

The action was built with contributions from different organizations and signed by three members of Congress, lawyers from the Corporación Sisma Mujer (Sisma Mujer Corporation), la Comisión Colombiana de Juristas (the Colombian Commission of Jurists), Colectivo de Abogadosthe "José Alvear Restrepo" (Cajar) (the "José Alvear Restrepo" (Cajar) Lawyers' Collective, activists from the Citizens' Initiative for Gender Equity and the GAP at Universidad del Rosario.

A look at the international scene

During the judicial process, more than 20 institutions, including academic institutions, social organizations, different individuals and public and private agencies, both national and international, intervened to offer elements of the issues raised in the unconstitutionality lawsuit.

Those who intervened told the Colombian Constitutional Court that it is essential to intervene urgently in favor of the rights of persons engaged in prostitution. However, it is up to Congress to take the reins so that a structural policy can emerge to guarantee the fundamental rights of this community, which works in completely unfavorable conditions. But thus far, it all comes down to one section of the Police Code.

> In the opinion of the Ombudsman's Office and the speakers of the unconstitutionality action, it is not equitable that those who work in prostitution assume the burden of obtaining the healthcare certificate issued by the Secretariat of Health, of providing or distributing condoms, while the pimps profit from their work.

Prostitution is not illegal in Colombia

Prostitution is a highly complex social phenomenon with serious public health and human rights impacts. Colombia's historical debt is precisely the lack of in-depth regulations regarding the problem.

Colombia has issued some regulations, such as the Police Code, which expressly states that prostitution is not an illegal activity and people cannot be punished for this work.

It has also been stated that persons engaged in prostitution should be protected by the legal system due to their vulnerability. In this sense, it is clearly not an illegal activity.

Formally, all people, regardless of whether they have a formal job or work, have access to the social security system in terms of healthcare through the subsidized system. Most people working in prostitution are in the subsidized health system and are not contributors.

With regard to the social security system in terms of pensions and occupational hazards, few prostitutes are contributors as independent workers and would therefore be covered by the system, but this is all too uncommon.

One of the organizations involved is the University of Massachusetts, which proposes a study from the two perspectives of regulation that currently exist in relation to prostitution:

Regulation in Germany, the Netherlands, and New Zealand. These countries have chosen to regulate prostitution in such a way that allows the business to be carried out formally. But the results show that the desired objectives have not been achieved, at least not fully.

In the Dutch case, there is an increase in violence against sex workers, illegal human trafficking has not declined, women continue to be controlled by pimps, and organized crime related to this sector has not decreased.

In Germany, the growth of the sex industry has not been controlled as expected, and the situation of sex workers has not been formalized. The economic benefit of the business has remained only with the managers or owners. In addition, the situation has not been monitored due to the autonomy granted to the establishments.

New Zealand, for its part, decriminalized prostitution in 2003, becoming the first country to do so. Nevertheless, the results of the study conducted by the participants are quite similar to the experience of Germany and the Netherlands. For example, the exploitation and labor vulnerability of sex workers has intensified.

The Nordic model: Sweden, Norway, and France. This model has been successful in meeting its objectives. In this model, women "sex workers" acquire the status of victims in prostitution, and in that sense, their conduct is decriminalized in its entirety. The activity is not legal, since pimps, administrators, and other individuals who profit from this business are penalized for their conduct.

With the implementation of this model, these countries have achieved: a decrease in prostitution, dignified treatment for sex workers, and a decrease in access to these services by men, mainly due to strong legal and social sanctions.

In conclusion, after presenting the two models, those who filed the action urge the Constitutional Court to order the rethinking of the articles in the Police Code that, in their opinion, violate the fundamental rights of persons engaged in prostitution. Based on their perspective, these even go against the provisions of the **Colombian Penal Code**, which stipulates penalties for people who profit from sexual activity, such as pimps. Finally, it welcomes the fact that a bill is underway to fully adopt the Nordic model to regulate the prostitution business.

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For an ecologically sustainable environment

Are protected areas actually protecting our biodiversity?

Currently, there are 1,391 protected areas in Colombia, with many human activities taking place both within these areas and at their borders (buffer zones). Kristian Rubiano, a doctorate student at Facultad de Ciencias Sociales (Faculty of Natural Sciences), mapped 51 protected areas to determine trajectories in land use change. The results, which were presented at the 58th Annual Meeting of the Asociación para la Biología Tropical y Conservación (ATBC), showed that protected areas are partially fulfilling their role in ecosystem conservation.

By Dalia C. Barragán Barrera
Photos Alberto Sierra, Ximena Serrano, Juan Ramírez
DOI https://doi.org/10.12804/dvcn_10336.36920_num6

In the Red List of Colombian ecosystems, 81 were registered, 53 of which fall within a threat category.

Notably, 2020 was not an easy year. While the whole world and social media were invaded by information related to COVID-19, a hashtag timidly started trending on Friday, June 5 of that year, which was World Environment Day: #PararLa-DeforestaciónDelAmazonasYa (Spanish phrase for "Stop Deforestation At The Amazon Now"). Amid the pandemic, Amazonia was stealing the little attention that was not paid on COVID-19. It was surely deserved, as, according to the Sistema de Monitoreo de Bosques y Carbono of the Instituto de Hidrología, Meteorología y Estudios Ambientales (Ideam), only during that year, 64% of the 171,685 hectares (ha) of deforested areas in Colombia were within the Amazon Forest.

"But Colombia is not just Amazonia," claims Kristian Rubiano, doctorate student, Faculty of Natural Sciences at Universidad del Rosario. Rubiano, who is now undergoing his doctorate apprenticeship at the Department of Physical Geography of the Stockholm University, Sweden, shows his concerns over the current decrease in natural vegetation coverage in several ecosystems across other regions of the country. "Although deforestation figures at Amazonia are alarming, the rest of the national territory is affected by the loss of ecosystems. As these ecosystems have less coverage than the Amazon rainforest, they are at risk of disappearing," says Rubiano.

According to the results of the first chapter of his doctorate thesis (still under development), where he presents an analysis on the change trajectory in

land coverage and use in 51 protected areas in Colombia between the years 2000 and 2018. The Caribbean region has been the most affected in terms of proportion of natural vegetation loss, at 5.4% (19,557 ha). In second place, we find the Andean region, with a 2.6% loss (58,420 ha). At Amazonia, however, loss percentage is lower, at around 0.7%, though in absolute terms, it is the region with the biggest natural vegetation loss. Parque Nacional Natural (PNN) Sierra de La Macarena, for example, has lost 50,553 ha (8.8% of natural vegetation loss) of the approximately 617,000 ha of the park.

"What happens with Amazonia is that due to its bigger land area, it reflects a large amount of natural vegetation loss," explains Juan Manuel Posada, head professor, Faculty of Natural Sciences, Universidad del Rosario and president of the Association for Tropical Biology and Conservation (ATBC), an entity that organized its 58th annual meeting in July 2022, in Cartagena (Colombia), in collaboration with several institutions, such as Universidad del Rosario. The main theme of the event was *Conserving tropical biodiversity achieving socioecological resilience.*

There, Rubiano showed the results of the first chapter of his doctorate thesis on the trajectories of land use in protected areas in Colombia, which, according to the 1992 Convention on Biological Diversity ratified in this country via Act No.165, 1994, must "aim at the protection and conservation of biological diversity, and the related natural and cultural resources."

Parks that take communities into account

The concept of "protected area" appeared in 1872 when the Yellowstone National Park, the first of its kind in the world, was created in the United States. The purpose of the park was to prevent the exploitation of resources within this vast biodiversity sanctuary. The term "exploitation" refers to the "set of elements destined to benefit from a natural product." All this is related to the concept of progress, traditionally seen as a way to move forward to a better or more developed status.

For this progress to happen, it is necessary to use the resources offered by ecosystems. But, as warned by Yolanda Kakabadse, president of the World Wildlife Forum (WWF), in 2016 to *La Verdad,* a newspaper from Murcia (Spain), in the context of the celebrations for Earth Day, we are "consuming resources in

Land hoarding at PNN Sierra de La Macarena. Large patches of forest are turned into grasslands to settle livestock and claim land possession. Picture: Fundación para la Conservación y el Desarrollo Sostenible, 2017. Source: Clerici, N. et al. Sci Rep 10, 4971 (2020).

such an abusive and irresponsible manner that we are falling short." Their depletion also produces a considerable reduction of habitat for countless species.

Let's think about Colombia. In terms of percentage of land surface, it is small, not having more than 0.22% of land surface. In contrast, it is a mega diverse country because it concentrates 10% of the worldwide biodiversity. This gives us great power.

But, as Benjamin Parker told his nephew Peter, "Spiderman," referring to an old Greek saying, "a great power comes with great responsibilities." If our responsibility is to maintain such biodiversity, reality tells us that we are clearly losing the battle.

In a report from Instituto de Investigación de Recursos Bio-lógicos. Alexander von Humboldt reveals that until 2017, "Colombian biodiversity has shown an average decrease of 18%." The biggest threat is associated with the loss of natural habitat of species due to the development of activities such as extensive agriculture and farming.

Proportionally, the Caribbean region is the most affected regarding natural vegetation loss

Mapping data in 51 protected areas in Colombia between 2000 and 2019 show that, proportionally, the Caribbean region is the most affected regarding natural vegetation loss within the protected areas, followed by the Andean region. The country's dry forests, decimated to critical levels, are concentrated in the Caribbean region, which reflects a severe loss of natural vegetation.

Regiones biogeográficas

Caribbean
Andean
Amazonia
Orinoquia
Pacific

5.4%
19,557 ha

1.1%
2,691 ha

2.6%
58,420 ha

0.6%
1,368 ha

0.7%
73,240 ha
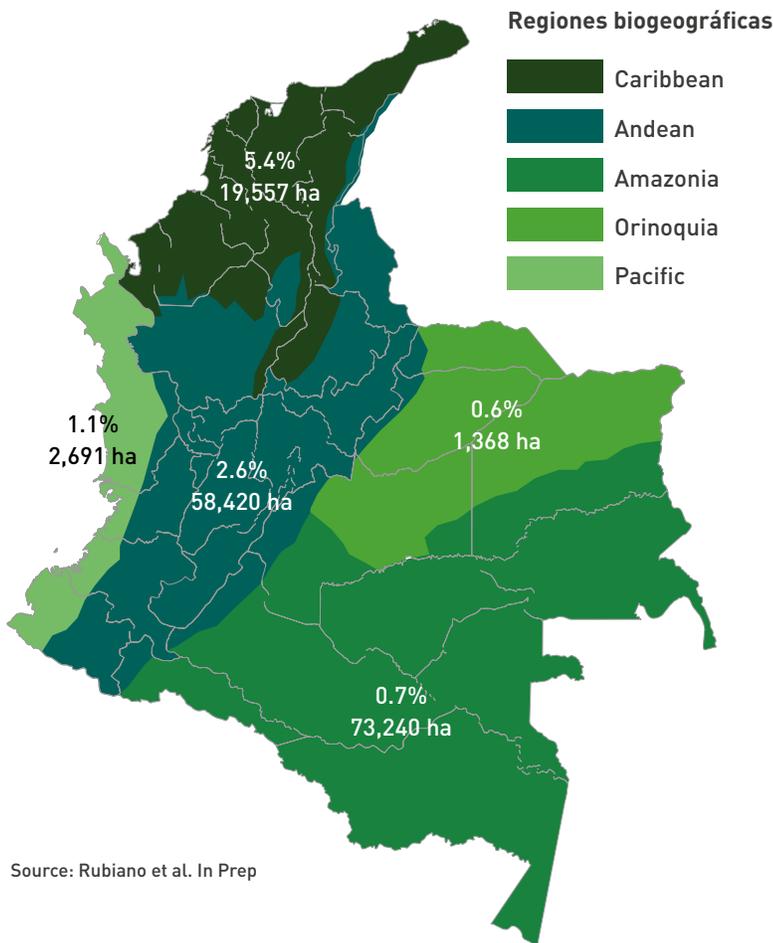
Source: Rubiano et al. In Prep

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Kristian Rubiano, Doctorate student, Faculty of Natural Sciences of Universidad del Rosario, states that "although deforestation figures in Amazonia are alarming, the rest of the national territory is affected by the loss of ecosystems. And, as these ecosystems have less coverage than Amazon's rainforests, they are at risk of disappearing."

If this happens in our small country, it is hard to imagine the impact this may have at regional level in a particular ecosystem, such as the tropical rainforest, that covers approximately 37% of the land area. According to an international study published in 2021 in *Science Advances,* 17% of the tropical rainforest has disappeared, at a global level, between 1990 and 2019, which is estimated at slightly more than 7,000,000 ha.

Although it may seem that the battle for ecosystem conservation is lost, we can still hope for the victory. For example, across the world, the number of protected areas has increased as an effective strategy of conservation. According to Parques Nacionales Naturales de Colombia (PNNC), over 15% of the country is currently composed by 1,391 protected areas, although only 60 of them are included in Sistema de Parques Nacionales Naturales (SPNN).

Professor Posada suggests that "to have an effective conservation process, we must start from all socio-economical aspects related to human communities."

Rubiano also adds that "the creation of protected areas must not be disconnected from people, since, in one way or the other, human beings interact with these reservoirs."

This is why, within these protected areas, we can see significant changes in land use, especially in buffer zones, the border between protected areas and unprotected land.

Within 39 Natural National Parks in Colombia, the deforestation rate has increased by 177% in the three years after signing the Peace Agreement. If this trend continued, the connection area between the Amazon and the Andean regions may disappear.

Advised by Nicola Clerici, head professor, Faculty of Natural Sciences, Universidad del Rosario, in collaboration with researchers Marius Bottin and Luigi Boschetti, Rubiano also mapped the 10-km buffer zone of 51 protected areas to compare levels of affectation. The research showed that buffer zones have had a greater natural vegetation loss than protected areas. "This allows us to conclude that at least in part, PNNCs are fulfilling their purpose," said Clerici, who added that "The results from the first chapter of Kristian's thesis show that around 97%(13,315,567 ha) of vegetal ecosystems within PNNs has remained stable in the period analyzed. However, this does not mean that they are working perfectly."

The concern regarding some PNNs, such as Cordillera de Los Picachos, Sierra de La Macarena, and Tinigua, is that their forest ecosystems are being decimated, especially now in the post-conflict period. "In an analysis we carried out in 2018, in which we compared the deforestation rate of 39 PNNs and their buffer zones three years before and after signing the peace agreements with the Fuerzas Armadas Revolucionarias (*Revolutionary Armed Forces*, FARC), we estimate an increase in deforestation of around 177% within the PNNs studied and of around 158% in their buffer zones. If the current trends continue, there would likely be a total disconnection between the Amazon and Andean regions in Colombia, which would be devastating for the ecologic connectivity of these regions," poses Professor Clerici.
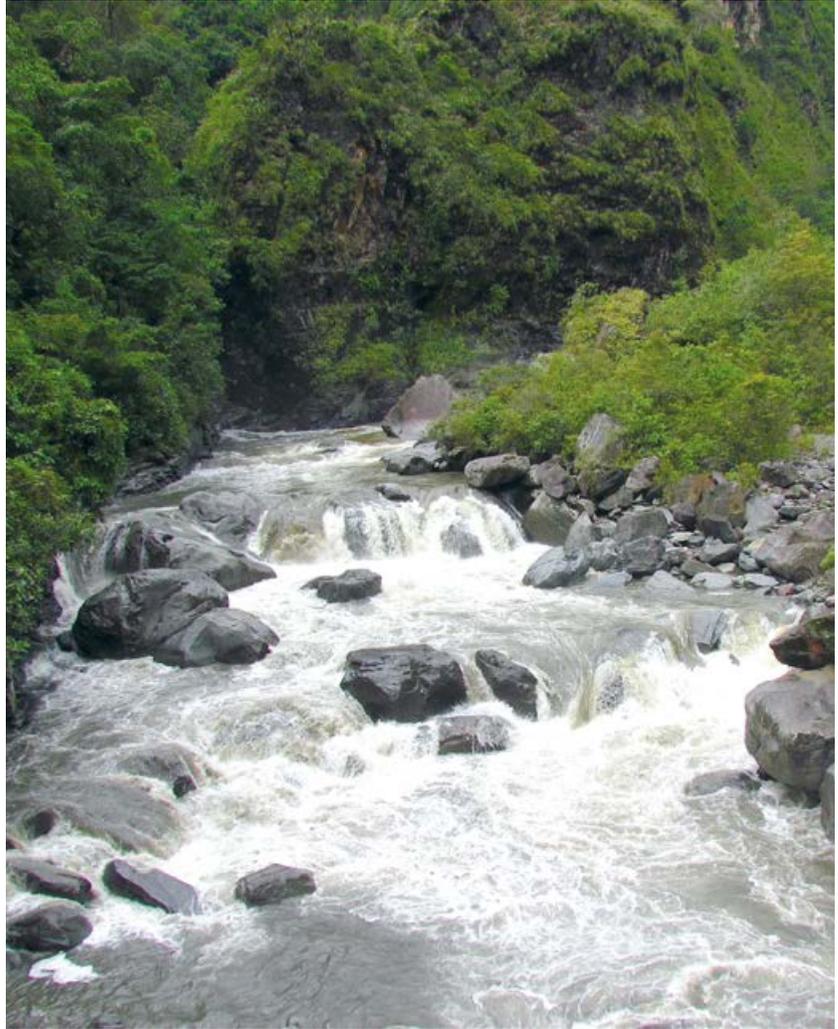
Professor Posada adds that "there is much concern that other ecosystems in the country, such as the high Andean forest and the tropical dry forest, may also disappear."

The tropical dry forest, a king in critical state

According to the results of Rubiano and his advisory team, the main trajectory of natural vegetation loss in Colombia has been the shift from forest to productive land and artificial areas, with around 105,372 ha of land transformed within the 51 protected areas analyzed and 202,564 ha in the buffer zones.

These changes occur in greater proportions in the Caribbean and Andean regions, where the biggest population centers of the country are located. "People like living in these areas mainly because they are drier, which provides two well-regarded characteristics: one is that areas with less rain tend to retain more nutrients in the soil; the other is that, in drier or higher-altitude climates, there is a lower probability of being exposed to tropical diseases related to humid environments. Hence, these regions of drier ecosystems are more decimated," says Professor Posada.

"Forests in Colombia are being threatened by fragmentation and degradation resulting from diverse anthropogenic pressures such as farming, human infrastructure, and agriculture, among others."
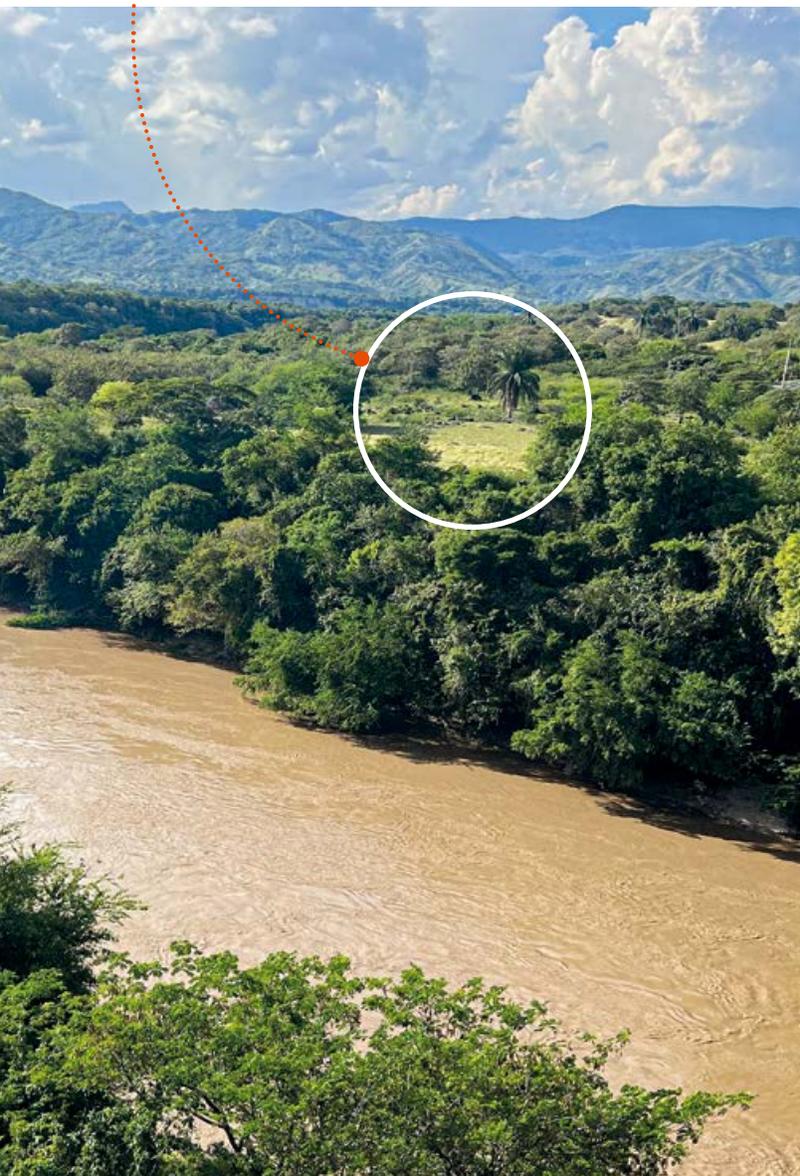
Aware of this growing threat in our ecosystems, the Instituto Humboldt, collaborating with Conservation International, the Instituto de Investigaciones Marinas y Costeras (Invemar), the Ministerio de Ambiente y Desarrollo Sostenible, and the Pontificia Universidad Javeriana, made a conservation diagnosis for the country's ecosystems following the categories of the International Union for Conservation of Nature (IUCN). Thus, in 2017, they consolidated a *Red List for Ecosystems in Colombia.*

In this list, 81 systems were listed, of which 53 (65%) are within a certain threat category (20 ecosystems in critical danger, CR; 18 endangered, EN; and 15 in vulnerable state, VU), while 28 (35%) represent a lower concern (LC).

In particular, dry ecosystems, such as the tropical dry forest, the tropical desert, the wetlands in Cundinamarca and Boyacá, and the tropical rainforest areas in Piedemonte Llanero are the ones in critical danger.

The tropical dry forest is the ecosystem with the greatest risk of extinction in the country, as it currently has around 1,022,632 ha, which equals less than 8% of its original coverage. The most worrying part is that only 6.4% of these forests are located within protected areas.

In the book Bosque seco Colombia: biodiver-sidad y gestión, Instituto Humboldt states that "the tropical dry forest is in a critical state of fragmentation and degradation, since most of its areas are exposed to anthropogenic pressures such as farming, human infrastructure, and agriculture."

It is crucial to preserve what remains of this type of ecosystems within protected areas since, when there is no or little human exploitation, these biodiverse natural structures are resilient. Rubiano's data showed that 171,844 ha of land within protected areas, as well as 274,815 ha in buffer zones, resulted in forest gains once human economic activities ceased.

Rubiano's thesis shows that within protected areas, we can win the battle of conservation of our ecosystems if we handle them appropriately. Ecosystems can, therefore, recover their territory.

Thus, it is important to create spaces to talk and debate about ecologic resilience and restoration, as happened at the ATBC congress this year. The discussions that took place there show that change in land use trajectories towards more sustainable systems may save the dry forest in particular, which, against all odds, still refuses to disappear.

Say "no" to the climate stowaway policy!

Although Latin America and the Caribbean are not great greenhouse gas emitters, they cannot keep being timid players in the imperious need of mitigating climate change, the most concerning civil and government problem of the 21st century. Urgent matters are restricting deforestation, fostering a cleaner agriculture, and decarbonizing their economies.

By Amira Abultaif Kadamani
Photos Ximena Serrano, Milagro Castro
DOI https://doi.org/10.12804/dvcn_10336.35994_num6

China emits 23.9 percent of greenhouse gases (GG); the United States, 11.84 percent; Russia, 4 percent; and Indonesia, 3.48 percent, according to 2020 data from Climate Watch. India is not included in these metrics, although there are others that state it is responsible for around 7 percent of the worldwide total emissions. Meanwhile, the European Union, that is considered a block even because of the common climate policies and goals shared by all 27 member states, emits 6.81 percent.

Within this top 6 biggest emitters an intense battle is fought, as in many other countries, to align economic growth with

Renewable energy sources contribute to the emitting profile of the region.

environmental sustainability. Amid the geopolitical turmoil, different arguments have appeared related to the climate crisis, such as "until the other parts commit and show real actions, I will not do so; I won't make efforts on my own," or "let's wait until the others react, so I can profit." This "climate stowaway" thought embodies a double tragedy: on the one hand, it has made most nations abide by that logic and feel less responsible, and on the other hand, it led to the dilemma of cooperation, as it is known in scientific literature. Because in the end, with this logic, nobody does anything.

The planet is heating up quite rapidly. According to the Intergovernmental Panel on Climate Change (IPCC), between 2030 and 2052, the global surface temperature increase will be very close to a 1.5°C, which would make Earth lose its stability before expected. In this context, the Paris Agreement (AP) was signed in 2015 as a regulatory framework agreed upon by 196 countries that, before the IPCC alerts, have defined goals for mitigating GG emissions as established by nations according to their own criteria. This was called the nationally determined contributions (NDC), which, it should be said, are not binding or subject to compliance assurance by an independent, multilateral scientific body. In this sense, the Sustainable Development Goals (DSG) were outlined and accepted that year. These goals set out the principle of action by governments, companies, academia, and other organizations in sustainability.

However, some years later, results have been scarce. At this stage, these acquired commitments, as stated by the United Nations (UN), would only help reduce a third of the amount required to avoid a 2°C temperature increase by 2100. "The

environmental governance stage, almost seven years after signing the AP and adopting the SDG is heterogeneous, ambiguous, and, ultimately, negative," says Franchini, professor at the Faculty of International, Political and Urban Studies at Universidad del Rosario, and his colleague Ana Carolina Evangelista, professor at the Faculty of Political Sciences and International Relations at Pontificia Universidad Javeriana.

Latin America and the Caribbean are a clear representation of this scenario. For the internationalist Matías Franchini, who has done research on global environmental governance and climate change policies for more than a decade, "analyzing the bigger picture, the degree of commitment in the region to mitigate the climate crisis is low to medium, and given its emission level (8 percent), it is conceived as a moderately conservative player within climate governance."

Naturally, this is not a complimentary conclusion, considering that the atmosphere is a global asset, and it is less so knowing that the majority of the population in this side of the world, at 660 million people, is at high or extreme climate risk, especially in the Caribbean, the Gulf of Mexico, and certain areas in the Andes. The vulnerability is not only given by the physical exposure to increasingly stronger climate events but also by the limited capabilities of adaptation, as expressed by Franchini in a study published in 2021 by Oxford Research Encyclopedia of Politics. In the study, he analyzes the performance of several Latin American and Caribbean countries to fight against the climate crisis.

In his analysis, Franchini starts from two fundamental axis: the trajectories of GG emissions and the type of public policies in each country, taking as a main reference those countries with a higher impact in the regional

When countries reopened business activities after the lockdowns, economies resumed their old ways.

aggregate (which, in order, would be Brazil, Mexico, Argentina, Colombia, and Venezuela). These five nations represent 80 percent of regional emissions, and only Brazil represents a third thereof (see chart with relevant information by country). Moreover, since the Paris Agreement, the level of climate commitment in the region has deteriorated, as a consequence of the environmental governance degradation in Brazil and Mexico.

For the author, the three main characteristics of the emitting profile in the region are the high but decreasing emissions related to agriculture and land use changes, mainly due to deforestation and cultivation in forested areas, the relatively high but declining participation of renewable energy sources in the energy matrix, and agriculture emissions higher than the global average. Thus, the bigger challenges in the region are to

"Ambiguity is Duque's environmental legacy"

For Matías Franchini, Iván Duque's government management in environmental matters, in general, and climate matters, in particular, is ambiguous. By the end of 2020, his government presented before the United Nations Climate Convention a new nationally determined contribution that involves reducing 51% of the greenhouse gas emissions by 2030, a rather ambitious goal that caused surprise nationally and globally. However, according to Franchini, the technical basis to determine said figure is unclear, as is its viability. Truth is, this statement generated a positive impact that allowed Duque to project the country as an environmental leader.

"However, there is a very marked ambiguity: on the one hand, an international speech that shows Colombia as a climate leader renowned by the international community, especially the United States; on the other hand, within the country, we can see an increase in the deforestation levels and in murders of environmental leaders, a situation that shamefully puts the country in the first place in this category. Also, there weren't many big green growth measures in the economic recovery package after the pandemic and, additionally, there is still support for fracking, a measure that certainly does not show climate leadership." In turn, for Germán Poveda, professor at

control deforestation, foster a cleaner agriculture, and decarbonize the economies. However, a measure that does not help in this sense is that all countries in this region of the world are subsidizing fossil fuels, even those that have established taxes on carbon, which are actually extremely low (from U$S1 to 3 in Mexico, up to U$S6 in Colombia, by ton emitted, compared to U$S140 in Sweden, for instance).

Faced with environmental governance (all the rules, tools, practices, and institutions that preserve, protect, and also exploit the environment), Franchini highlights how, in the previous five years, it has dwindled in the main state players. Brazil and Mexico are the most outstanding cases: the former, being led by a president who openly denies the climate crisis, and the latter, being led by one who thinks oil is the key to develop its economy. They both decide on their own, some-

thing that is common in the region. "Except for some blocks of Central American and Caribbean nations, countries in Latin America do not negotiate together or have similar positions in climate change negotiations for two main reasons: their economic and foreign interests are different, and their integration strategies change depending on the governing party. Thus, any integration project stays a myth," explains Franchini.

Individual actions matter a lot

Even though States are usually repositories of all the responsibilities, this is merely a mirage that does not take pity in the reality shown by this new period we are living in: the Anthropocene, determined by the impact exerted by the human being on the environment.

Universidad Nacional de Colombia and former member of the Intergovernmental Panel on Climate Change, since 2015, the management of the last two government offices is rather poor in climate terms:

"Although Colombia has cleared its conscience saying that we emit less than 1% of greenhouse gases, this argument is not valid to have maintained for so long real -not ideal- politics of inaction before threats, risks, and impacts caused by climate change. This is a very timid and late goal."

Considering that a third of the Colombian emissions arise from deforestation, we should focus our public policies there, in order to mitigate climate change. Now, the overwhelming loss of forests, particularly in Amazonia, is a problem that

did not arise in the recent years, and that was known to aggravate after signing the Peace Agreement with FARCs, as warned by environmental entities of different levels and the very government of Juan Manuel Santos. However, the right measures to contain or counterbalance the impacts were not taken. What are these measures? "Controlling the territory, having State presence, implementing the Peace Agreement and establishing new mechanisms so that populations that enter illicit economies can have licit substitutes for their economic sustenance. The matter has such a magnitude that one may say that, if Colombia manages to control or mitigate deforestation, it will be able to solve a series of historical problems in the country," concludes Franchini.

México

- It has national policies for climate since 2007, and a national law on climate change since 2012. Thanks to these, the Sistema Nacional del Clima (Sinacc) [National Climate System], an organization and bureaucracy structure to fight climate change, and the Ley General de Cambio Climático [General Act on Climate Change], were created. And, in 2016, the Ley de Transición Energética (LTE) [Act on Energy Transition] was issued. However, the impact of these measures in GG emissions has been limited. The climate agenda has declined since the government of Enrique Peña Nieto (2012-2018) and keeps losing strength with López Obrador, for whom oil is the engine of economic growth.
- In 2014, it became the first country to establish a carbon tax of U$S 1-3 per ton emitted from fossil fuels.
- Spends around 3.7% of its GDP to subsidize fossil fuels.
- Although it aimed at reducing per capita emissions to 5 tons of CO2e in 2030, this is an insufficient goal for Climate Action Tracker.

Panorama of the five climatic powers in the region

Argentina

- In 2016, the Gabinete Nacional de Cambio Climático [National Bureau on Climate Change] was created, which defined action plans to reduce greenhouse gas emissions and mitigate its impact.
- In 2019, a national climate law was issued, establishing a basic guideline for climatic measures and bureaucratic structures to fight climate change. It also outlined a program of adaptation and mitigation, but it has had little impact. During the government of Alberto Fernández (2019-ongoing), the exploration of fossil fuels has been a priority.
- The carbon tax applied in this country is U$S 5 per ton emitted.
- Spends around 4.6% of its GDP to subsidize fossil fuels.
- Aims to reduce CO2e per capita emissions to 10 tons by 2030, but according to Climate Action Tracker, this is insufficient even considering the lack of development of programs to mitigate climate change.
- Expanded the share of solar and wind energy within its energy matrix from 2% in 2016 to 8% in 2019.

Colombia

- In 2015, it launched its low carbon development strategy, which includes sectorial plans to achieve mitigation objectives in energy, transportation, agriculture, industry, waste and housing areas.
- In 2018, the Ley del Cambio Climático [Act on Climate Change] was issued.
- Spends around 2.8% of its GDP to subsidize fossil fuels.
- One of the most severe environmental issues is rampant deforestation. According to data from the Ministry of the Environment, in 2021 174,103 hectares of natural forest were lost, 1.5 % more than in 2020, although the way to showcase the data has been criticized by several environmental organizations (more information here).
- Since 2021, the carbon tax applied in this country is of around $17.660 Colombian pesos (around U$S 6 then) per ton emitted, the highest in the region, but still way beyond necessary.
- Its goal is to diminish CO2e emissions by 11.2 tons by 2030, and this objective helps having a climatic law and a low-carbon development strategy.

Venezuela

- This country has not issued information on greenhouse gas emissions since the 1990s, so it is very difficult to assess its nationally determined contributions to face the climate crisis on a scientific basis.
- According to the available data, the goal to diminish per capita emissions to 8.5 CO2e tons by 2030 is not very ambitious and quite improbable (not to say impossible) to be met, considering the lack of experience and capacity to address climate issues.
- From information published in 2013, we know that this country spent 26.5% of its GDP to subsidize fossil fuels that year, which made the gas gallon price to be the cheapest in the world.
- There are no climate change policies established nor programs or strategies to limit emissions in terms of forest protection or management of energy matrix.
- Its speech follows the argument of holding western developed economies accountable for climate change, so they should be handling this crisis.

Brasil

- This country saw a dramatic increase in deforestation, reaching 13.235 km2 between August 2020 and July 2021, the largest devastation of tropical forests in 15 years, according to the Instituto Nacional de Investigaciones Espaciales (INPE) [National Institute of Space Research].
- Since 2010, there is national legislation on climate including mitigation goals and long-term adaptation, and the transition to a sustainable, low carbon economy. It also established the need for having tools such as carbon markets, carbon taxes and climate funds.
- Since 2011, the development and implementation of climate policies in the country stalled, and receded during the - offices of Dilma Rousseff (2011-2016), Michel Temer (2016-2019) and Jair Bolsonaro (2019-ongoing). The latter is especially negligent to control deforestation, which increased 34% within the first year of his tenure.
- Spends around 3% of its GDP to subsidize fossil fuels.
- Its goals are to reduce per capita emissions to 5,2 tons of CO2e* by 2030, but this is an insufficient goal for Climate Action Tracker, an independent scientific organization that analyzes and monitors actions in every country compared to the commitments agreed upon at the Paris Agreement.

* CO2e means "equivalent carbon dioxide" and is used to assess the "emission impacts (or avoid emission) of different gases that produce the greenhouse effect." Source: Mongabay

Under this perspective, it is not a set of powers or government agents who sovereignly fix, in absolute terms, the climate path; better yet, individual actions magnify themselves in synergies.

Clearly, the States' reaction and ability to act is insufficient to make the drastic changes that this crisis demands. In this sense, it is essential to intervene individually, including agents in various levels, such as universities, cities, regions, social movements, political parties, etc.

The COVID-19 pandemic showed us that both the interrelationship of global matters and individual actions spread and contribute to our shared future. However, this flashing conscience from the pandemic in its rales was just "a swallow that, precisely, did not foretell the summer," as the popular saying goes.

Months after the first reopening after quarantine, economies retook the practices of what they knew how to do in the old ways, amid the limitations that were still imposed by the global sanitary emergency.

Today, two and a half years later, the recovery is evident, but no less overwhelming. "The global economy has recovered from the pandemic recession with some particularities, such as the high public indebtedness, the disruption of global value chains, and high inflation; however, the structure of stimuli that guide the economic players is still being short-term profit without big transformations in terms of sustainability," comment Franchini and Evangelista in a joint publication in April on the environmental crisis, the pandemic and the worldwide geopolitical conflict.

For the researchers, "the most valuable, and painful, lesson that the pandemic has taught us to address the global environmental crisis is that, when faced with existential crisis, humanity can react, but in a late, costly, and excluding way."

The window to moderate climate effects is getting smaller, and the severity of the complex environmental challenges require "a deep, global and transversal governance that means progressively substituting the dominance of selfish, immediate interests of societies and individuals with the search of the global well-being in the long term."

It is true that Latin America and the Caribbean have, for decades, suffered from poverty, lack of growth, authoritarianism, insecurity, and violence, among others. Their social, political, and economic agendas have these issues as a priority over other topics. But, hopefully, it is not too late to understand that speaking of environmental imbalance, the urgent matters are, indeed, the most pressing.

Sparks, Climate Change, and Human Activities

The fire triangle burning up our ecosystems

Naturally occurring wildfires are essential for the evolution of biodiversity in some ecosystems. Nevertheless, just as a few ecosystems literally rise from the ashes, others may become seriously affected by the conflagrations. Human intervention, combined with high temperatures from climate change, are creating the perfect cocktail for wildfires to become increasingly voracious. What is the spark that started it all?

By Dalia C. Barragán Barrera
Photos Alberto Sierra, Milagro Castro, Ximena Serano
DOI https://doi.org/10.12804/dvcn_10336.37296_num6

The ashes and flames from a small campfire at a hunting camp suddenly spread rapidly through a North American temperate forest, igniting logs, vegetation, and pretty much everything in its path. The frightened forest animals flee in terror. Among them, the silhouettes of two white-tailed deer (Odocoileus virginianus) stand out amid the flames that literally consume the wilderness while they and the rest of the animals seek refuge in the water...

We all remember this scene from the movie Bambi (1942), when the fawn and his father manage to escape the raging fire caused by the burning ashes from a campfire that some hunters had started the night before and that, in a matter of minutes, had consumed everything. This animated film, among many others, vividly exemplifies how human actions can cause disastrous forest fires, even when, in all honesty, this is not entirely true.

Are wildfires also naturally occurring?

Actually, yes. In ecosystems, naturally occurring wildfires are usually started by lightning. However, their expansion may be conditioned by several factors specific to each zone, and therefore, there are ecosystems with more naturally occurring wildfires than others. Hence, each ecosystem has a particular wildfire regime and, according to their ecosystem-wildfire relationship—by which ecosystems can sometimes benefit or become very damaged—ecosystems have been classified into three types: *fire-sensitive, fire-independent, and fire-dependent.*

Fire-sensitive ecosystems, such as the Andean forests, are not very flammable due to their type of vegetation and the amount of moisture they retain. Consequently, they do not allow wildfires to spread. For this reason, their biodiversity is not adapted to fires.

Fire-independent ecosystems are not related to fire since they exist in very cold or

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Naturally occurring wildfires do not destroy ecosystems. Instead, in Colombia, raging forest fires, which every year become larger and more severe, are mostly caused by deforestation-related activities.

very humid areas or places without vegetation and they do not allow flames to spread, such as deserts and tundra.

Finally, those ecosystems that are benefited by fire, where even their biodiversity has evolved due to the presence of fire, are known as fire-dependent ecosystems. Temperate forests, like the one wherein our beloved Bambi lives, are examples of these ecosystems. In these forests, flames burn through the underbrush or debris, but thick trees have adapted to fire and are not incinerated. Hence, when the fire runs out of tinder or kindling, it simply subsides and dies down, and everything is peaceful once again...

Nevertheless, as the saying goes, "*Where there was fire, ashes remain...*": new seeds grow from the burning ashes, which prompts the forest to recover and cover itself once more with vegetation. Here, if a new spark is generated with favorable conditions for burning off this material (such as low humidity, high temperatures, and strong winds), flames will expand again. This cycle is naturally repeated over and over again, thus benefiting biodiversity.

US fire fighters are well acquainted with fire regimes since, during the spring months, they often work tirelessly to control fires, not only spreading water on impacted sites but also

← Laura Obando, a researcher from the Faculty of Natural Sciences at Universidad del Rosario, points out that forests are commonly burned at their borders to clear land for agricultural and cattle farming activities. "These controlled fires change moisture levels in and around the burned area, making them drier and more vulnerable to wildfires."

← "The problem is that by suppressing fires in these semi-open fire-dependent forest areas, human intervention has densified their vegetation, which subsequently makes raging wildfires spread faster and become more devastating since these areas have modified their natural fire regime," asserts Stijn Hantson, a professor from the Facultyof Natural Sciences at Universidad del Rosario.

starting controlled fires that burn brush to prevent wildfires from spreading.

So why are forest fires getting more and more devastating?

Currently, high temperatures characteristic of climate change processes, in tandem with the fact that humans are intervening in fire regimes, are causing increasingly devastating wildfires.

A study published in Nature Communications, in May 2022, indicates that human-ignited fires in California are becoming more ferocious.

"The problem is that by suppressing fires in these semi-open fire-dependent forest areas, human intervention has densified their vegetation, which subsequently makes raging

wildfires spread faster and become more devastating since these areas have modified their natural fire regime," comments Stijn Hantson, professor from the Faculty of Natural Sciences of the Universidad del Rosario and lead author of the study. The professor adds that "in California, there are currently very dense and dry forests that, together with extreme drought intensified by climate change, are generating wildfires that are getting more and more extreme."

In fact, and according to the Fire and Resource Assessment Program (FRAP) of the state of California, the average area of the annual wildfire perimeters has doubled in recent decades (2010-2018) from previous decades (1980–2010). The increase has been from 172,100 hectares (ha) per year to 330,900 ha/year.

For this reason, the study conducted by researchers from the University of California (Irvine campus) sought to follow and model forest fires in that area of the western United States in the last 20 years, in near real time, based on satellite images

from the Suomi National Polar-orbiting Partnership, which is operated by the National Office of Oceanic and Atmospheric Administration (NOAA) and NASA.

"These satellite data identify not only fire perimeters but also fire behavior (for example, how fast the flames spread), which can be used to later detect and assess the impacts on the ecosystem, such as the percentage of dead trees. In this way, new alternatives will be available for an improved management of wildfires," complements Hantson.

In the face of increasingly voracious and frequent fires caused by human intervention, the number of dead trees has also increased since these trees lack the evolutionary time to adapt to these new fire regimes. Consequently, the plant structure of the different ecosystems can vary at unknown levels.

For this reason, the research study led by Professor Hantson will generate methods for the management, regulation, and control of forest fires after the corresponding follow-up activities have been implemented. In addition, the study will

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At a general level, 31 protected areas in the country have experienced a sharp increase in deforestation in the years after the conflict, which has raised the deforestation rate to 177 percent; This translates into 33,000 hectares of protected forest losses.

monitor wildfires in parts of the world without follow-up programs, such as Colombia.

It is well known—and proclaimed with fervor—that Colombia possesses a wide variety of ecosystems. The Amazon, for example, reflects this characteristic.

On the one hand, unlike the temperate forest where *Bambi* lived, the Amazon is a *fire-sensible* ecosystem that is negatively affected by conflagrations.

On the other hand, it is a tropical humid forest with some peculiarities that make it less prone to wildfires because it literally "extinguishes" them naturally.

Deforestation: the big culprit

So why are these forests *fire-sensitive*? The problem is that human activities are creating

"These forests are commonly burned at their borders to clear land for conducting agricultural and cattle farming activities," explains Professor Laura Obando..

The group concluded that the Amazon is burning because deforestation is "breathing down its neck." Only in this period of time, 19,600 ha of forest were deforested, which has prompted grasslands to increase from 8 percent to 10.3 percent. The study also confirmed that fire is the most commonly used method for converting Amazonian soil into grasslands.

According to Laura Obando, a researcher from the Faculty of Natural Sciences at Universidad del Rosario, "forests are commonly burned at their borders to clear land for conducting agricultural and cattle farming activities. Traditionally, a section of forest is removed through the 'slash and burn' process and the resulting ashes help to fertilize the soil. Consequently, these controlled fires change moisture levels in and around the burned area, making them drier and more vulnerable to wildfires. The fauna and flora are affected because they have not had time to adapt to these new fire regimes".

The post-conflict era has unleashed "other fires"

Even when, in Colombia, these fires have been influenced by several socioeconomic and political aspects, the post-conflict is also currently playing an important role. According to an international collaborative study published in 2021 in People and Nature, co-authored by Laura Obando, since signing the Peace Agreement with the Revolutionary Armed Forces of Colombia (FARC for the Spanish acronym), communities have had access to previously restricted lands, which are now being used for agricultural activities. This is one of the main reasons why deforestation and, in turn, wildfires have increased, especially since 2016.

Overall, 31 protected areas in the country have experienced a sharp increase in deforestation in the years following the conflict, which has raised the deforestation rate to 177 percent. This translates into 33,000 hectares of protected forest losses. Only in the department of Meta, within three areas of the Parques Nacionales Naturales de Colombia (Network of National Natural Parks of Colombia [Cordillera Los Picachos, Sierra La Macarena, and Tinigua]), deforestation has increased by 69 percent, thereby expanding from 7,800 ha in 2017 to 13,800 ha in 2018. Hence, wildfires have also multiplied by six.

Then, the unspoken fear that the evil tiger from The Jungle Book had of the "red flower" cannot surprise us at all. Still, naturally occurring wildfires do not destroy ecosystems. Instead, in Colombia, raging forest fires, which every year become larger and more severe, are mostly caused by deforestation related activities.

In conclusion, without clear policies that promote the rational use of soil and forests in our country, the survival needs of the rural population will continue to prevail over forest conservation.

Just like the phoenix rises from the ashes after the fire, when a wildfire burns up a *fire-dependent* ecosystem, life finds a way amid the debris. Still, given the climatic variations and the indiscriminate deforestation caused by us, human beings, we will not know which ecosystems our children and grandchildren will inherit. For this reason, deep down, Shere Khan was not really afraid of the "red flower" but rather of the humans who with used its power to deforest his natural habitat. Once again, fiction turns into reality. ◾

the ideal conditions for these forests to catch fire. Since they have not adapted themselves to wildfires, they burn uncontrollably. This is somewhat similar to what happened at the end of *"The Jungle Book"* (Spoiler Alert!) when Mowgli wanted to face Shere Khan the tiger with the much feared "red flower" lit on a torch but ends up accidentally burning part of the monsoon forest.

Particularly, in the Amazon, deforestation is one of the main causes for the proliferation of raging wildfires. .

A study published in 2013 by researchers from the Universidad Nacional de Colombia and Universidad Autónoma de Barcelona, directed by Professor Dolors Armenteras, assessed satellite data from the MODIS sensor (which remotely detects potential fire sources) collected between 2000 and 2009 as well as satellite images from the United States Geological Service (USGS) in parts of the Colombian Amazon area, with an area of 5,413,597 ha.

Wildfire Figures in Colombia

From 2000 to 2009, 90.5 percent of the heat sources detected, which may later turn into fires, were located in unprotected lands throughout the country (mainly in the Orinoquía region, which is a *fire-dependent ecosystem*), while less than 9.5 percent were concentrated within protected areas

Source: Armenteras et al. 2009, https://ref.scielo.org/gvfgqt

The team led by Professor Armenteras (2013) have assessed the number of fires in the Parques Nacionales Naturales de Colombia (National Natural Parks of Colombia) (PNN, for the Spanish acronym) of Cordillera Los Picachos, Sierra La Macarena, and Tinigua. The number of fires per each 100,000 hectares has varied through the years (approximate data). 2007 was the year for which the largest number of fires was reported:

Number of Fires 2000–2010

2001: **7**
2002: **5**
2003: **19**
2004: **25**
2005: **10**
2006: **11**
2007: **60**
2008: **15**
2009: **14**
2010: **20**

―――― FARC presence

(PNN) Cordillera de Los Picachos, Sierra La Macarena, y Tinigua.
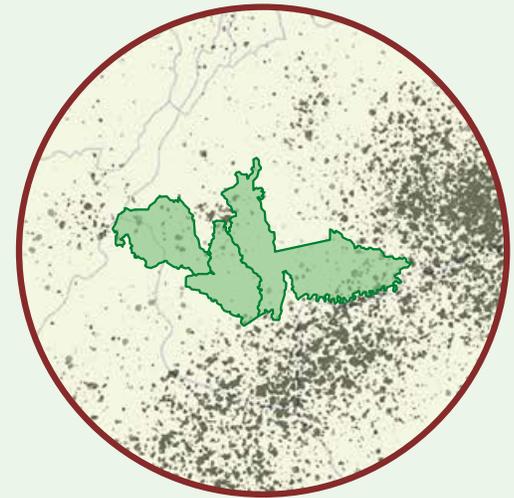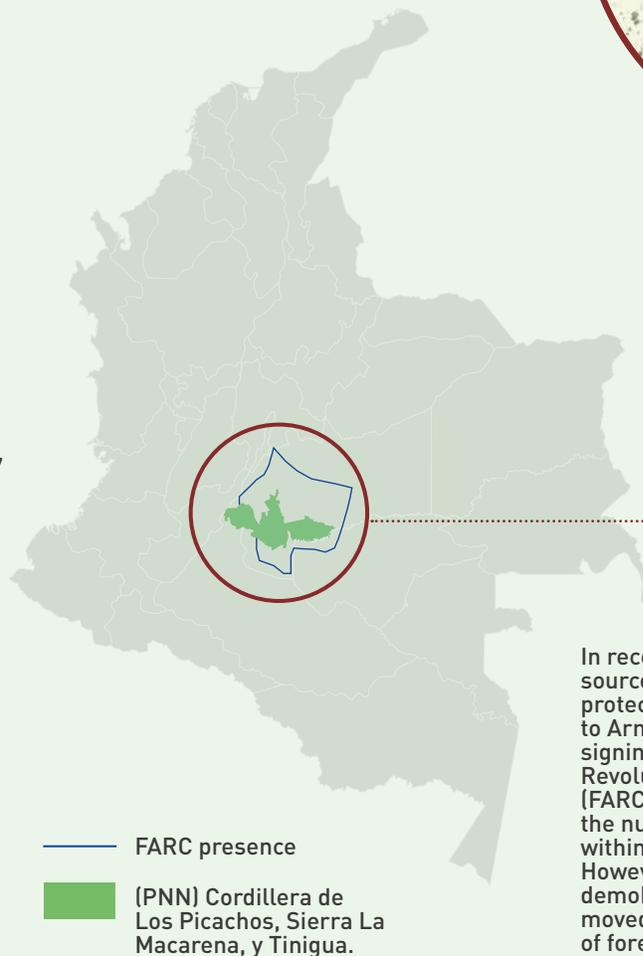
In recent years (2017 and 2018), heat sources have increased within the protected areas of Colombia. According to Armenteras et al. (2019), after the signing of the peace agreements with the Revolutionary Armed Forces of Colombia (FARC for the Spanish acronym), in 2016, the number of forest fires increased within these National Natural Parks. However, these territories were not fully demobilized until 2017 when the FARC moved out, which prompted the number of forest fires to increase.

Number of Forest Fires 2017–2018

2017: **136** (Farc present)
2017: **263** (Farc not present)
2018: **241** (Farc present)
2018: **870** (Farc not present)

Source: Armenteras et al. 2013, https://dx.plos.org/10.1371/journal.pone.0054310

Source: Armenteras et al. 2019, https://doi.org/10.1038/s41559-018-0727-8

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Thinking about matters on the national agenda

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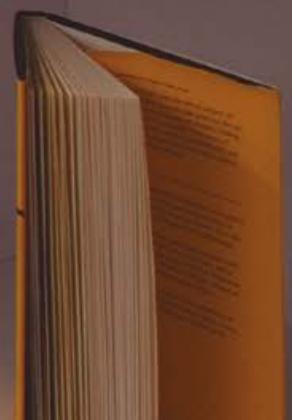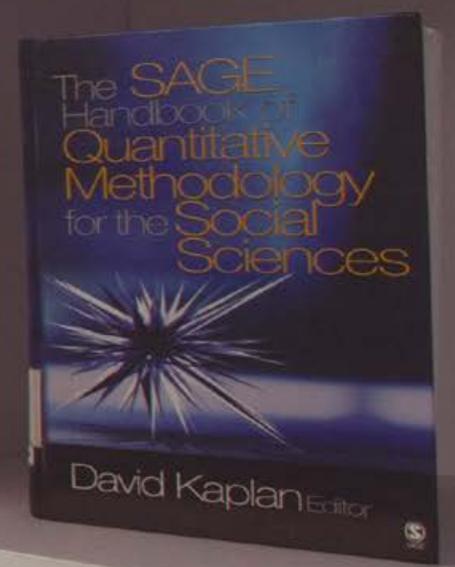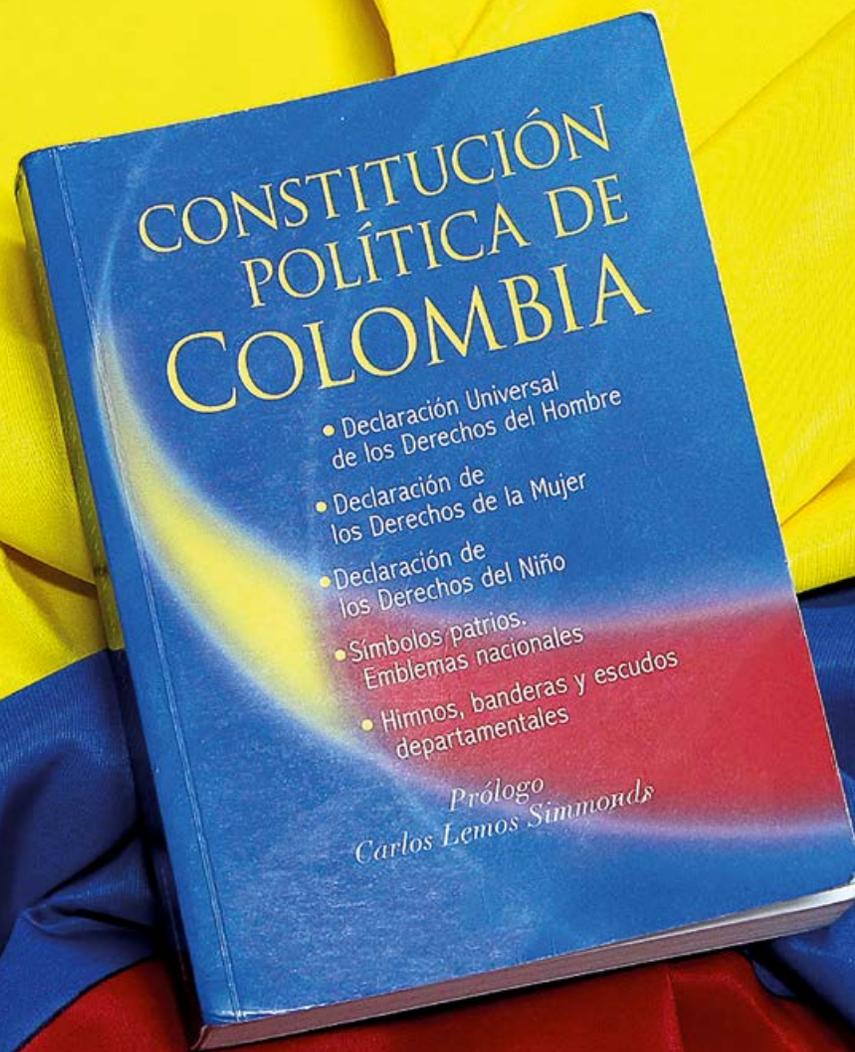
The first thirty years of the Political Constitution of Colombia: A happy birthday?

Our national constitution turned 30 in 2021. Was it a happy birthday? Professor Diana Valencia Tello posed this question to some of the greatest experts in constitutional law, and the answers explore history, current events, and new challenges of our Magna Carta and, therefore, of our society.

By Carlos Arturo García Bonilla
Photos Ximena Serrano, Milagro Castro,
Alberto Sierra y Juan Ramírez

On July 4th, 1991, the National Constitution governing our country was enacted. To commemorate its thirtieth anniversary, Universidad del Rosario held a meeting led by Diana Valencia Tello, Professor of the Faculty of Law, with scholars, experts, and magistrates to reflect on these 30 years of history. The result of this meeting was collected in the book *Reflexiones y desafíos de la Constitución Política de 1991 tras treinta años de su expedición* (*Thoughts and Challenges of the 1991 Political Constitution Thirty Years after Its Promulgation*), published by Editorial Universidad del Rosario. Based on this text, and thanks to the lucid support of Professor Valencia Tello, academic editor of the issue, we prepared a small guide to navigate through the twists of our constitution.

Historical backgrounds

We must remember that after the liberal revolutions that took place in the Western world at the onset of the 19th century, law rose in the modern State as a means to organize all aspects of the political, social, and economic life of communities. The idea was to formulate regulations that were as objective, general, and abstract as possible to apply them equally among the population. This idealist attempt, though praiseworthy in principle, had a fundamental problem: as it was based on abstract equality, it did not consider the diversity of different social realities, thereby deepening all kinds of inequalities throughout the 19th century.

For instance, if we consider the Civil Code, we can see it establishes a principle of formal equality among people. This sounds great on paper, but in reality, there are vast differences in the population that we must take into account. To ex-

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Although there are many challenges arising from the Constitution, three are worth mentioning: reconciling internal tensions created by the State juridical pluralism, broadening rights through the Constitutionality Block, and addressing challenges implicit in the fourth industrial revolution.

emplify, there is notable inequality between the owners of the capital and those who own nothing. If we do not consider this, we run the risk of experiencing what happened in the 19th century: under the principle of equality before the law, big companies would hire many people in subhuman conditions and keep them "tied" in the new factories being consolidated in industrialized countries.

The inequalities deepened by this principle of equality caused a series of strikes and demonstrations at the end of the century, which led to rethinking the law. It then materialized in a new kind of law striving for material equality. This is the main characteristic that set off the Social State of Law, which began gaining popularity by the end of the 19th century and the beginning of the 20th century.

The Social State of Law aims to highlight the differences among people. To continue our line of thought, workers without capital would need special protection from their employers so that they do not abuse their dominant position. This was also the beginning of a law intervening more in the State, which sought to develop different industries, economic areas, or public services. The classical liberal State was thought of as a minimal State that would let people do and let things go their way, dividing public and private matters to leave the latter in the hands of the market. However, inequalities and the abuse of the dominating position exerted by the elites in power caused a shift towards the Social State of Law.

What happened in Colombia?

Since its birth as a nation, Colombia has experienced deep inequalities. During the 20th century, efforts were made to address these inequalities and consolidate a Social State of Law, albeit with little success.

A big part of the problem was that excessive centralism led to most resources generated in the regions staying in the main capital cities, while the remainder of the territory lacked State presence. There were no public services, and most of the population had no access to basic health and education services. Hence, the 20th century left Colombia with a big debt towards the regions and communities that were more affected by these inequalities, and assuring vital minimums for the population became essential.

In this context, the 1991 Constitution was enacted to change this situation. It is worth noting that the first article in our Constitution states that "Colombia is a Social State of Law."

How was the 1991 Constitution enacted?

The Magna Carta ruling over Colombia was created amid a very complex scenario. The country was likely experiencing the most violent period in its history, which permeated deeply into all levels of society and led us to understand that a new juridical regime was urgent to achieve a more egalitarian State with equitable political participation, guaranteed access to rights in a robust and solid way for all the population, administrative decentralization, and the conditions needed to overcome this structural violence. We shall remember the 1989 Marcha del Silencio (*Silence March*) after the murder of Luis Carlos Galán, which gave rise to the Movimiento de la Séptima Papeleta and, consequently, the Colombian Constituent Assembly.

The drafting of the new Colombian Magna Carta proposes a secular, inclusive, decentralized society that grants human rights and protects the environment; a peaceful society based on respect, able to address the strong social and economic inequalities that have historically existed in the country

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Is it a happy birthday? "The short answer is yes; it has been a happy birthday. The 1991 Constitution was undoubtedly a great step forward in our history, and it has helped to build a more decentralized and collaborative country. It has been the basis to build a more peaceful and, hopefully, equitable society. The long answer is that there is still a long way to go; that there are tensions created by the Constitution itself, and also potentialities still to be developed. It is even valid to wonder if it is now falling short in light of these new social realities," concludes Professor Diana Valencia Tello from Universidad del Rosario.

We can consider that the 1991 Constitution arose as a Peace Agreement. Under the 1886 Constitution, there were only the Liberal Party, the Conservative Party, and a minuscule movement of left-wing, pro-communist ideas. From the 1991 Constitution, new spaces of participation were created. It is relevant that this Constitution was signed by the three political leaders: one from the conservative party, one from the liberal party, and a representative of the demobilized M-19 movement.

What happened with the new Constitution?

The drafting of the new Colombian Magna Carta proposes a secular, inclusive, decentralized society that grants human rights and protects the environment; a peaceful society based on respect, able to address the strong social and economic inequalities that have historically existed in the country. With this Constitution, the entirety of the Colombian State was organized in a different way to provide its structural bodies and its decentralized bodies with more autonomy. Among the most critical changes introduced by this Constitution, we can find the creation of the Corte Constitucional (*Constitutional Court*), the Acción de Tutela (*Act of Protection*) and the Bloque de Constitucionalidad (*Constitutionality Block*).

It is a great challenge to analyze these 30 years of our Constitution. But, to do so in a wider and more thorough way, the Public Law research group of Universidad del Rosario organized, in December 2020, the event *Treinta años de la Constitución Política de 1991: ¿un cumpleaños feliz?* (*Thirty Years of the Colombian Constitution: A Happy Birthday?*), for which a wide call invited all interested people to discuss these topics by submitting a presentation proposal.

The initiative received 120 presentation proposals, around which 21 workshops were organized to achieve an effective exchange of ideas for around two hours. Those participating in the debates were invited to write an article describing both their initial presentation proposal and the final reflection from the activities at the debate tables. Said conclusions were compiled in the book *Reflexiones y desafíos de la Constitución Política de 1991 tras treinta años de su expedición* (*Thoughts and Challenges of the 1991 Political Constitution Thirty Years after Its Enactment*).

Main challenges of the Constitution

Although there are many challenges to our Constitution, three are worth mentioning: reconciling internal tensions created by State juridical pluralism, amplifying rights by using the constitutionality block, and addressing challenges implicit in the fourth industrial revolution.

Harmonizing state juridical pluralism

By attempting to establish a more horizontal juridical status, the 1991 Constitution granted a series of competences to certain bodies, which have created some conflicts around who has the last word. There is no single institution with complete autonomy, and this is where this interinstitutional dialogue becomes necessary, although this interaction does not always happen as a dialogue, but as judgments colliding with one another.

In the first chapter of the book, Professor Nelcy López Cuéllar comments that the conceptualization of interinstitutional dialogue starts in Canada with several constitutional and political scientists, who spoke about a conflict between the Parliament and the Supreme Court on the control mechanism for law constitutionality. The philosophical problem of law in this sense is that dialogue should occur among equals.

However, in State structures, there are power hierarchies and relationships that are not necessarily symmetric, which ultimately affect dialogue by previously defining who, in practice, has the last word.

It is part of the democratic debate to keep fostering dialogue to find the most harmonic or better agreed-upon solutions that create the fewest conflicts. The core of the problem is evident when analyzing the structure of the State. The first US Constitution was based on the theory of checks and balances. This theory aims for one power to control the other.

In this sense, the structure is designed as a power battle that does not foster dialogue. This type of structure was devised in the 18th century, but nowadays, in complex societies, in information and knowledge societies where citizens usually have more access to data and communication, a decision based only on authority or hierarchy is no longer considered fair. It is necessary to find new mechanisms that enable the involvement of different points of view and help create consensus.

The argument that took place in the initial panel was focused in the High Courts. In several cases, the Constitutional Court has been placed as the institution with the last word, notwithstanding the opinions of the Supreme Court of Justice or the Council of State. However, it is necessary to closely analyze each case because the situation is usually more complex than simple hierarchy.

We know our society changes now at a more rapid pace, and a signal of this is that, only 30 years after its enaction, there are issues that raise the question of whether our Constitution is now failing to meet our current society's needs.

Part of the problem is that when institutions with well-defined competencies are established, each of them is autonomous to establish certain type of decisions. "In our legal system, there are several topics in which competence is shared among institutions, and they end up competing," explains Professor Diana Valencia.

We can find a way out of this conflict in the 1991 Constitution itself. Article 113 establishes that the different State bodies have separate functions but collaborate with each other to reach the State goals. From this, we can infer a principle of "harmonic collaboration." In the light of this principle, dialogue strategies among courts have been promoted, such as the creation of joint rooms for members of the different (high) courts to examine matters with converging competences to avoid divergent judgements that create these "train wrecks."

↑ Having no capital, workers need special protection so that their employers do not abuse their dominating position.

The constitutionality block as a device to amplify rights

One of the most important differences between the 1886 Constitution and the 1991 Constitution is that the latter has a more dynamic understanding of human rights. Considering the need to grant them in the broadest possible way, the international instruments for the country to be governed in these issues were elevated to constitutional status. The former constitution, in turn, considered that if a national law was in conflict with an international human rights instrument, the national law was prevalent, even if Colombia had signed and ratified said instrument.

The set of international instruments that gained constitutional status is known as the "Bloque de Constitucionalidad (Constitutionality Block)." In this framework, if a national law is in conflict with an international human rights instrument, the law can be declared unconstitutional.

The Constitutionality Block has three functions:

1. To develop constitutional rights employing international instruments for their interpretation.
2. To integrate new rights that are not expressly mentioned in the Constitution.
3. To amplify the grants to rights via mechanisms stipulated in the international instruments.

One of the most notable examples that illustrate these functions is the recognition of prior consultation and free and informed prior consent as fundamental rights of the ethnic communities. The origin of this right is the inclusion of C169 - Indigenous and Tribal Peoples Convention, 1989 in the Constitutionality Block. This acknowledgment shows the three functions in action.

First, there is a development in constitutional rights since the Constitution article establishes a general participation right of Colombians and a mention in the paragraph of Article 330 on "fostering the participation" of indigenous communities in decision-making regarding natural resource exploitation. There, we can find a right that has been established in a general way, interpreted and developed specifically via C169.

Second, there is integration of rights since there was no clear and specific right for indig-

enous communities to be consulted. Including the C169 in the Constitutionality Block integrated this right to our legal system and turned it into a demandable right via judgment SU-039/97.

Third, guarantees were amplified since besides consolidating the definition of the right to consultation, clear mechanisms were established to ensure that the consultations to indigenous communities met minimum conditions based both on C169 and on decisions by the Inter-American Court of Human Rights. Thus, the right to previous consultation for communities was not only established as an abstract right, but was also regulated to make it effective.

The Constitutionality Block is a powerful device to amplify and grant human rights in Colombia. However, its full potential has not been yet used, and many times, it has been limited to the judicial scope. For example, the Executive Power regulated prior consultation via decree 1320 in 1998 unilaterally, ironically, without consulting with the communities. "The challenge we have is for it to be understood by all branches of public power, to make their functions effective and to develop all its capacity to protect human rights for Colombians."

The fourth Industrial Revolution

Notably, 105 years have passed between the 1886 and the 1991 constitutions. Over a century was needed to reach the decision that the then current Magna Carta was no longer meeting the needs of the population. We know our society changes now at a more rapid pace, and a signal of this is that only 30 years after its enaction, there are issues that raise the question of whether our Constitution is now failing to meet the needs of our current society.

Even when the new Constitution is more dynamic and flexible thanks to mechanisms such as the Constitutionality Block, there are realities that nobody could foresee. The digital revolution has created new means of forming relationships that is out of the scope of traditional juridical systems.

The Agere Research Incubator of Claustro del Rosario decided to address the issue of the social cost of this fourth in-

people have no insurance, holidays, or minimum working conditions. Who is accountable for them?

Article 53 of the Constitution states that "in case of discrepancy between the practice and what arises from documents and agreements, the first should prevail—that is, what happens in practice." This is known as the primacy of reality principle. The legal twists and turns of the relationship between Rappi and its delivery people can be complex and ambiguous; however, it is clear that their reality is deplorable and that they are working in conditions that do not grant their working rights.

Let's return to the beginning of the text to review the first article of the Constitution: Colombia is a Social State of Law. Let's remember the spirit of this concept: to protect people from the abuse arising from inequalities.

It is clear that there is inequality and that it creates a deplorable situation in a vulnerable population. It is clear that to keep building the society we aimed for when we wrote our Constitution, we need to have tools to address all situations that create inequalities. If the situation remains, and we do not have the instruments to address them, we must ask ourselves whether we need new resources to face the current challenges.

Is it a happy birthday?

"The short answer is yes, it has been a happy birthday. The 1991 Constitution was undoubtedly a great step forward in our history, and it has helped to build a more decentralized and collaborative country. It has provided the foundations to build a more peaceful and, hopefully, equitable society. The long answer is that there is still a long way to go, that there are tensions created by the Constitution itself, and potentialities still to be developed. It is even valid to wonder if it is now falling short in light of these new social realities," concludes Professor Diana Valencia Tello from Universidad del Rosario.

It is true that a country cannot be built upon decrees, and a law or constitution will not magically change society. However, it is worth remembering that communities are built around ideas and agreements, and our Constitution materializes the ideal that we have agreed upon as a community. Hence, it is vital to create these spaces of dialogue for us to reflect upon our Magna Carta. This is actually a way for us to think about ourselves as a community and to understand who we have been, who we are, and, above all, who we want to be in the future. ◐

dustrial revolution by analyzing the situation in the context of delivery applications (apps). They have gained wide popularity in the latest years and have a relevant incidence in the country's economy. However, the reality behind the conditions of their workers is far from ideal.

Rappi, an app created in Bogota in 2015, has grown to become one of the most used apps in the country. It delivers profits of around 550 million Colombian pesos. The biggest challenge lies in defending working rights for "rappitenderos" ("Rappi delivery people"), who are in charge of the message and delivery services, the company's business purpose. Their legal situation is far from clear. The company categorically states that they are not their employees since there is no contract with them and that, in fact, the contract occurs between the Rappi delivery person and the client using the app.

In reality, Rappi delivery people are in a state of deep vulnerability. In spite of the great profits that the company makes, dispatchers receive a smidge amount, which forces them to work over ten hours a day to gather a vital minimum. According to Agere, approximately 70% of the service fee is collected by Rappi, while the delivery person collects the remaining 30%, that is, between $2,000 and $3,000 per service. Delivery

↑
The democratic debate should keep fostering dialogue to find more harmonic or better agreed-upon decisions that do not create these many conflicts.

In the "eye" of diabetes

Diabetes mellitus is considered one of the most threatening chronic diseases of the 21st century. If not treated correctly, patients can suffer damage to various organs, including the eyes. A recent study by Universidad del Rosario found that the cornea, in addition to the retina, also deteriorates in cases of diabetes. In patients with Type 1 diabetes, the cornea is damaged faster than that in patients with Type 2 diabetes.

By Stefany Hernández
Photos 123RF, Milagro Castro
DOI https://doi.org/10.12804/dvcn_10336.36855_num6

← For the research team, the idea is that not only the retina should be checked, but also the cornea, and that the degrees of damage should be identified as much as possible to prevent or delay a corneal transplant

This seems to be a priority in health. According to the World Health Organization's (WHO) World Vision Report 2020, the eyes are the fourth most affected organ due to various diseases, including diabetes mellitus. However, this report only refers to the retina as the only tissue whose alteration can lead to blindness in diabetic patients. But why is the retina more relevant than the cornea in this chronic disease?

For Diana Patricia Amador, Professor of the School of Medicine and Health Sciences of Universidad del Rosario and PhD in Physiology, the answer lies in the relevance given to the cardiovascular and neurological impact to our body. The damage caused by the excess of glucose or "sugar" in the blood (also known as hyperglycemia) significantly affects the blood vessels and the nervous tissue.

What is diabetic keratopathy?

Although the deterioration caused by diabetes is not known in detail, if we add other variables, it could lead to more corneal transplants to diabetic patients; a transplant is an extreme measure for the health care system.

These two systems are the mainly affected in other types of diseases, such as hypertension or kidney failure.

As Dr. Amador mentions, "guidelines for clinical practice worldwide do not stipulate that a medical check-up for a diabetic patient must include the evaluation of the endothelium and corneal pachymetry (medical exam that measures the thickness of the cornea)." She also states that the idea of a degeneration in the cornea as a secondary aspect came to light just a few years ago, but there is still a need of more research and prevention programs on the matter.

According to the International Diabetes Federation (IDF), by the year 2021, there were 537 million people with some type of diabetes in the world. It is estimated that there will be around 643 million by 2030. These figures are especially alarming because of the exponential increase in diagnoses. Developing countries are greatly affected by this disease, mainly due to the lack of regulation on food with high concentration of saturated fats and sugars, the lack of nutritional education, and access to certain healthy foods. In addition, there are high rates of sedentary lifestyles, alcohol consumption, and illicit drug use.

The problems caused by diabetes begin in the pancreas, where humans produce insulin, the hormone responsible for using the glucose from food as an energy source for all systems, organs, and tissues to work properly. When insulin is not produced, glucose accumulates in the blood, which, over time, leads to hyperglycemia and generates vascular and neurological damage, among others. Currently, the WHO recognizes three types of diabetes mellitus: gestational, Type 1, and Type 2 (see chart).

Human beings are born with a corneal endothelial cell density of up to a maximum of 7,500 cells per mm2, and the loss of this density over the years, at a rate of around 0.56 percent per year, is normal. But we are still in need of more information about this deterioration for diabetic patients.

Epithelium

Bowman Membrane

Corneal stroma

Descemet membrane
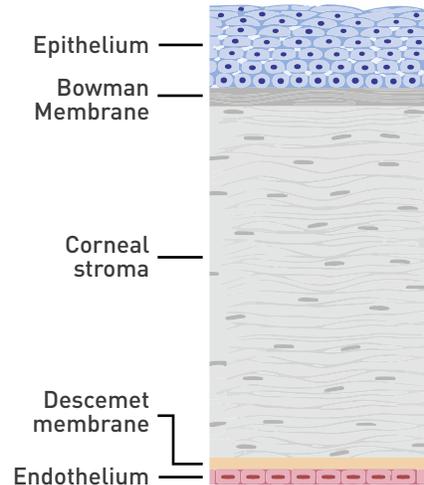
Endothelium

Patients with diabetes may experience this progressive cell loss due to hyperglycemia, which directly affects the endothelial cells of the cornea. These cells are not designed to control or metabolize it and, therefore, must work harder, thus producing large amounts of toxic waste that damages the cells and can even cause their death.

Pioneering research

Despite the fact that diabetes is considered one of the most lethal chronic diseases of the 21st century, scientific studies on the subject suggest that we still do not have enough information to prevent, treat, and improve the medical prognosis of patients suffering from it or of those at risk of developing it. However, in a recent study conducted by the Neuroscience Research Group (NeURos) of the School of Medicine and Health Sciences of Universidad del Rosario and published in *Cornea*, it was found that a stronger progressive deterioration in corneal endothelial cells appeared in patients with Type 1 diabetes compared with patients with Type 2 diabetes.

Dr. Amador explains that humans are born with a corneal endothelial cell density of up to a maximum of 7,500 cells

Córnea

According to the International Diabetes Federation (IDF), by the year 2021 there were 537 million people with some type of diabetes in the world and it is estimated that by 2030, there will be around 643 million. The figures are especially alarming because of the exponential increase in diagnoses.

Scopes of diabetes

- Gestational diabetes mellitus, which occurs in 1 out of every 6 births worldwide, is treatable and can be reversed after delivery or be prevented through timely obstetric care.

- Type 1 diabetes mellitus, also known as "juvenile diabetes" because it mostly affects children, is commonly caused by an autoimmune response of the body that attacks the insulin-producing cells in the pancreas, thus preventing the hormone from executing its function. Hence, the organs trigger alarm signals due to lack of energy. According to data from the IDF, in 2021, about 651,000 cases of type 1 diabetes were diagnosed in children between zero and 14 years of age worldwide.

- On the other hand, type 2 diabetes mellitus, the most common one among adults, accounts for as much as between 90% and 95% of people suffering from this disease. These patients mainly suffer from hyperglycemia, with the distinction that the organs force the pancreatic cells to produce more insulin, causing them to become overworked and eventually die. Meanwhile, the glucose that cannot be used remains in the blood stream and, if it reaches high levels, can be dangerous if not treated timely and properly.

per mm², and the loss of this density over the years, at a rate of around 0.56 percent per year, is normal. But we are still in need of more information about this deterioration for diabetic patients.

The researchers began by focusing on cases of Type 1 diabetes because it is a disease that generally appears at an early age and has a more severe metabolic impact, therefore requiring more medical monitoring and follow-up.

But as the study progressed, they ran into a major hindrance: they found no records of Latin American or Colombian patients aged 0 to 5 years with Type 1 diabetes reporting corneal injury, which forced them to limit the study group to a population of children over 8 and young adults diagnosed with type 1 diabetes, who had a study or analysis of the corneal endothelium.

"I was surprised (for the case of Colombia) about the fact that we did not find any data on diabetic patients in terms of quantification of any of the corneal assessment criteria, since there are at least eight. Unfortunately, there was not a single document with these specifications, or with reports of pachymetry, endothelial count, or cellular variability... nothing," says Dr. Diana Patricia Amador. For this reason, the study group collected data from 367 patients with Type 1 diabetes and 2,136 patients with Type 2 diabetes from human studies around the world, all of them with endothelial measurements and pachymetry studies.

The researchers' conclusion after their analysis is that patients with Type 1 diabetes have greater cell loss in endothelium and corneal thickening than patients with Type 2 diabetes, regardless of age and gender. In oth-er words, the cornea is damaged faster in the former group to the extent that there is a high probability that by the age of 30, patients with Type 1 diabetes will have the cornea of a 75-year-old or with such a level of opacity as to imply the need of a corneal transplant.

For the leader of the research group, "the idea is that not only the retina should be checked, but also the cornea, and that the degrees of damage should be identified as much as possible to prevent or delay of a corneal transplant."

The heart of the matter lies in the fact that although the deterioration caused by diabetes is not known in detail, if we add other variables, it could lead to more corneal transplants to diabetic patients; a transplant is an extreme measure for the health care system.

Dr. Amador states that "It would be ideal to be more prepared, from the point of view of the healthcare staff, to face this impact that perhaps we have not yet identified in a very efficient way."

An unstoppable disease

537 million people suffer from diabetes worldwide

783 million people are expected to develop diabetes by 2045

Source: International Diabetes Federation.
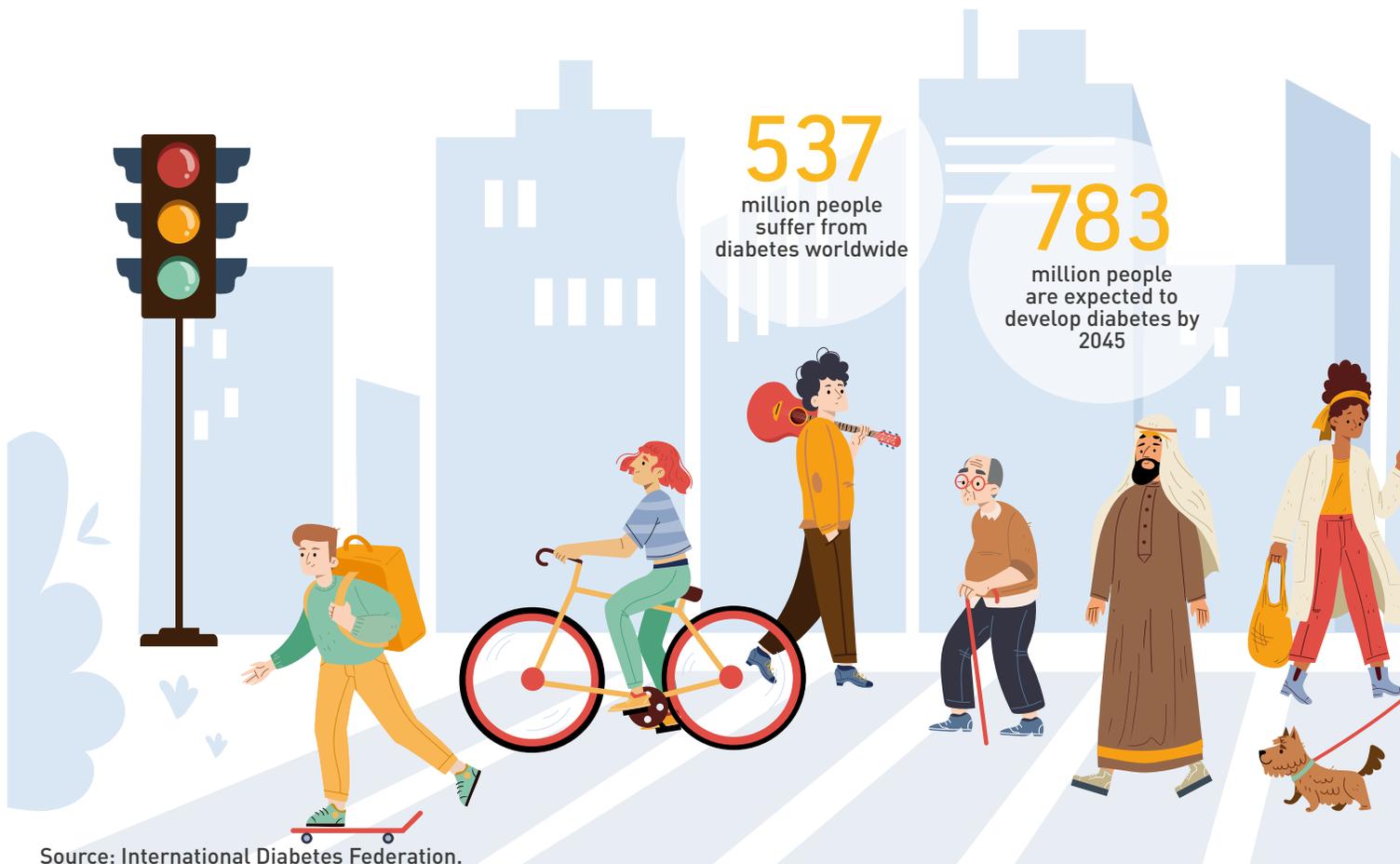
In Colombia, the IDF recorded, for 2021, close to 3,200 cases of children between the ages of 0 and 19 with Type 1 diabetes mellitus; of these, there are no reports of keratopathy diagnosis or evolution, which is a cause for alarm since no long-term projections can be made to prevent harm to the visual health of diagnosed patients when they enter young or old age.

Currently, this study on diabetic keratopathy is under continuous and collaborative development by the NeURos Research Group together with other Colombian institutions, "and we hope that this is not the first and last to be conducted in the country on this subject," concludes the expert.

32 million people, approximately, live in South and Central America

42% (around 13 millions) of adults between 20 and 79 years old are undiagnosed.

3,5 million cases of diabetes mellitus are currently present in Colombia and it is expected that by 2045 there will be 5,014,000

Diana Patricia Amador, researcher of the Escuela de Medicina y Ciencias de la Salud (School of Medicine and Health Sciences of Universidad del Rosario, explains that "guidelines for clinical practice worldwide do not stipulate that a medical check-up for a diabetic patient must include the evaluation of the endothelium and corneal pachymetry (medical exam that measures the thickness of the cornea)."

Hunger and malnutrition worsen in Latin America and the Caribbean

Four out of ten Latin Americans do not receive regular and nutritive food. In spite of the intergovernmental policies in the region to fight hunger and food insecurity, implementing them has been a very slow process and has fallen very short in the face of this distressing emergency.

By Amira Abultaif Kadamani
Photos Ximena Serrano, Milagro Castro
DOI https://doi.org/10.12804/dvcn_10336.36853_num6

The figures are spine-chilling: around 768 million people around the world suffered hunger in 2021, 46 million more than in 2020, and 103 million more than in 2019, before the outbreak of COVID-19. Those living in Latin America and the Caribbean are 56.5 million, namely, 8.6 per cent of the total population, according to the annual report The State of Food Security and Nutrition in the World 2022 (Sofi), published last July by five agencies of the United Nations (FAO, IFAD, Unicef, WFP, and the WHO).

Women and children are most vulnerable to hunger, food insecurity, and the different forms of malnutrition (see glossary). Although those living in rural zones are traditionally most affected, some social groups settled in urban areas have started to be included in the list of victims.

The triggering factors are extreme climatic phenomena, the social and economic conflicts countries face, and the inequalities in different places, a scenario that obviously got worse with the pandemic. If this result is discouraging, it will get worse when the effects of the war in Ukraine are measured.

These effects have not yet been included in the calculations of the abovementioned balance and will undoubtedly aggravate the setback by altering the world supply chains even more, as well as the price of agricultural supplies and energy. "The world is moving in the wrong way," warns the document above, and if we continue on that path, we would be very far from meeting the 2030 target set to eradicate hunger, food insecurity, and malnutrition, which is the second Sustainable Development Goal (SDG) out of the 17 objectives set forth in 2015.

Although countries have designed strategies at different degrees and scopes to mitigate and put an end to this dire situation, such objective cannot be met as it is. For that reason, the regional alliances become an important mechanism to accept that challenge.

In that line, a researcher from the School of Business Administration of Universidad del

Women and children are most vulnerable to hunger, food insecurity, and the different forms of malnutrition.

Rosario, Alejandra Pulido, together with a group of colleagues from other academic institutions (Cesa, Fundación Universitaria Konrad Lorenz and Politécnico Gran-colombiano), devoted to the task of assessing the policies on food security carried out by different multilateral organisms of cooperation as well as economic, trade, and social development. Such evaluation focused on the Andean Community (CAN), formed by Bolivia, Colombia, Ecuador, and Peru; on the Southern Common Market (Mercosur) with Argentina, Brazil, Paraguay, Uruguay, and Venezuela; and on the Pacific Alliance with Chile, Peru, Mexico and Colombia.

Their work, published as a chapter in the book Integración latinoamericana: retos para la región y Colombia, (Latin American Integration: Challenges for the region and Colombia) edited by Politécnico Grancolombiano (2020), consisted in reviewing the existing literature on this topic and analyzing the official integration documents.

"Our purpose was to see how food security was approached at the community level, and the conclusion is that it was not truly worked upon. What happened mostly, in the context of those integrations, was sharing experiences and transfer-

ring knowledge and best practices among the countries," Pulido affirms. She took advantage of her academic experience in international trade and business to explore the Latin American integration regarding Zero Hunger (SDG #2). "The initiatives in terms of food security are driven by national policies, not by community ones. And although CAN is the organism which has more structured strategies, tactics, and policies, there is a distinction between the proposals set forth (see comparative chart on Latin American integration treaties) and the implementation. As for the latter, a completely different analysis should be conducted."

As the representative in Colombia for the Food and Agriculture Organization of the United Nations (FAO), Alan Jorge Bojanic confirms that the matter is in the agendas of many entities dedicated to the regional integration, but that convergence of aims, good intentions, and statements has neither been materialized nor translated into allocated budgets or actions. "Except for certain specific policies and agreements, the integration achieved in these stages has been weak; they are important although many times the rhetoric is not translated into actions," states the Bolivian leader.

The literature examination done by Pulido and her colleagues on food security in Latin America unveiled a prevailing interest of researchers for human health and nutrition topics, especially regarding women, nursing mothers, and children.

Food security or food sovereignty?

One of the great debates hovering this matter is whether countries must tend to food security or food sovereignty. Food security involves guaranteeing both physical and economic access to sufficient and adequate food to cover the daily needs of the population. Food sovereignty refers to the power of a State to create and carry out policies to foster the sustainable production of food items, especially in small scale instead of industrially, embracing the traditional knowledge of communities and the scientific research and prioritizing the local construction of the links for productive chains.

For Pulido, these are not exclusive matters because sovereignty is a means for ensuring security as well. Clearly, all countries do not have the same possibilities and productive capacities and are not competitive in everything. Thus, a balance between self-sustainability and foreign trade exchange has to be sought for the sake of gearing towards syner-

→

Food sovereignty refers to the power of a State to create and carry out policies to foster the sustainable production of food items.

gies and achieving more efficacy and efficiency when it comes to fighting hunger and food insecurity.

"Thanks to sovereignty, production and exports are controlled, a better coordination with suppliers is achieved, and different productive mechanisms are generated. But that does not mean being completely self-sufficient, since that is very hard today. What can be actually achieve? based on food sovereignty, better mechanisms for self-sufficiency are generated for people who don't have access to food," the researcher asserts while underlining the value of integrationist processes and the complementary nature of national economies.

"The concept of sovereignty is very arguable (...) because some people associate it with import substitution (...) and others soften it by speaking precisely about how to avoid dumping in the national production that may affect the food security

El **hambre**
de los **otros**
Ciencia y políticas alimentarias
en Latinoamérica, siglos XX y XXI

Stefan Pohl-Valero
Joel Vargas Domínguez
EDITORES ACADÉMICOS

Comparative chart on Latin American integration treaties

Mercosur

Eradicating poverty
Improving sustainable production
Best practices
Reduction of vulnerability
Maternal feeding and child undernutrition

Andean Community

Fighting inequality
Institutional management
Improving sustainable production
Exchanging experiences
Innovation
Best practices
Reduction of vulnerability
Food safety

Pacific Alliance

Eradicating poverty
Fighting inequality
Innovation
Best practices

Source: Prepared by the authors of the chapter *Hunger and food safety, challenge of Agenda 2030. A view from the Latin American integration*, published in the book Latin American Integration: challenges for the region and Colombia.

in the country," Bojanic clears up. He emphasizes that the phrase that prevails in the FAO is food security, with an additional adjective, "nutritional" because one thing is to fill the tummy and another is to be well-nourished. As he sees it, both concepts can be complementary, as long as countries work to guarantee the good feeding of their people and, simultaneously, strengthen production and national products, without becoming a limitation to importing indispensable food for their inhabitants.

In Latin America and the Caribbean (LAC), there are many organizations for regional integration, including the above mentioned

and others like Celac, Aladi, Alba-TCP . One could think that such a diversity of organizations diminishes the weight, the force, and the efficacy of the process that seeks effective solutions, if we are "struggling" along different roads towards a common goal. However, Pulido considers that such a situation may not necessarily happen because these bodies have diverse and complementary objectives, which does not hinder achieving a convergence among them in order to meet the ultimate target of the SDG #2. And, since we live a global world, the need for interconnection is, on many occasions, evidently unavoidable.

### The nuances of economic development

According to a study made by FAO, OPS, WFP and Unicef on food and nutritional security in LAC in 2019, "the periods with greatest economic growth [in the region] during the last decades coincide with the most important periods of hunger reduction. (...) Therefore, the economic deceleration of the countries in the region is one of the factors most affecting food and nutrition security of people and homes, with different consequences in the diverse population groups. This is especially meaningful for a region with high levels of inequality."

Colombia is leading as the country in the *Organization for Economic Co-operation and Development* (OECD) with greatest economic development in the region , with a projected GDP of 6.1% for 2022, above the world growth average of the member countries. That is the harvest of the economic reactivation implemented up to now, and is a good indicator. But, in Pulido's view, that is not a solution for food insecurity. "Having a higher growth this year due to a reactivation process does not imply that we can guarantee, in a certain period of time, food security, as there are other variables which, instead of drivers, are limitations," she warns, referring mainly to agricultural-industrial supply overcosts, which are transferred to the family basket. "Growth may occur, as in our case, by industrial production or hydrocarbon exports, and the inter-annual variation of the GDP does not determine food security," she adds.

The FAO representative in Colombia agrees on the existence of a relationship between economic growth and poverty reduction, but he clears up that that happens only if there are specific programs aimed at such a purpose. "Economic growth will not occur if it is not accompanied by a wide base growth, namely, there are many factors involved in such a growth and that, in turn, a good deal of those earnings is geared towards poverty eradication programs."

Pulido believes that Gustavo Petro's incoming government has shown new policies on agricultural transformation, which could enhance the food scenario. Nevertheless, that process will not bear fruit in the short term, and its benefits will not be harvested before 10 or 12 years. In addition, the availability of raw material should be assessed, just as the production costs

Map of hunger in the world

Prevalence of undernutrition for the years 2019-2021

Percentage of
Total population

0% - 2.5%

2.5% - 4.9%

5% - 9.9%

10% - 24.9%

25% - 39.9%

40% - 60%

No hay datos

Source: FAO https://www.fao.org/fileadmin/templates/SOFI/2022/docs/map-pou-print.pdf
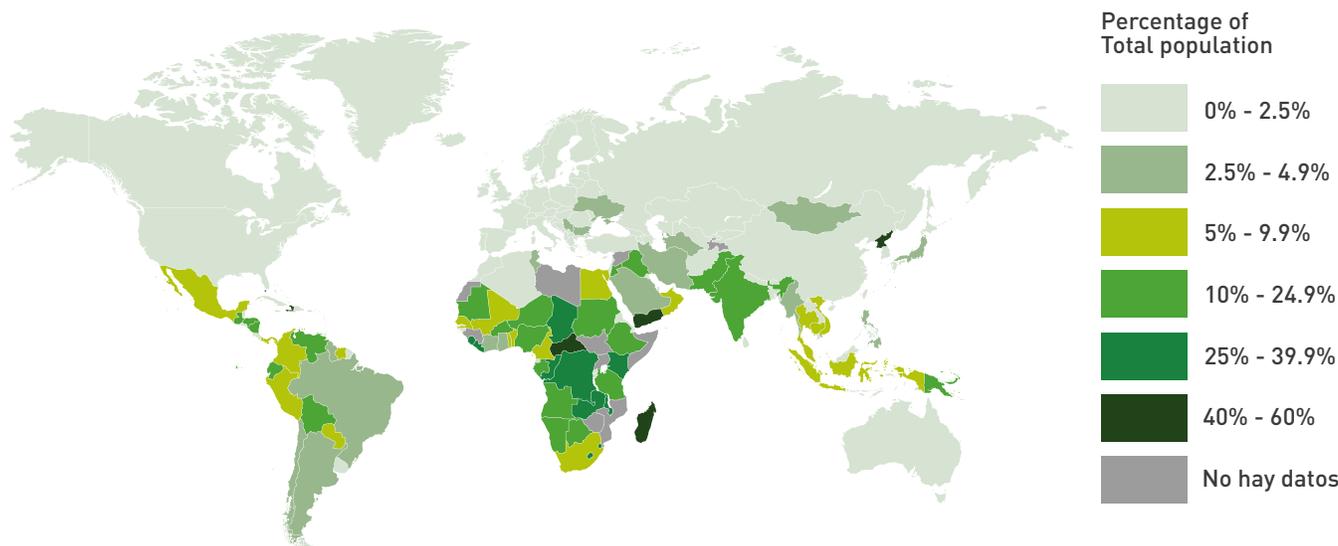
of local supplies and the supply chain compared with import costs for agricultural supplies or products.

As the Sofi report states, the world dedicated almost 630,000 million dollars a year in the 2013–2018 period to support feeding and agriculture, fundamentally to individual farmers, by means of policies on trading and markets, and state subsidies. But, "mostly, this support not only alters the market but it is not reaching many farmers either, it damages the environment and does not foster the production of nutritional food," warns the document. This happens because "the assistance to agricultural production is mainly focused on basic food, dairy items, and other products rich in animal proteins, especially in countries with high and mid-high incomes. Rice, sugar, and diverse types of meat receive most of the incentives at the global level, unlike fruit and vegetables, which get less support in general, or they are even fined in some low-income countries."

For this reason, one of the key messages from the multilateral entities that conducted this analysis is that state sub-

➡

"Our purpose was to see how food security has been approached at the community level, and the conclusion is that it was not truly worked upon. What happened mostly in the context of those integrations was sharing experiences and transferring knowledge and best practices from each country," professor Alejandra Pulido states.

sidies must be directed to consumers instead of producers since that means an evident improvement in the accessibility to a healthy diet, with a good side effect: the reduction of greenhouse gases in agriculture.

However, that is not a magic formula because the report immediately alerts about the "likelihood of undergoing negative consequences in the reduction of poverty, the farming incomes, the total agricultural yield, and the economic recovery."

The big question that such a scenario poses is how the public resources dedicated to agriculture can be used to meet multiple objectives, how to foster production and make a transition towards a more efficient decarbonized agriculture, which may utilize less resources and protect the soils and simultaneously fight compelling needs, such as the reduction of poverty. "These multiple objectives are sometimes contradictory and that is where politics steps in, which, as the saying goes, is the science of what is possible, not of what is desirable," Bojanic points out.

In the middle of this entangled labyrinth, we still need to consider the implications of a soaring world inflation that begins to look like a recession. The challenges to overcome are enormous, and there is no detailed model that may be applied strictly by all countries suffering from hunger or food insecurity because in the specificities of each of their societies, there are unique advantages or limitations. However, faced with a shared set of problems, the countries in this region of the world could, at least, go beyond their positive experiences to build synergies that mitigate this painful reality. ◨

Glossary of terms

-Food insecurity: "Situation in which people cannot have regular access to sufficient innocuous, and nutritive food for a normal growth and development, and to lead an active and healthy life."

-Malnutrition: "Abnormal physiological condition caused by insufficient, unbalanced or excessive macronutrients contributing to food energy (carbohydrates, proteins and fats) and micronutrients (vitamins and minerals), essential for growth as well as physical and cognitive development. It is manifested in many ways, such as: undernourishment and undernutrition, micronutrient deficiencies, overnutrition and obesity."

-Undernutrition and undernourishment: "When food intake is insufficient for satisfying the needs for feeding energy." In Colombia, there are 4.4 million undernourished people according to data from Sofi 2021.

-Micronutrient deficiency: "when one or more vitamins or essential minerals are lacking. They are measured in milligrams or micrograms."

-Overnutrition and obesity: "an abnormal or excessive accumulation of fat that may damage health. Overweight is one of the indicators of malnutrition in girls and boys under 5. It is estimated that 4 million girls and boys under 5 are overweight in Latin America and the Caribbean, constituting 7.5% of the infant population in the region.

Sources:
https://www.fao.org/hunger/es/

FAO, OPS, WFP y UNICEF. (2019). An overview of food and nutritional security in Latin America and the Caribbean 2019. Santiago. 135. License: CC BY-NC-SA 3.0 IGO

"Competition laws contribute to countries being more prosperous"

To make markets operate effectively and fairly, the role played by competition law is vital, especially for emerging economies such as ours. We interviewed Juan David Gutiérrez, professor of the Faculty of International, Political, and Urbanistic Studies, Universidad del Rosario.

By Carlos García Bonilla
Photos 123RF, Freepik, Milagro Castro, Juan Ramírez

We have all heard about business cartels, such as the toilet paper cartel, notebook cartel, diaper cartel, etc. We may have also heard about companies monopolizing a sector of the market and asphyxiating any possible competition or using their position of power to abuse users. These are the types of issues that competition law addresses: market failures that may affect our economy both at personal and macro levels.

To better understand what business cartels are and how we can defend ourselves from their actions, we talked with Professor Juan David Gutiérrez Rodríguez, an expert in competition law who recently published two studies on the topic: the chapter *Derecho de competencia en América Latina y el Caribe: evolución y principales retos en el Anuario de derecho de la competencia* (2021) [Competition Law in Latin America and the Caribbean: Evolution and Main Challenges in the Yearly Review on Competition Law] and the chapter on South America in the book Re-search Handbook on Cartels to be published by Edward Elgar in March 2023.

ADVANCES IN SCIENCES (AS): Professor Juan David Gutiérrez Rodríguez, what is competition law?
Juan David Gutiérrez Rodríguez (JDGR): Competition law is a set of regulations that seeks markets to operate competitively. In Colombia, it is framed by the political Constitution; Act 155, 1959; Decree 2153, 1992; and Act 1340, 2009. The Colombian constitution sets forth the right to free economic competition: the freedom that I should have, as a consumer, to approach a market and

purchase goods and services; the freedom that I should have, as a businessman, to approach the market and offer my goods and services, both in equal conditions. Competition law seeks to preserve this freedom of access to the market for both buyer and seller, a kind of freedom that is not artificially or significantly restricted by company behaviors or government regulations.

(**AS**): **When do these behaviors become illegal?**

(**JDGR**): The behaviors considered illegal by these regulations can be classified into two groups. The first group comprises *anticompetition agreements*, that is, agreements between competitors aimed at limiting the competition among them. For example, if we are competitors and we agree on increasing—or not decreasing—prices, distributing markets, or fixing the same production amounts, we will have higher prices than if we were competing. When we talk about these agreements, we are talking about business cartels.

The other group of illegal behaviors is called *market power abuse*. This behavior only includes the unilateral behaviors of one company that concentrates the largest part of the production of a good or service in a country or region and that does not face robust competition from any other competitor.

(**AS**): **How does this market power abuse take place?**

(**JDGR**): Let's picture a company with 95 percent of participation in a market that starts selling products at a loss to take its rivals out of business. Why would they do something like that? Because if the competitors go out of business, this company will be the only player in the business and will be able to increase prices in such a way that it will recover the loss incurred while taking the rivals out and may even make a profit since there is no competition.

Market power in itself is not bad. It is normal for markets to have big, powerful companies. It becomes a bad behavior when these companies abuse this power.

(**AS**): **How is the consumer affected by these behaviors?**

(**JDGR**): In many ways. If companies agree to increase prices, it will affect the purchasing power of consumers. It was the case of the Medellin Public Companies (EPM) (see text box), sanctioned by the Superintendencia de Indu-

→ "It is worth noting that competitiveness is not the same as competition. In order to be competitive, you need other things: you need public goods, railways, Internet, connection to the sea to export. You need a State that works."

stria y Comercio (Superintendent of Industry and Commerce) 20 years ago. It affected consumers because they were obliged to buy something they did not want. It also affected companies that saw their markets closing down. In almost all cases, anticompetitive behaviors go directly against consumers, and we are all consumers.

Companies that participate in concentrated markets have sophisticated ways to put their hands in our pockets without us noticing. The most common behavior punished by the Industry and Commerce Superintendence are agreements to fix prices.

Sometimes, agreements are just made not to decrease prices. But there are times when these agreements use sophisticated formulas to establish prices. In markets where prices vary day after day (such as retail and wholesale markets) or even minute after minute (such as tourism), companies use a common formula to fix prices and make the same variations for everybody.

Ultimately, the essence of laws that regulate competition is that a company that operates in the market must make their

"We want companies to compete independently in the market because we understand that economic competition will make companies decrease prices, seek innovation, increase quality, and improve their offers to attract clients," comments researcher Juan David Gutiérrez.

decisions autonomically; it cannot agree with their competitors to decide how to participate in the market. We want companies to independently compete in the market because we understand that economic competition will make companies

decrease prices, seek innovation, increase quality, and improve their offers to attract clients.

In Greek mythology, Sisyphus tried to carry a rock to the top of a mountain every day. When he was about to reach the top, a strange, foreign energy threw the rock back down, so he had to start over again. What competition law seeks is for businesspeople to be heirs of Sisyphus, in a way, make them go out to the market every day, and revalidate the reasons why clients choose them to acquire a good or service.

(AS): What is Colombia's position in this topic?
(JDGR): Colombia has legislation in place since 1959; we were one of the first countries in Latin America to establish this kind of regulation. But it was only after the 1991 Constitution that the necessary institutionality was generated, and this right to free economic competition was formed. Thanks to this, since

the 90s, the State started researching, detecting, and frequently sanctioning companies who acted illegally.

There is an important type of consumer that can also be affected by business cartels: the State.

During the last decade, Colombia has worked quite a lot to track down cartels that want to rig public tenders.

(AS): How do companies scam the State?
(JDGR): Public tenders are hiring processes aimed at generating competitive micromarkets for the best bidder to win and provide goods and services to the State. In these processes, participants can agree to distribute tenders and simulate competition, although results are assigned previously.

For example, at the end of 2019, the Industry and Commerce Superintendence sanc-

Cases of market power abuse

Professor Juan David Gutiérrez explains some cases of power abuse that have occurred in the country:
- "In 2005, Cadbury Adams, which had a dominant position within the chewing gum market, was fined for selling a product at a loss for over 12 months to stop the expansion of a new competitor, Tumix."
- "Several years ago, Empresas Públicas de Medellín (EPM) was the only organization that offered broadband Internet in the Medellin metropolitan area. When it decided to enter the on/demand TV market, they forced people who acquired broadband internet to also buy the television service since they could receive the on/demand TV signal via the same cable as Internet. The offer was a single contract for both services: Internet and television. Hence, several people who did not want a TV subscription were forced to buy it. EPM was sanctioned by the Superintendence 20 years ago because of this. The strategy eliminated future competitors because if consumers already received on-demnd TV because they were forced in order to have the Internet service, the other providers of the two services would find a populated market and would not have the chance to compete."

tioned six companies and five people with fines of up to a million dollars after discovering an agreement to distribute selection processes related to the school food plan in Bogota. Companies who fulfilled the requirements to participate decided not to do so for the tender to be considered deserted and force the District to change the tender terms with higher prices.

This situation may happen in other scenarios of public hiring, and it is important for the Industry and Commerce Superintendence to prevent it because public expenditure represents 15% of the total economy expenditure of the country. The value of public hiring in Colombia is close to 10% of the GDP, and collusion in hiring processes can increase prices between 10 and 30%. Thus, the State can acquire fewer goods and services due to anticompetitive agreements. This affects every person who receive State services, especially the most vulnerable population who benefit from state programs and subsidies.

(**AS**): **As a country, we may not be the only ones to be tumbled down, right?**
(**JDGR**): No, this is not particular of Colombia. We are one of the countries in the region who has detected more cartels in the last 20 years, only behind Brazil,

who has a much bigger economy. In this period, Colombia detected 72 cases; Chile detected 29 cases; and Argentina detected 10 cases. This does not necessarily mean that it happens more frequently in Colombia but that we have a better detection capacity.

(**AS**): **How are cartels detected?**
(**JDGR**): Two tools have proved to be very important in the last decade to detect business cartels. The key to uncover the diaper, notebook, and toilet paper cartels was the "Programa de beneficios por colaboración" ("Collaboration Benefit Program"), which aims at motivating any person participating in a cartel to inform about who the other participants are in exchange for a benefit that may include total exoneration of the fine.

With the diaper cartel, there was an informant. A company said: "I have been part of a cartel for several years, here is all the evidence." They gave the evidence of all communications and meetings among businesspeople to agree prices or refrain from lowering them.

The second tool is the ability to collect and process digital and electronic evidence. In the analogic era, the Superintendence literally sat to review physical documentation and see if they found anything. It was like looking for a needle in a haystack.

← "Before 2009, sanctions were small and not deterrent; it was almost a good deal to break the law, pay the fine, and go on as if nothing had happened. But that year's Act 1340 significantly increased sanctions, fixing fines of up to 100,000 current minimum wages (SMLMV by its acronym in Spanish), which is a lot of money for almost every company."

Currently, the Superintendence only requests access to the company's computers and mobile devices. They can find evidence of the existence of a price cartel by applying forensic informatics to preserve the integrity of information.

(DC): Do these sanctions imposed really have a deterrent effect on these behaviors?
(JDGR): This is a very good question. Before 2009, sanctions were small and not deterrent; it was almost a good deal to break the law, pay the fine, and go on as if nothing had happened. But that year's Act 1340 significantly increased sanctions, fixing fines of up to 100,000 current minimum wages (SMLMV by its acronym in Spanish), which is a lot of money for almost every company.

In other jurisdictions, such as the European Union (EU), in the framework of digital economies, they are discussing whether sanctions are enough because some technological giants are unaffected by fines: they keep breaking the laws, integrating this behavior in their business model, and as long as they can still operate, they'd rather pay the fine. That's why the EU wants to enforce different, more structural solutions that include the possibility of fractioning big companies to favor market competition.

(DC): Then, does competition law favor competitiveness?
(JDGR): Notably, competitiveness is not the same as competition. To be competitive, you need other things: you need public goods, railways, Internet, connection to the sea to export. You need a State that works. Competitiveness occurs because of the levels of economic competition as well as by all the environmental factors that allow a company to thrive. Thus, economic competition is just a small piece in the history of competitiveness.

In general, countries with competition law systems that are more robust in terms of effectiveness to detect these behaviors and sanction them are more prosperous countries. As they are more prosperous, they have a more effective State that can detect more cartels.

What is actually true is that business cartel operation has a big impact not only on a country's economy but also on its social conditions.

(DC): How do they affect society?
(JDGR): In a country plagued with cartels, the poorest consumers are more affected because this phenomenon increases poverty and inequality. It is true that, for there to be more equality, the State needs to work well. But if markets do not work well, such as when there are business cartels in operation, poverty may increase because consumers may be able to buy less for each peso they receive as their salary.

In the case of the school food plan cartel in Bogota, the purchasing power of the State had reduced because of a dishonest behavior of the offerors: the State bought fruit at a more expensive price because of an anticompetitive agreement, which meant it had fewer resources to offer public services.

As another example, if competitors agree to increase the price of diapers, this will affect poorer people more. Proportionally, low-income people spend more on food or essential goods than middle- or high-class people if diapers see a 10 percent increase in their price. For this reason, some Latin American countries, including Colombia, are more focused on chasing after cartels in basic markets, such as farming and food businesses.

Countries such as Mexico have betted on tracking cartels operating in the health industry since it is an essential good. Moreover, people with the lowest incomes spend a higher percentage of their income on health. The same happens with education. In general, a better market operation may lead to better life conditions for the poor. ◨

4

Joining disciplines together to improve the quality of life

Rumors leading to a criminal life: Impact on school dropout rate

Receiving information about profit opportunities can cause a young person with low academic performance to drop out of school. Researchers from different universities analyzed the speed with which these rumors go viral and impact the school dropout rate.

By Stefany Hernández
Photos Alberto Sierra, Milagro Castro
DOI https://doi.org/10.12804/dvcn_10336.37298_num6

For American economist Gary Becker, criminality is considered a trade with a cost and a benefit: the cost is the expected legal consequences it may bring, and the benefit is perceived as the profit received by offenders. This theory argues that the person who initiates his criminal life has knowledge and understanding of their actions, the goal of which is to improve their individual welfare.

In this context, Darwin Cortés, Economist and Professor at Universidad del Rosario and co-author of academic paper

Crime and Education in a Model of Information Transmission, published in *Annals of Public and Cooperative Economics,* asserts that criminality has different social elements that influence decision making when starting out in this trade. One of these is the rumors about how beneficial crime is.

According to this case study on high school students, a criminal can convince them that "the trade" is profitable without the need to justify the type of crime they are being asked to commit.

"What we are assuming is that at the beginning, all young people are in school and may eventually receive information about criminal life," explains Professor Cortés. "If

that happens, it is because they learn that there are people who are engaged in this activity," he continues.

Thus, the question that students ask themselves is as follows: Does crime pay? When young people first encounter a criminal, they ask themselves how profitable can crime be. "If that encounter happens when the student has just heard the rumor, it would indicate that crime does generate a benefit for them. If that encounter occurs later, it may pay little or not at all. The student uses that decision to leave school or continue studying," explains Cortés.

The aim of this research was to contribute to the economic analysis of crime by Economist Gary Becker by applying the economics of rumor by Indian economist Abhijit Banerjee. To such end, a generalized theoretical model was built based on what can occur in the decision-making process of high school students and the profitability of criminal life.

↑ The novelty from a theoretical point of view is that we apply a mathematical model of how rumors spread, and we consider and study them as a form of 'viral' transmission of information, exactly like the spread of any virus," explains Darwin Cortés, a researcher of the Faculty of Economics at Universidad del Rosario.

→ In addition to examining the speed at which rumors spread, the study simulated a situation in which studying was more profitable than criminality by convening free education programs based on meritocracy and students' good academic performance.

The study was also conducted by authors Guido Friebel, from Goethe University in Germany, and Darío Maldonado, from Universidad de los Andes.

Banerjee's model indicates that each individual makes decisions based on the opinions or rumors of others, as long as they lead to personal gain. This, in other words, is known as the "herd model." Professor Cortés states, "The novelty from a theoretical point of view is that we apply a mathematical model of how rumors spread, and we consider and study them as a form of 'viral' transmission of information, just like the spread of any virus."

To this end, three scenarios were evaluated in which both academically successful and underachieving students were faced with the decision to either drop out of school and start a life of crime or continue learning, depending on the profitability of both activities.

In the first scenario, a criminal life is not beneficial to either group. In this case, the speed with which the rumor spreads is null and there is no increase in the crime rate.

In the second scenario, criminal life is beneficial for some but not for others. The speed at which the rumor spreads is medium, and it affects students with poor academic performance over those with good grades.

In the third scenario, crime does pay, the rumor spreads quickly and affects both students with good and bad grades.

Well-intentioned policies, adverse effects

In addition to examining the speed at which rumors spread, the study simulated a situation in which studying was more profitable than criminality by referring to free education programs based on meritocracy and good academic performance. The researchers then analyzed how the hypothetical context influenced the decision to drop out of school and engage in criminal life.

In this case study on high school students, a criminal can convince them that "the trade" is profitable without the need to justify the kind of crime they are being asked to commit.

The analysis based on the applied statistical model concluded that in this situation, the speed of rumor spread in the aforementioned three scenarios dropped. However, this does not rule out the possibility that students become criminals, especially those with low academic performance.

For Professor Cortés, the dilemma is to try to show that a policy that targets a certain population can affect those who fail to meet its premises. "For example, in Colombia, the program called Ser _Pilo Paga_—no longer effective—was a case of public policy that meets these meritocracy requirements and could be a subject of study to know what really happens to those who were not qualified to be part of it."

Moreover, Professor Cortés considers that for a public policy to be successful in encouraging young people to continue with their studies based on academic performance, it is important to draft, at the same time, other public policies that follow up on underachieving students to reduce the dropout rate since there are other factors, besides lack of motivation, that lead to student dropout, such as teenage pregnancy, drug use, and child labor, among others.
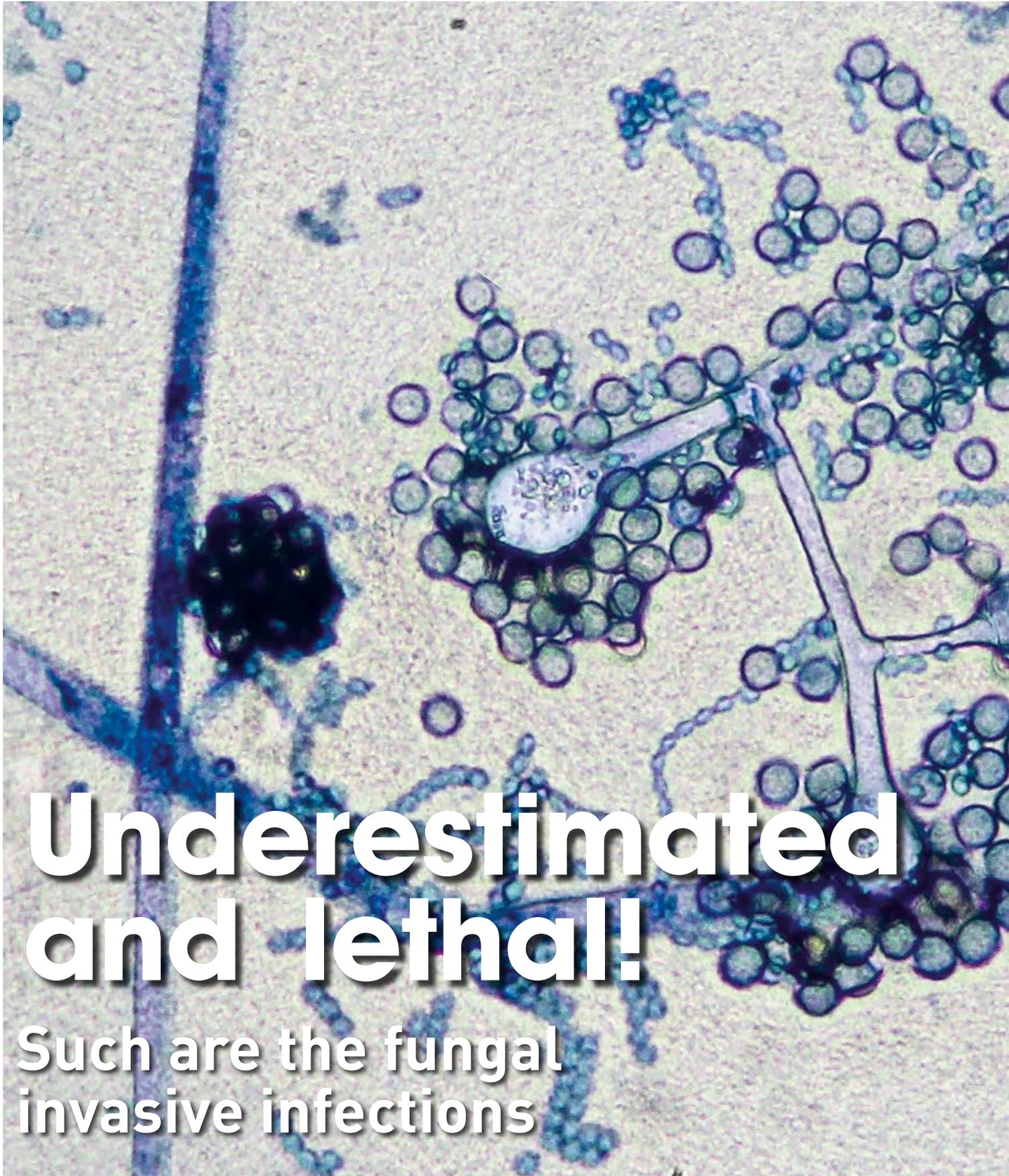
Underestimated and lethal!

Such are the fungal invasive infections
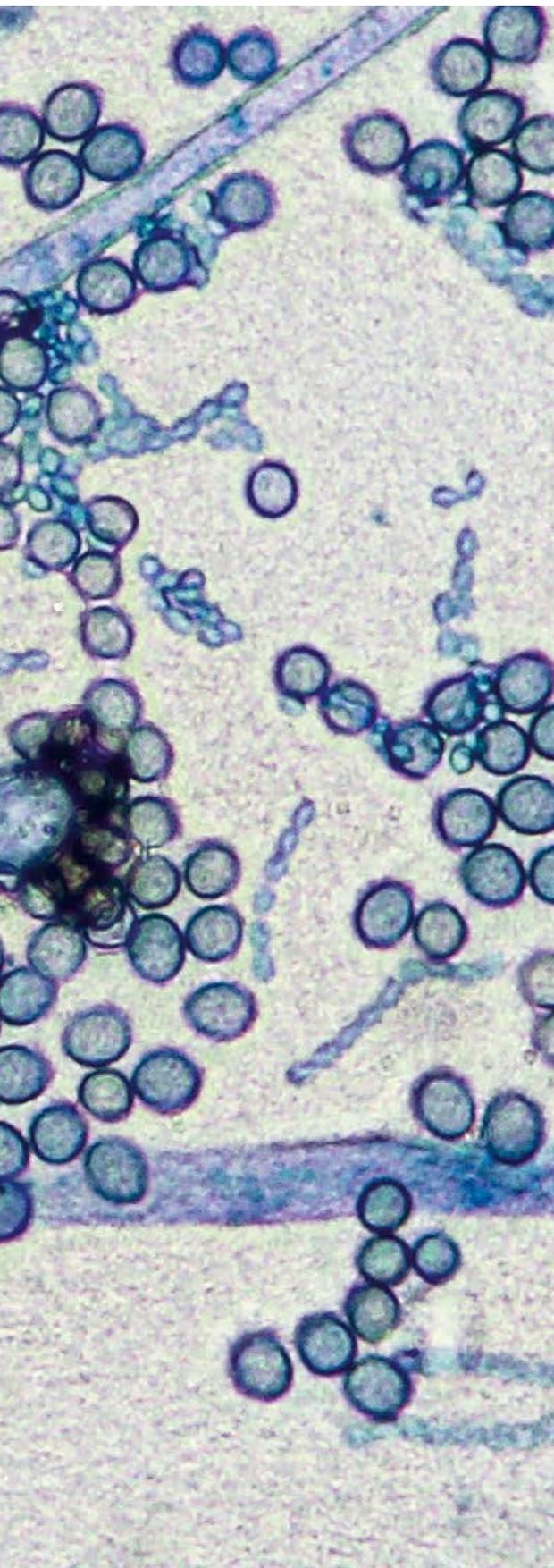
In the kingdom of these germs, there are some six million species, but three of them particularly affect human health to the degree of becoming a threat for public health and a hard challenge for therapies that could save lives.

By Ximena Serrano Gil
Photos Carolina Firacative, Ximena Serrano.

Fungi. This word, by and large, conditions the popular imagination to picture representations of wild or edible mushrooms, nasty injuries on the skin, nails and hair or allergies, but beyond that, there are some that may cause the host's death when invading the human body.

Yes, indeed, there are some fungal species that can trigger infections in the blood, brain, lungs, and other vital organs unless they are timely treated based on an adequate diagnosis. This has turned the invasive fungal diseases into underestimated and lethal enemies all over the world. Biologist and Medicine doctor Carolina Firacative, professor at the School of Medicine and Health Sciences of Universidad del Rosario and member of Studies in Translational Microbiology and Emerging Diseases Research Group (MICROS), in the same institution, has investigated the risk factors of those who develop such illnesses to recognize the impact of fungi-related infections in human health.

The scenario gets complex if we take into account that both in the environment and in every millimeter of our skin and mucosa, an endless number of microorganisms cohabit; many times, they are disregarded when it comes to assess a patient. The fact is that, in general, when it comes to infections, we tend to think about bacteria or viruses rather than fungi; therefore, the patient will not respond to the treatment because they are, biologically, quite different microorganisms.

That is why hundreds of thousands of people across the world, particularly those immunocompromised, suffering from cancer, HIV, transplants, and COVID-19, among other base conditions, are attacked each year by microorganisms like Candida albicans, *Aspergillus fumigatus,* and Cryptococus neoformans, the most common fungal species responsible for invasive pathologies in humans.

←
Aspergillus sp. formed in rotten bread, dyed with blue lactophenol at 1% 40x objective, 10x ocular lens, 400x total magnification with imprinting technique.

The review made by Firacative, under the title Invasive Fungal Disease in Humans: Are we Aware of the Real Impact?, published in Memorias do Instituto Oswaldo Cruz, linked the risk factors and the most common base conditions to develop a fungal disease. From the epidemiological perspective, the three most frequent and highest risk infections are **candidiasis**, produced by yeasts of the genus *Candida*; **asper-gillosis,** caused by the *Aspergillus* fungus*;* and **cryptococosis,** generated by the *Cryptococcus.*

The frequency in which people face these germs is very high, as we practically live surrounded by them. "*Candida* lives with us. If we take a sample of our inner cheeks, we will find it there, as well as in the intestine," the researcher states. Likewise, these microorganisms can survive for long hours on a diversity of surfaces like bathroom curtains, computer screens, stereoscopes, or public transportation handrails, "but if there is a balance with other microorganisms like bacteria, or a stable immune system is maintained, the disease will not develop," Firacative adds.

With *Cryptococcus* and *Aspergillus* something similar happens: "They are not in our bodies, but they are in the environment. In general, *Cryptococcus* is found where there are doves or other birds and their faeces. *Aspergillus*, which can circulate in heating systems and air-conditioning equipment, resides in trees, vegetable material (foliage, flowers or bark), and on the ground.

"We are constantly inhaling infectious particles and that doesn't cause big problems, but it can be so if is the person suffers from some kind of immunosuppression or a serious underlying disease," the expert explains. The concern is valid because although humans are naturally resistant to most invasive fungal illnesses and disease severity depends on the host's immune response A study published in 2017 in the Journal of Fungi points out that invasive aspergillosis affects over 300,000 patients per year, out of almost 10 million at risk.

An underestimated record

According to the study Prevalencia mundial y multinacional de enfermedades fúngicas: pre-cisión de la estimación, it is estimated that on a global scale, 1.5 million people die annually due to these diseases, a similar figure to deaths by tuberculosis and three times higher than the mortality rate due to malaria. From this standpoint, fungal diseases constitute an emerging problem worldwide.
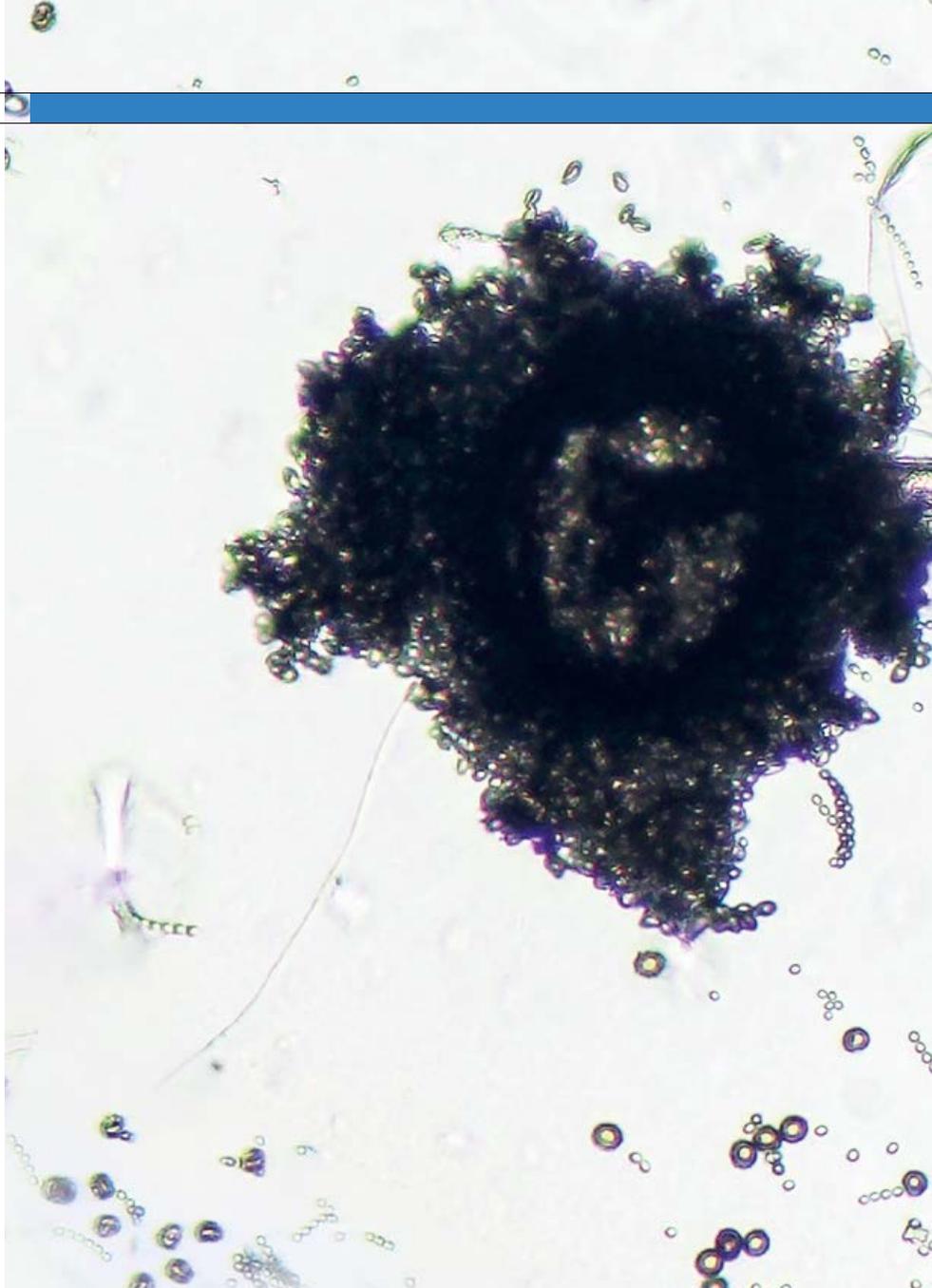
↑
Photomicrograph of *Aspergillus sp.* conidiophores and conidia, one of the most common fungal pathogens causing invasive disease in humans. Lactophenol blue stain. 400X Magnification.

However, most of them are not taken into account when it comes to routine hospital attention since keeping a record of them at public health institutions is not mandatory, so, there is no reliable information as to its local, regional, or cross-border prevalence.

"We can say that in Colombia, at large, the record is underappreciated and data is scarce," Firacative affirms. Faced with this scenario, clinicians Carlos Álvarez Moreno, Jorge Cortés, and David W. Denning, from the Faculty of Medicine of Universidad Nacional, from the Clínica Universitaria Colombia and from Manchester University, respectively, published, in 2017, a study on the burden of fungal infections in Colombia. The results reveal that they found roughly 755,000 cases of these infections, out of which close to 600,000 corresponded to candidiasis and 130,000 to aspergillosis. Those findings allowed them to

Carolina Firacative, professor at the Escuela de Medicina y Ciencias de la Salud(School of Medicine and Health Sciences) of the Universidad del Rosario, has researched other factors having an incidence in the complexity of these affections, such as the susceptibility of those pathogens to anti-fungal medicine.

What is a fungal disease?

Also known as mycosis, it is caused by a great variety of fungi which live both in the environment and in the microbiota (range of microorganisms living in the body).It becomes invasive when it brings about progressive infections in internal organs, which end up being lethal if not timely diagnosed and treated.
The infection may begin by inhaling infectious particles from the surroundings or by direct inoculation. However, fungi must meet four criteria to unleash an invasive disease in the human being:
- **Being able to grow at or above mammalian body temperature.**
- **Getting to the internal tissue by penetrating or evading host barriers.**
- **Lysing tissues and absorbing their components.**
- **Having the ability to evade host immune defenses.**

conclude that fungal infections account for an important burden of disease for the Colombian population, as it affects approximately 1.5 per cent of the population.

In addition to her work mentioned above, researcher Firacative has studied other factors having an impact on the complexity of these maladies, such as the susceptibility of these pathogens to anti-fungal medicine. "We analyzed whether the drugs we have today can be good or useful for the treatment. We also analyzed what types of patients are mostly affected by these fungi; why some of them are affected while others are not. Similarly, from an environmental approach, we examined where these fungi proliferate, and found cases where a hospital located near a wood area favors the fungi to enter through the air-conditioning ducts and infect a patient. Thus, we could track down the fungus, the patient, and its environment thoroughly, because this is multifactorial," the academic puts in context.

One of the threats leading to a fungi infection happens when a person is admitted in the hospital or in intensive care units (ICU). It is the case of *Candida* which, although it normally remains in the skin, it may enter the blood when the needle of a syringe goes through the skin or through the use of intracranial or intravascular devices. For that reason, it is so important to take all the necessary measures in patients undergoing surgeries with this kind of hospital supplies.

The article written by the professor details that *Candida albicans* and other species of *Candida* have the ability to form biofilms in permanent bladder catheters, in cardiac valves, in particular prosthesis, and even in different tissues of the patient. The biofilms are a group of microorganisms that stick to all surfaces, helping to develop a high tolerance to antimicrobial medicine, and therefore, they lead to resisting the antifungal active principles.

At this point, it is worth mentioning that the lengthy or indiscriminate consumption of antibiotics suppresses and destabilizes the growth of beneficial bacteria, which enable a balance in the body. That situation contributes to strengthen the resistance of fungus to pharmacological treatments that may fight them off. When these therapies do not represent any competition facing those good bacteria any more, a greater colonization is generated and may remain longer in the patient.

And now, climate change...

Additionally to what has been explained, yet another antagonist steps into this chain of invisible universes threatening public health: climate change. The disruption of climate conditions may have an influence in spreading fungi and in the likelihood of infecting more hosts.

As doctor Firacative explains, "temperatures are higher and higher and fungi have already started to adapt to these new conditions. One of the abilities enabling a fungus to cause a disease is that it may survive an external average temperature of 40°C. This means that the average human body temperature of 37° C will not be an obstacle for it."

Definitively, microorganisms have been skillfully adapting to climate change and have achieved a surprising evolution for that purpose.

Firacative indicates that many fungi are pathogens of key plants for agricultural activity, like tomato, potato, the banana tree, and a large number of flower crops that did not use to cause infections, but now they do. The tool to control them has been the application of fungicides. "These chemical products are similar, in their molecular composition and structure, to those taken by patients," the expert warns. "If we take in such pathogens from an environment already exposed to agricultural drugs, that fungus may already be resistant to medicine."

Fungi around us

Criptococosis (pathogen agent: *Cryptococcus*).

It mainly affects the central nervous system causing meningitis and encephalitis.

Candidiasis (pathogen agent: *Candida*).

It mainly affects the blood stream, which may lead other organs to get infected and produce *sepsis* (unbalanced immune response).
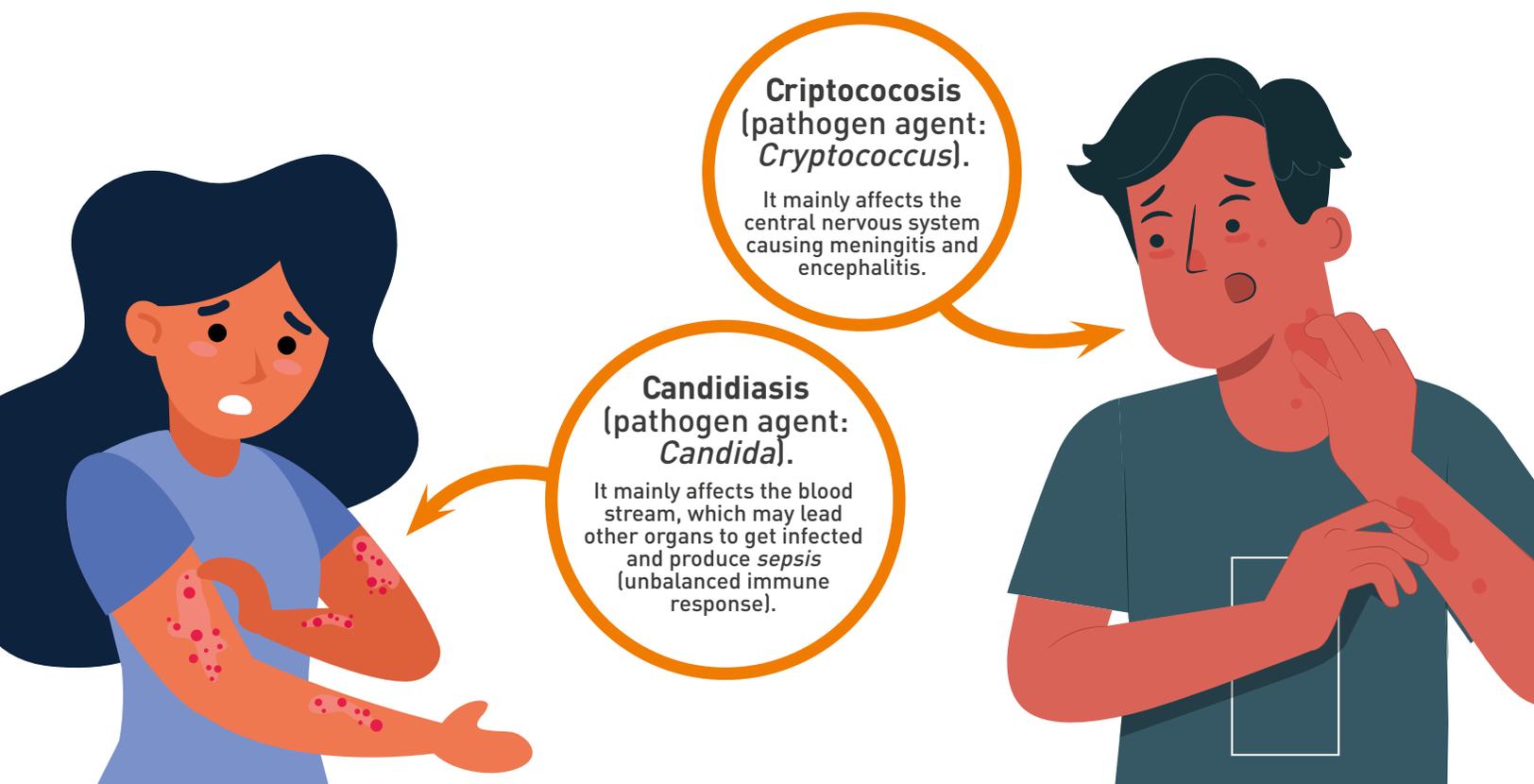
Such question is reinforced in the publication One Health: Fungal Pathogens of Humans, Animals and Plants, which explains that "the use of the same types of antifungal medicine in crop plants and in human beings generates an indirect selection pressure that increases the risk of developing strains resistant to the drugs used in antifungal therapy."

These infections are never transmitted by intake; the problem arises when the infectious particles are cast over the crops, as the contact with the chemical products means that they will already present considerable levels of resistance; so, that drug will not be effective when the doctor treats the patient.

Fungal infections must also be considered

Although Carolina Firacative's work contributes with findings and knowledge that feed the epidemiological global databases, the researcher highlights that beyond that effort, her role

Fungal diseases are an emerging issue worldwide. However, most of them are not taken into account when it comes to routine hospital attention as keeping a record of them at public health institutions is not mandatory.

Prevention Measures

It is common to see prevention campaigns for viral or bacterial diseases, but not for those stemming from fungi. The following is a list of recommendations made by researcher Carolina Firacative, for a public health campaign:
- Do not take vegetable material to a hospital (flowers, fruit and not even plants in pots).
- Carry out a correct maintenance service to air-conditioning and heating systems.
- Control mold on walls, furniture, etc.
- Promote the frequent wash of hands among health care staff.

as teacher is to tell students that they should not think only of bacteria and virus as infection sources; they have to keep fungi in mind as well since in transplant patients, in serious medical condition, or in terminal stage, only the main condition is taken into account, and other possibilities are not considered, such as complications of their health derived from fungi, resulting in less recorded cases than what really occur.

"To me, the most important thing is to raise awareness among health care staff that their patients can be attacked by these infections, which must be timely identified, or otherwise the mortality rate increases," the professor emphasizes.

In some way, medical advances also contribute to increase the number of people exposed to these risk factors, as in past years, maybe only 1 transplant per week was performed, and now, 20 are practiced. Other indicators that have gone up over time are the number of cancer patients and HIV positive cases (5,000 new cases annually in Colombia, according to the surveys by the Ministry of Health and Social Protection).

Based on all these reasons, the researcher insists on the importance of effective and truthful communication "among colleagues, infectologists, clinical laboratories, and nursing staff, as this best practice increases the speed of an adequate diagnosis, and therefore, it may help the patient to survive."

Aspergilosis (pathogen agent: *Aspergillus*).

It mainly affects lungs and causes some masses damaging the pulmonary function. The greater infection risk is run by patients under chemotherapy and connected to mechanical ventilation.

Microbial communities: The bad guys, the good guys, and... the antibiotic pressure

We are not alone. Bacteria, fungi, parasites, and viruses inhabit our bodies and can play important biological roles, either beneficial or detrimental. Knowing them is essential for proper management.

nfections associated with intestinal bacteria are a major problem worldwide, as they favor the onset of life-threatening diseases in humans and animals. From the Universidad del Rosario, Marina Muñoz Díaz, PhD in Biotechnology, leads studies aimed at the detection and characterization of pathogenic bacteria, which affect the wellbeing of an individual and can cause changes in the microbial community. Dr. Muñoz's work, together with researchers from the Microbiology and Biotechnology Research Center of the Universidad del Rosario (Cimbiur) of the Faculty of Natural Sciences, of which she is the technical director, is pioneering in Latin America.

Identifying the diversity of species that colonize an organism (**microbiota**) and that compete, cooperate, and interact with each other is essential to ensure the effectiveness of existing treatments against them.

In this regard, the researcher explains that "what is transversal in microbiology research is the use of molecular biology and next-generation sequencing tools, which make it possible to understand the genetic bases that modulate the effect of microbial species (bacteria, fungi, parasites, and viruses) on hosts and environments. This interaction produces both beneficial and detrimental effects on human, animal, and environmental health."

The bad guys

"My research is initially aimed at characterizing the 'bad guys', i.e., the pathogens. Once we know the genetic bases, we will be able to find solutions to serious health problems," says Muñoz.

This characterization is unique for each patient and allows the development of a map that serves as a reference. Nevertheless, the description has to be periodically repeated since microorganisms change, i.e., they gain and lose genetic material.

For example, "we can have *Escherichia coli*, a common bacterium in the intestinal microbiota. Some populations of this species are bad (pathogenic) and, if they have the opportunity to multiply, can cause serious problems. If, in addition, they are resistant to antibiotics, a treatment that was once effective now becomes ineffective. Therefore, the patient's clinical condition may become more complicated until a truly effective alternative is found. This is why characterizing the 'bad guys' is so important," adds the researcher.

The tools used in Cimbiur allow the identification of the presence of microorganisms and molecular markers of interest for health, such as those related to antibiotic resistance, which provides very useful information for patient management.

The researcher's main work focuses on the characterization of bacteria such as Clostridiodes difficile (which causes diarrhea and colitis), Clostridium perfringens (common in food poisoning), carbapenemase-producing enterobacteriaceae (CPE), and other microorganisms that severely affect the intra-hospital environment and the community.

The good guys

On the other hand, "we hardly ever pay attention to the beneficial aspect, let alone consider a holistic view of the intestinal ecosystem, an essential approach to assessing the effects that occur. The analysis of the presence and interactions of pathogenic microorganisms, along with all the genetic material of the microbiota (the **microbiome**), is very important to learn about **microbial ecology**," explains Muñoz.

"It is important to put all this information to use. Therefore, at Cimbiur, we plan to obtain products with biotechnological potential, such as diagnostic tests, surveillance schemes, and even probiotics, to transfer knowledge. Notably, science can have a positive impact on people by generating solutions to community problems," says Professor Muñoz.

Microbial ecology

To understand microbial ecology, imagine it as an orchestra:
- The musicians of the orchestra are the **microbiota.**
- The entire orchestra, all the members and their corresponding instruments, their coding potential, is the **microbiome**.
- The music they can create, their interactions, is known as the **metagenome**.
- Only by having the whole picture can one know what the potential of that orchestra is.

Microbiota
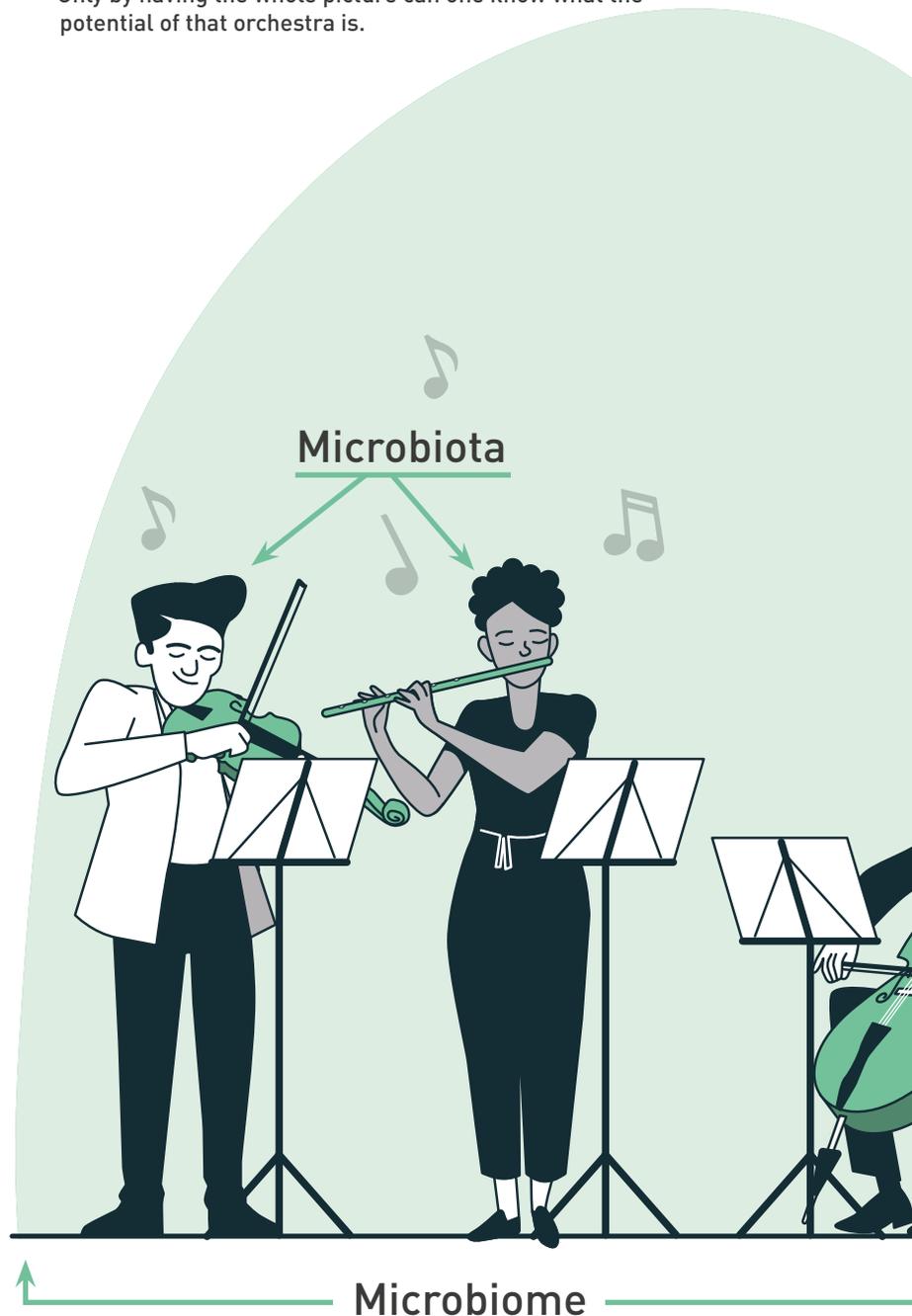
Microbiome

The tools used in the Microbiology and Biotechnology Research Center of the Universidad del Rosario allow the identification of the presence of microorganisms and molecular markers of interest for health, such as those related to antibiotic resistance, which provides very useful information for patient management.

Metagenome

Glosary

Microbiota
Group of microorganisms found in an environment (skin, mucous membranes, etc.). Microorganisms inhabit these places on a more or less permanent basis and, in some cases, have specific functions.

Microbiome
It refers to the microorganisms present in a specific environment, including all the genetic material. This group forms a dynamic and interactive micro ecosystem.

Metagenome
The set of microbial genes present in a given environment or ecosystem. Metagenomics includes the techniques used to study this whole set without the need to isolate each of the population found.

About the scariest bacteria

Clostridioides difficile is a gram-positive, anaerobic bacterium that forms resistant spores, which can be found in contaminated food or water. The microorganism reaches the intestine through the consumption of spores, where it produces an array of toxins that cause the associated diseases.

The spores are shed through the feces and are very resistant, even to sodium hypochlorite. Therefore, it is advisable to thoroughly decontaminate vegetables by hand.

Infection levels
Asymptomatic patients.
Patients with diarrhea. Simple colitis.

All of the above refers to the controllable part of the infection, but when other variables come into play, such as overuse of antibiotics, other conditions, or a patient who is immunocompromised, the impact of the microorganisms can be exacerbated and result in

Pseudomembranous colitis.
Fulminant colitis/toxic megacolon.
Death of the patient.

Misuse of antibiotics

Antibiotic resistance is one of the leading causes of death worldwide. More than 1.2 million people died in 2019 as a direct result of infections with antibiotic-resistant bacteria, according to a study conducted in 204 countries and published in the journal The Lancet.

Although antibiotics are designed to cure and save lives, they can also cause adverse effects by eliminating beneficial intestinal bacteria responsible for maintaining the balance of the gastrointestinal system. In addition, antibiotics can exert a selection pressure that causes resistant populations, those with molecular markers conferring resistance, to proliferate. In such a situation, bacteria proliferate and invade the organism.

The scientific community is warning that bacterial resistance to antibiotics can be the next pandemic. In the article *Gut microbiota composition in health-care facility-and community-onset diarrheic patients with Clostridioides difficile infection*, published in 2021 in the journal Scientific Reports of the publisher Nature, Professors Marina Muñoz and Juan David Ramírez stated that "one of the infections with the greatest global impact is *Clostridioides difficile* infection (CDI), considered to be the causative agent of diarrhea associated with the use of antibiotics."

This bacterium can trigger a variety of mild problems, such as diarrhea and inflammatory bowel disease, to serious digestive disorders, such as toxic mega-colon, pseudomembranous colitis, and sepsis, which entail a high mortality risk. The problems associated with CDI worsen mainly in patients in intensive care units (ICUs), where it represents one of the five infections with the greatest impact worldwide.

These disorders are related to the overuse or misuse of antibiotics, which exposes the organism to a stimulus that affects the microbial communities. Consequently, bacteria capable of resisting antibiotics proliferate and colonize the intestinal micro environment. According to Muñoz, "we are attacking our organism in two ways, i.e., attacking the beneficial microbiota and favoring the pathogen. In short, we are disrupting the intestinal balance."

Object of study

Patients in ICUs are administered high doses of antibiotics that cause an imbalance in the microbial communities, which, together with immunosuppression, either due to existing diseases or to the application of treatments, makes these patients more susceptible to suffer complications such as CDI. "It is the ideal environment for pathogenic bacteria to multiply, colonize, and impair the balance of the intestinal microbiota. This is associated, among other factors, with poor absorption of nutrients and weakening of the immune system," explains Muñoz. Therefore, this population is of great interest to the research center, whose members are also involved in a collaborative project with the Hospital Universitario Mayor Méderi in Bogotá, aimed at describing the intestinal metagenome in ICU patients.

The study published in *Scientific Reports* described the changes observed in microbial communities in patients with *C. difficile*.

Patients in ICUs are administered high doses of antibiotics that cause an imbalance in the microbial communities, which, together with immunosuppression, either due to existing diseases or to the application of treatments, makes these patients more susceptible to suffer complications.

"My research is initially aimed at characterizing the 'bad guys', i.e., the pathogens. Once we know the genetic bases underlying their effect, we will be able to find solutions to serious health problems," says Marina Muñoz Díaz, PhD in Biotechnology, who leads several studies at the Universidad del Rosario aimed at the detection and characterization of pathogenic bacteria.

The hospital is now studying all the genetic material, known as the metagenome, to fully understand what is happening to patients at the intrahospital level.

According to biologist Muñoz, previous studies have shown that there is a high frequency of infection in both intrahospital and community settings. Using molecular techniques, the microorganism (*C. difficile*) has been detected in more than 58 percent of hospitalized individuals and in approximately 38 percent of people in the community. Depending on individual risk factors, complex clinical outcomes can occur.

Research for the world

The microbial diversity of the country has not been thoroughly studied. In general, the diversity of plants and animals is discussed but not that of microorganisms, which are even more diverse. "Our research center is working on the description of microbial diversity and reporting it in international databases because we need the world to know it to develop more accurate comparison strategies. This research is pioneering in Colombia," says Muñoz.

According to the biologist, research on *C. difficile* carried out in the United States and England has shown that the populations of microorganisms are highly conserved, i.e., they are similar to each other; diversity has been limited to a few *clades* (a group of species that share a common ancestor). By contrast, studies in Colombia found that there is a high diversity and that there are more populations of these microorganisms than previously reported.

Upon studying the molecular markers (small windows within the genome) and observing that there were different arrangements,

the researchers decided to analyze the entire genome. The research center is also a pioneer in the "study of genomic epidemiology," which makes it possible to gain insight into the organization of the human genome and, at the same time, to carry out robust studies on populations of microorganisms.

The next step of the research consisted of studying whether the microbial population in hospitalized patients was the same as that found in the community (outside the hospital). Using the tool, it was determined that only one of these populations was shared.

The microbiomes inside and outside the ICUs function with a different structure at the genome level, including the genes that encode toxins and the antibiotic resistance markers. Taken together, this may increase the complexity of the clinical management of infected patients, which has not been previously studied in Colombia.

"If physicians had access to the results obtained from this type of tools for each patient, they could easily select and prescribe the most effective treatment. These tools are also useful to know the dispersion patterns of these microorganisms and to discover the way they reach different regions or even the way they spread within a hospital," emphasizes Muñoz.

5
Digital innovation

MalSEIRS

An epidemiologic model to predict the behavior of computer viruses
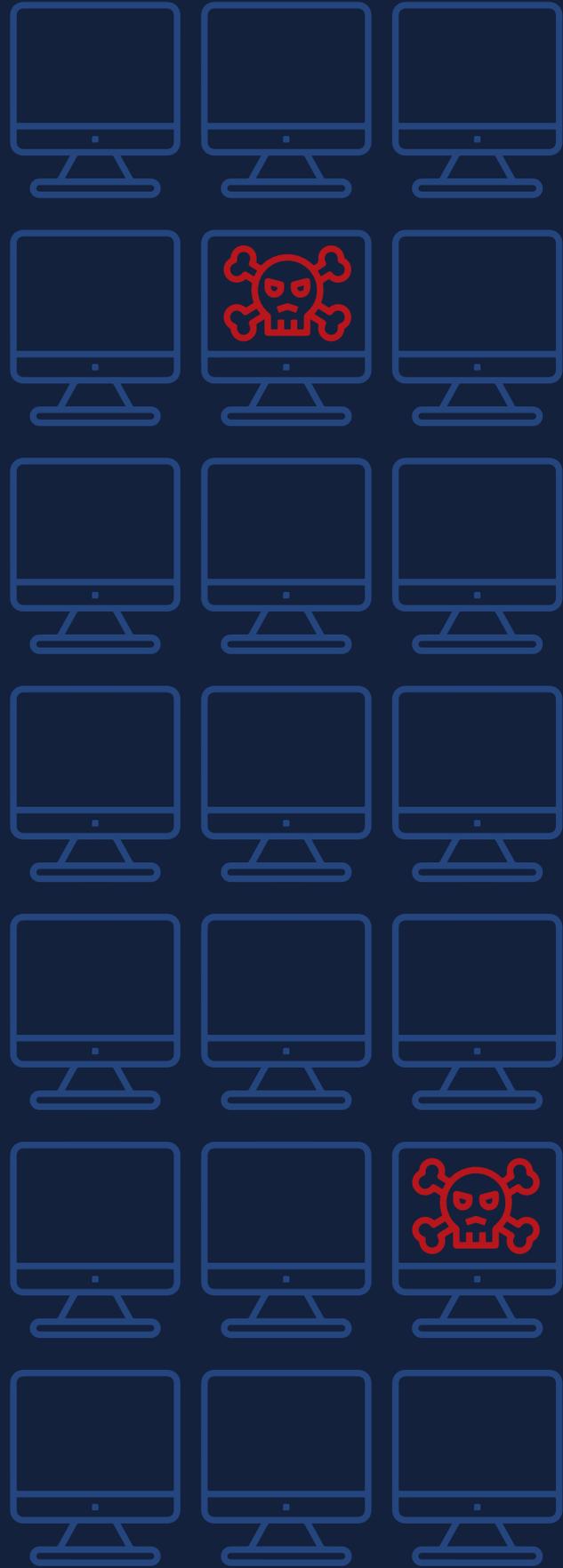
Students of the Applied Mathematics and Computer Sciences (Macc for its acronym in Spanish) program from Universidad del Rosario developed a research project on the application of epidemiologic models to understand malicious software (MalSEIRS). With this, they want to offer better solutions to face the cyberattacks companies are exposed on a daily basis.

By Camilo Calderón Acero
Photos Milagro Castro, 123RF .
DOI https://doi.org/10.12804/dvcn_10336.36921_num6

I n November 2021, the website of the Departamento Nacional de Estadísticas (National Department of Statistics, Dane) had to be taken down for a couple of hours, which removed access to hundreds of users who use this platform daily. The reason was a cyberattack against the entity. Cybercriminals deleted the databases containing sensitive and confidential information, affecting around 420 servers within the network.

We can say that the network was "infected" with a virus that made all its components "sick," just as when COVID-19 spread throughout the world and affected human beings. While COVID-19 is airborne and spreads in close contact, the Dane systems were infected because the equipment was connected to the Internet.

As in the example, everyday equipment, programs, or apps, devices, or platforms (IT assets) connected to the network are exposed to multiple risks, and measures must be taken to prevent them. Something similar happened during the pandemic, when quarantines and the use of facemasks were ordered, frequent hand wash was suggested, vaccines were being developed in record time, and later, intense vaccination sessions were implemented to counterbalance the spread of numerous SARS-CoV-2 subvariants.

The similarities are no coincidence. Students of the Applied Mathematics and Computer Sciences (Macc for its acronym in Spanish) program from Universidad del Rosario (URosario), Isabella Martínez Martínez, and Andrés Felipe Florián, together with researchers from Universidad de Murcia in Spain and coordinated by Daniel Díaz López, Principal Professor at the School of Engineering, Science and Technology of URosario, discovered that they could apply the parameters of a detailed

epidemiologic model to the cybersecurity field. Thus, they could pinpoint the behavior of malicious software (malware) and proposed formulas (algorithms) to avoid them. The results were published in Complexity in December 2021.

They were mainly based on the SEIRS model—susceptible, exposed, infected, recovered, and susceptible again—a complex, yet also very precise method commonly used in the epidemiology field that considers a great spectrum of scenarios in which a viral attack may happen and an infectious disease may progress. In the recent pandemic, its application was of great use to establish infection peaks—that is, the periods with more positive cases confirmed.

Malware is one of the most lethal threats in cyberspace. It is known for corrupting and damaging IT systems silently. It can steal, encrypt, and delete data as well as spy on the user's activity without nobody noticing. "It is like a disease, a condition that poses IT assets under permanent threat. As happens with breathing and talking to other people without a facemask, when we run the risk of catching a respiratory disease, computers communicate with each other via networks, and this is how they can spread malware," explains Isabella.

Epidemiology applied to cybersecurity

The researchers built their mathematical model based on epidemiology's own methodologic resource. To achieve this, it was essential to analyze the behavior of cyberthreats from preexisting mathematic assumptions, a field of study that has been developing globally for around 20 years.

"Our research is framed in the context of infectious diseases and, in this field, its most basic epidemiologic model is SIR (susceptible - infected - recovered), which takes data from people that meet certain conditions (that is, the number of cases that go from one stage to the other, for example, from being infected to being recovered)," explains Martínez.

"It is a very simple model that handles statistical rates. This means that the rate at which individuals (or computers, in our case) move from one denomination to the other (from susceptible to exposed, for example) does not change in time. For instance, if the rate of susceptible and infected people is 0.5, this means that, in a given time, half of the susceptible people will become infected."

Each parameter in this model allows us to make an inference over the course of the

↑
A key point in the study performed by the group of students was to determine how similar the model proposed is to other predictive models. One of the most important findings here was the more rapid stabilization of the MalSEIRS model.

Susceptible   **Exposed**

disease. For example, if there is a high infection rate and a high recovery rate, we can say the virus is infectious, but the disease it causes is not severe. There is where mathematics is useful to understand the scope of a pathology or, in this case, a cyberthreat.

However, SIR is a simple model since it does not consider new subgroups of "subjects" (IT equipment) that may appear when handling large quantities of infected equipment (over 100 units) and when infection has been present for over 1 day. For example, the Exposed-to-the-Virus subgroup (E) represents the nodes before being infected and may spread the disease, or the Susceptible subgroup (S), where nodes lose previously acquired immunity.

The SEIRS model does consider these new subgroups (E and S), so it is a more complex model compared to SIR. But, at the same time, it is more precise since it allows for the inclusion of new scenarios in which a cyberattack may happen.

When applying the analogy of epidemiology to the universe of cybersecurity and malware, we obtain the acronym MalSEIRS, a model that considers a larger number of attack parameters (i.e., changes in the incubation rate, deaths, and population size) and that these parameters may vary in time. In the MalSEIRS model, considering progress in time is vital since it better adjusts to what really happens during a cyberattack.

"Rates vary in time because nobody is aware of the infection when it's starting, and the virus spreads massively. When we are aware of the infection, and we start protecting ourselves with the proper supplies or mechanisms, the rate starts dropping. The same happens with computers. When a malware is known to be circulating through systems, a protection mechanism is placed on the susceptible nodes, which makes infection rate to drop," states Díaz López.

I R S

Infected **Recovered** **Susceptible**

In this respect, Florián adds the following: "What we do is take rates from the model that depend on time—infection, recovery, propagation, and immunity loss—and extrapolate them to the malware infection events. What happens with the infection rate is that the more pieces of equipment are infected, the less "healthy" pieces available there will be to be infected (and, as a secondary effect, more network congestion may happen). Therefore, the infection rate will vary: it will rise in the early infection stages, and drop in the later stages."

The great restriction of the previous models is that they do not consider that the variation rates among categories may vary in time. We need to consider that as a cyberattack progresses, the human and technological team in charge of incident response will take containment measures to diminish the infection rate or make it drop to zero. The same applies for other rates in the model that may also vary in time for external reasons.

For Professor Carlos Arturo Castillo Medina, Director of the Graduate Diploma in Telematic Network Security of Universidad El Bosque, it is increasingly necessary to have this kind of tools that allow organizations to make timely decisions since cyberattacks are usually more common and lethal than people think.

"The great strength of this project is the malware behavioral study, which allows for the development of profiles based on suspicious behaviors and behavior guidelines of the infectious cyberagent. This enables its detection before we have seen its attack or course of action," he added.

From theory to practice

A key point of the study performed by the Macc students was to determine the similarities between the model proposed and other predictive models. One of the most important findings here was the more rapid stabilization of the MalSEIRS model. This means that their figures could assimilate those in reality more rapidly than in other models.

→ Daniel Díaz López, professor at the School of Engineering, Science and Technology of URosario.

To reach such conclusion, they first reviewed the ranges of each parameter in the model individually to obtain data of their application at a large scale. Then, the results were compared with similar models. To justify the variability of rates in the model, they used data available from other attacks, such as those committed by the *Wannacry* worm, in 2017; the *Slammer* worm in 2003; and the *Emotet* Trojan, discovered in 2014.

The third phase of the project assessed defense mechanisms that may be implemented to stabilize the model and reach the required rates to contain an attack in a robust way. "We thoroughly reviewed parameters such as vaccination or initial susceptibility rates for the devices entering the network," says Martínez.

"We analyzed how high the rates must be to contain a malware in a network. This value in itself is a defense mechanism, because it lets us know how many pieces of equipment must be immunized or how much money we must invest in antivirus licenses to get rid of the malware."

Simulations considered several scenarios, such as computers losing the "antivirus signature" (the file that tells the antivirus software to find risks and repair the threatened systems) after a certain amount of time passed, letting new pieces of equipment into the network with a probability of being susceptible or a susceptible piece of equipment being recovered quickly.

Data to make *cyberdecisions*

Cybersecurity is not a minor topic in Colombia. Besides the Dane attack, in 2021, over 20,500 cybercrime reports were submitted before the Prosecutors Office. In fact, it is estimated that, during said year, there were 87 threat attempts per minute according to data from the report titled *The Scenario of Threats in Latin America 2021.*

Thus, for researchers, it was important that the *MalSEIRS* model could provide valuable information and recommendations on defense and attack mechanisms to organizations. Therefore, the findings from the research were compiled in a playbook that can be offered as a handbook for companies to know what to do in case they are victims of a cyberattack (defense strategies) or what measures can be implemented to preventively attack possible threats of this kind (attack strategies).

Currently, not all organizations have a structure to react to these incidents and understand the nature of an attack, which can characterize it properly and apply the ideal defense mechanism. What usually happens is that reactive measures are taken from the moment the incident happens.

As in the Dane event, Internet disconnection (which would be the obvious choice) is not always the best alternative. "Disconnecting" implies economic or reputation loss for the company, which may even be bigger than the loss caused by the malware. For this rea-

Types of malware cyberattacks

Malware: malicious software that can invade operating systems and cause all kinds of damages (steal information, cause damages to the device, obtain an economic benefit, take control of the device, etc.).

Virus
Designed to copy themselves and propagate to as many devices as possible. They use transport means such as external memories or electronic mail.

Spyware
Their objective is spying and stealing information. They are also capable of downloading other malware and installing them in the device.

Worm
Its objective is to multiply, creating copies of itself and spreading across the network. Unlike viruses, they require no action from the user.

Trojans
Once they enter the system, their objective is to create an access point for harmful software to enter. They are usually disguised as legitimate software.

son, we must think on intermediate defensive strategies that allow for operating in a safer way and, at the same time, keep potential threats under control.

The researchers' proposal for this scenario is to apply different measures, such as allowing the network to only connect new equipment that has been previously immunized. "They must be immunized before acting so they are not exposed to infection. The second thing I would personally do is isolate all the devices infected to prevent them from spreading the malware further. It is also essential to implement immediate 'vaccination' measures in equipment within the network, since once connected they are susceptible to the risk, and also treatment measures for the infected equipment," comments professor Díaz López.

For the project members, it is valuable that mathematics and epidemiology can offer solutions for one of the greatest problems that companies face today.

Keyloggers

They record and follow up on every key pressed in a device without our consent. They may be based in a software or hardware, such as a USB device.

Ransomware

They have a bigger impact, particularly economic, in users. Their objective is data kidnapping to demand a ransom in exchange of not disclosing or destroying said data.

Adware

Designed to show unwanted ads in a massive way. They cause little harm but are quite bothersome for users.

Backdoors

They will allow the cybercriminal to take control of the device remotely. They are commonly used to infect several devices and create a zombie network, or Botnet.

Definitions from:
Guideline of cyberattacks from the Instituto Nacional de Ciberseguridad (National Institute of Cybersecurity) (INCIBE) de España https://www.incibe.es

→ Isabella Martínez, student of the Applied Mathematics And Computing Sciences (Macc) program at Universidad del Rosario.

→ Andrés Felipe Florián, student of the Applied Mathematics And Computing Sciences (Macc) program at Universidad del Rosario.

Both Florián and Martínez, the two main authors, agree that the study is more precise in the field of cybersecurity, combining theory and practice. Both want the foundations to go beyond mathematics – to use concepts from cybersecurity and forensic analysis to be applied to real-life situations and, thus, offer new and practical solutions.

MaISEIRS is one of the most effective tools right now. There are challenges within their work since this model can only be applied on existing malwares and new threats whose behavior may not be predicted by the model appear on a daily basis. It is also very common that organizations do not monitor cyber risks properly, so there usually is no reliable, real-time data that allow making timely decisions.

In this sense, engineer Castillo warns that although these prediction tools are an important contribution to the battle against cybercriminals, they also have limitations, such as showing 'false positive' results. "Some data can be interpreted as malware when it is probably just a software searching for updates. This requires a second revision from another perspective. My having a headache, bone pain and a fever does not necessarily mean that I caught a cold. It may be laryngitis, tonsilitis or even COVID-19," he comments.

Both Florián and Martínez, the two main authors, agree that the study is more precise in the field of cybersecurity, combining theory and practice. Both want the foundations to go beyond mathematics to use concepts from cybersecurity and forensic analysis to be applied to real-life situations and, thus, offer new and practical solutions.

The hyperconnected generation

Smartphones have become the kings of a permanently connected world, where it has become a habit and almost a necessity to respond to virtual reality stimuli. According to a study conducted by Universidad del Rosario, together with other institutions, instant messaging applications and social media produce more impulsivity among the youths.

By Magda Páez Torres
Photos Alberto Sierra

Have you ever thought about how many times a day you check your smartphone? Undoubtedly, smartphones have become part of our everyday life, to the extent that in Spain, according to a study conducted by researchers at Hospital General Universitario de Valencia in 2018, people checked their smartphones 150 times a day. The Digital 2022 Global Statshot report stated that in Colombia, a person spends an average of 3 hours and 46 minutes facing the cellphone screen, connected to social media.

That is because these devices combine the chance of communication with several entertainment options, shopping, and accessing information in real time. All of this has led this generation, especially children and young people, to adopt an online lifestyle, where being connected seems to be more than a necessity.

How dependent has contemporary society become on smartphones? What are the consequences of the close and continuous use of these devices?

Precisely within the framework of these questions, Professor Óscar Robayo Pinzón, of the School of Business Administration of Universidad del Rosario, together with a group of researchers, published the study entitled *El uso excesivo de teléfonos inteligentes y aplicaciones_nos hace más impulsivos? Una aproximación desde la economía_del comportamiento.*(Does the Excessive Use of Smartphones and Apps Make Us More Impulsive? An Approach from the Point of View of Behavioral Economics).

From the point of view of behavioral economics, a discipline that seeks to understand the effect of emotions and psychological biases on economic and financial decisions, academics set out to assess the relationship of young people with their smartphones: frequencies, preferences, and motivations or impulses to stay connected. "What we found is that there is a correlation between making impulsive decisions and a greater dependence on smartphones, perceived from the users," remarked the researcher Robayo. That is to say, there is a pattern of impulsive selection when it comes to using the cell phone, characterized by obtaining immediate positive actions such as likes, views, or reactions from other users.

The study was conducted with 20 students for 28 days. Through an application valid for Android and iPhone, the usage time of the apps was monitored individually for each of the 20 participants, resulting in 560 logs collected on a weekly basis. The researchers did not have direct access to the devices, only to the Excel reports generated by the app.

The consolidated log showed a total of 619 different applications, with an average of 68.6 apps installed on each device.

A detailed analysis showed that the most used apps by the participants were WhatsApp, with 68.88 minutes per day; Instagram, with 36.64; YouTube, with 33.64; Facebook, with 19.53; and Chrome, with 18.20 minutes on average. It is important to point out that this record was taken prior to the onset of the COVID-19 pandemic, when the use of mobile devices skyrocketed, which may have changed the usage habits of the apps.

The study results show that people who are more impulsive prioritize the use of smartphones without realizing that this may have negative consequences in the medium term, which stems from the normalization of phone use in working, academic, and family spaces.

"It seems that it's okay for you to check your smartphone many times a day, and no one socially punishes you for it. As a result, people check their phones between 90 and 150 times a day, depending on the country and where the tracking comes from.

Every time we check our phone, we may be a bit impulsive, i.e., we can't help checking it every time it vibrates, every time a notification rings; it's the impulse to see what happened, who contacted me," says the expert.

This statement is complemented by Sandra Rojas, a professor at the Universidad Nacional, who was also part of the research team. "The prolonged use of any source that may cause a habit is going to increase the probability of acquiring an addiction and making it more difficult to leave; for example, addiction to gambling, to food, to alcohol, to drugs... The only difference is that the use of virtual networks is socially accepted. Therefore, what we tried to show in the study is that although nowadays it is necessary to have a social network or to use a smartphone, it somehow generates greater impulsivity and addiction to use. The more time you are exposed to the stimulus, the more addictive it will be," she explains.

This is precisely what young people from different backgrounds account for. For Juan Carlos*, a high school student, the smartphone has become part of his routine. "I use it all day long. If I could, I'd be online 24 hours a day, because it's a form of entertainment for me. My life would be awful without my cell phone, because it distracts me. I can chat, do many things," says this teenager, whose favorite apps are Instagram, Tik Tok, Facebook, and WhatsApp.

Laura Valdivieso*, a university student, holds a similar opinion: "The cell phone has a great influence on my life, in the sense that I work 'there', I am in contact with important people to me and I also socialize. So, this device is essential in everyone's life because it means being in contact with someone without actually seeing him or her every day," the young woman emphasizes.

They are part of the 81.3 per cent of the total population that uses social networks in Colombia, that is, 41.80 million people, according to 2022 data from DataReportal. .

Emotional impacts and other variables

Different studies have also delved into the potential consequences or collateral impacts from the prolonged use of smartphones, as was contextualized by the research conducted by Professor Robayo. "In many countries, there seems to be a link between a high use of social network applications and negative consequences for the wellbeing and health, such as insomnia, anxiety, depression, and self-esteem and self-image issues in teenagers and young adults. There is a dissociation of one's own body image to the extent that these young people are more exposed to these filtered contents," says the Rosario researcher.

Another key point addressed by the research is the fear of being disconnected from virtual reality. "In addition to whether or not I have likes or views, there are new constructs such as nomophobia, i.e., the phobia of not checking the phone or the phobia of not having a cell phone; the fear of missing something that is happening on the networks," (*FOMO, fear of missing out*) explains the researcher.

For example, in a recent study by the same team of researchers, which is currently under peer review, an exper-

Preferred Apps by young people

Top 5 according to the percentage of use

1 27.7%

2 14.7%

3 13.5%

Source:
https://doi.org/10.1016/j.heliyon.2021.e06104

"We found there is a correlation between making impulsive decisions and a greater dependence on smartphones, perceived by the users": Óscar Robayo Pinzón, professor at the School of Business Administration of Universidad del Rosario.
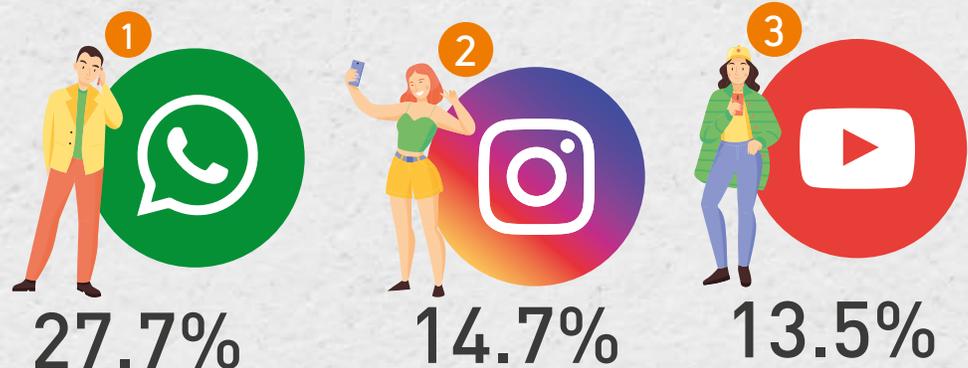
iment in which fictitious rewards were used to evaluate the behavior of users was conducted. The users were offered money in exchange for spending less time on their social networks. "Something like, Would you stop using your social networks for 30 minutes, if you got 1,000, 2,000, 5,000... Colombian pesos? In effect, as we reduced their time on social networks, they asked for more money in return."

The research addresses the fear of being disconnected from virtual reality.

Upcoming solutions?

Faced with this scenario, the imperative question is which solutions do we have at hand. In this regard, researcher Óscar Robayo proposes self-regulation. "There is no clear solution because there is no social recognition of the fact that something is going on. The situation has been normalized, even more so since the pandemic, which accelerated the adoption of platforms, allowing us to be connected and continue work-

ing. My option would be to conduct a kind of self-regulation, as is practiced with environmental issues where there are incentives to use fewer cars and promote the use of bicycles. We have to think that the change starts with us, to be self-conscious about not using the phone, to use it a bit less in exchange for incentives," he said.

Similarly, researcher Sandra Rojas called for family to set rules or agreements to regulate the use of cell phones. "When it tends to become obsessive, compulsive, or addictive, a habit can be controlled in the core of the family, for example, by creating rules, especially in shared moments: dinner, breakfast, or those spaces where a dialogue should prevail.

It is a matter of agreeing on rules to avoid the use of social networks, or the telephone itself, and to be present in the here and now," she says. Although at the level of governments and legislation the road is even longer because of the implications this has in terms of individual freedoms, academics agree that it is necessary to look for options to gradually encourage disconnection in certain environments, with parallel stimuli, so that people gradually regulate the use of mobile devices by personal choice and so that the online generation can take a break and address the demands, benefits, and challenges of a tangible reality. ◘

*The names of the students were changed since they are minors.

4 7.9%

5 7.3%

First impressions are not always correct
Math helps measuring
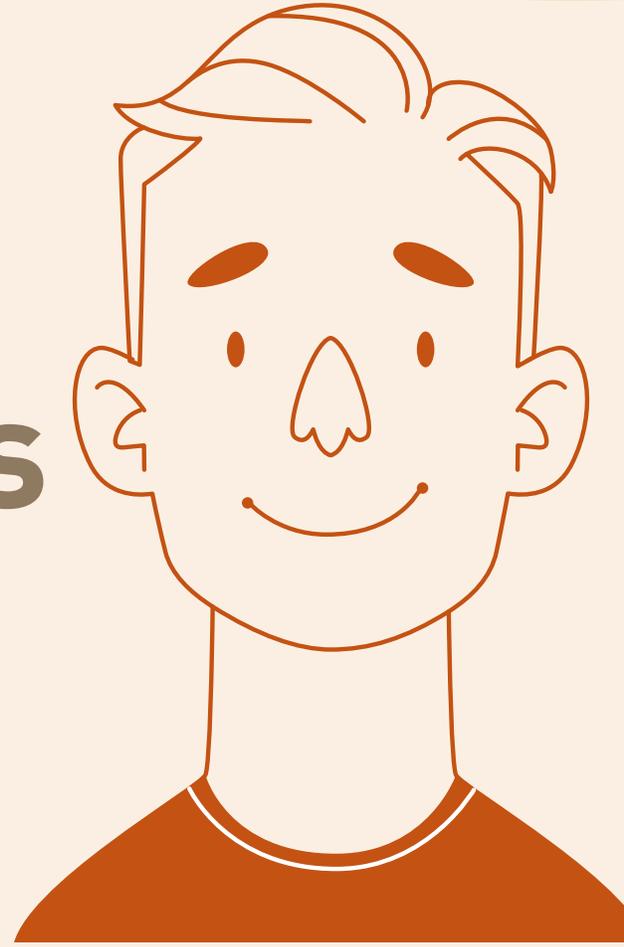
The use of mathematical models in psychology has become a key tool for the analysis of human behaviors. Sergio Barbosa, Professor of the Psychology Program at Universidad del Rosario, decided to identify a predictive model that best reflects human reasoning when judging moral attitudes.

By Camilo Calderón Acero
Photo Milagro Castro
DOI https://doi.org/10.12804/dvcn_10336.36847_num6

In 1998, sitting U.S. President Bill Clinton was entangled in a political-sexual scandal when an out-of-wedlock affair with one of his White House interns was revealed. His favorable image among the citizenry changed radically and put his own term at risk. The interesting aspect about the case is that the public's attention was not focused on his performance in the position but on a moral aspect.

Many disciplines have been concerned with pondering and analyzing human behavior and how it should be based on ethics and morals, like in philosophy or sociology. Likewise, **moral psychology** has deepened its insights into understanding not only what we consider moral but also how human beings elaborate and vary (update) their judgment about what is right or wrong behavior.
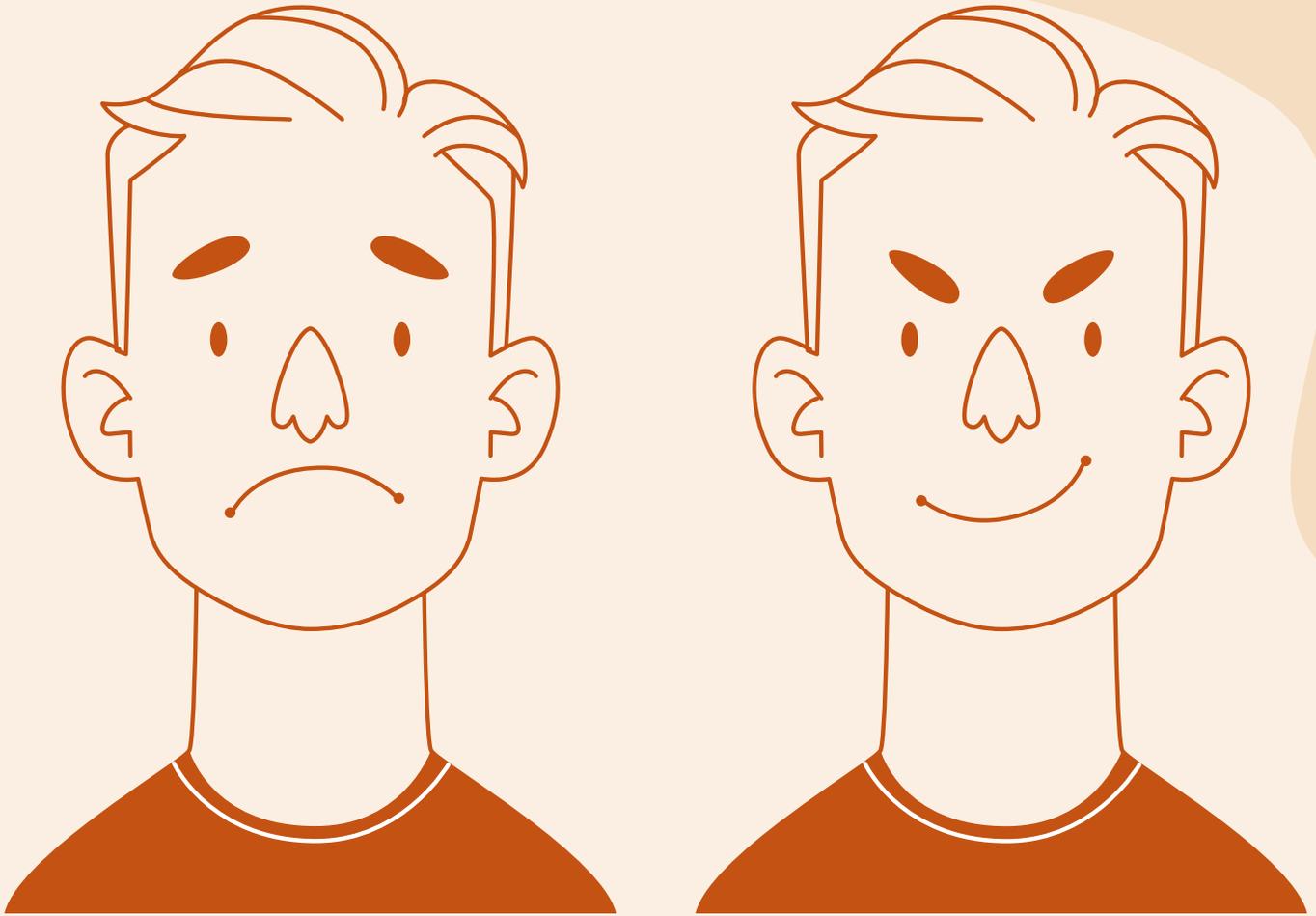
moral behaviors

To obtain a more accurate assessment of this phenomenon, <u>Sergio Barbosa</u>, Professor of the Psychology Program of the School of Medicine and Health Sciences of Universidad del Rosario, conducted research on the subject. He not only sought to delve into the way we attribute moral traits and how these traits are updated over time, but the research also showed that this phenomenon can be adequately captured by predictive models such as Bayes' theorem and similar models.

This allows to calculate the probability of occurrence of one event based on new information known from other related events.

For example, the probability of a rainy day may be 30 per cent, but that changes if we also consider that it is winter and that the area is being affected by the La Niña phenom-

↑
To be able to create a predictive model that could anticipate what people would say when faced with certain information or moral attributes, the first thing to do was to set up the parameters of both positive and negative attributes.

enon. Each new piece of information is likely to modify and update the model.

According to Barbosa, "as we give people more information, they should change their beliefs." That happened in our experiment: people did not stick to their first impression. The interesting thing was that some participants would update their beliefs following a Bayesian model, especially for positive attributes. But when we added negative attributes, i.e., behaviors they considered to be those of a bad person, the models were mathematically simpler, based on averages.

Averages are faster to process, but they leave out very different values. For example, a student may have four scores - 4, 4.5, 1 and 3.7 - and their average will be 3.3.

This is far from being the student's actual performance because averages are highly hypersensitive to extreme values, high or low. Only having one very low score (1) affects the final value. With moral traits, this would be equivalent to making generalizations about someone based only on certain behaviors.

The interest in involving the exact sciences in this type of social science research is linked to the use of more precise methodologies, the results of which can be more contrastable. "We can define how the psychological process to be studied operates in mathematical terms and confront it with what happens in real life. In this case, we use it for the attribution of traits related to morals, vices, and virtues of the human being," emphasizes Professor Barbosa.

In the field of psychology, Bayesian models have been used to explain memory and perception phenomena, language acquisition, word segmentation, and interpretation of complex language, among others. However, this is one of the first studies that use those hypotheses for the analysis of moral judgments.

From the point of view of William Jiménez Leal, associate Professor in the Department of Psychology at Universidad de los Andes and also director of Barbosa's Ph.D. program, which was the origin of the research, "the use of probabilistic models allows us to establish a dialogue with other disciplines, such as mathematics, economics, or computer science, something that would be unlikely otherwise. The kind of predictive modeling makes it much more feasible that professionals in these disciplines are receptive to our research studies," he claims.

How to measure a certain behavior

In order to create a predictive model that could anticipate what people would say when faced with certain information or moral attributes, the first thing to do was to set up the parameters of both positive and negative attributes.

For this purpose, they used open and closed questionnaires with psychology students; their answers allowed them to extract more than 100 morally relevant adjectives.

This sample was screened to eliminate synonyms, colombianisms, and offensive terms. Eight adjectives (four virtues and four flaws) arose from this screening process to finally reduce the adjectives most consistently classified as morally good or bad to four.

In the next stage, another group of students were surveyed to identify the most related behaviors; for example, those that would make them think of a person as dishonest. As in the first stage, more than a thousand terms were screened and with a final result of around 100, the final questionnaires were used with another group of people. At this point, a fictitious character, *Andrés*, was created to portray the classified behaviors.

The research study *"Different algorithmic models underlie virtue and vice attributions"* was approved for publication in Collabra magazine: Psychology journal of University of California, an open science Q1 journal.

"With all the information they had about *Andrés*, we asked respondents to rate from zero to one hundred how good or bad person they considered *Andrés* to be, and that is the data we compared with the predictive model," explains Barbosa. "What the model did was react to each of the situations we introduced to the respondents."

The parameters of the model were given by the definition of prior probability (how much of this trait do you think a person might have?) and conditional probability (how much do

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"We can define how the psychological process to be studied operates in mathematical terms and confront it with what happens in real life. In this case, we use it for the attribution of traits related to morals, vices, and virtues of the human being," emphasizes Professor Sergio Barbosa from the School of Medicine and Health Sciences of Universidad del Rosario.

you think a person displaying this behavior might have such a personality trait?). In the end, these model responses were cross-checked with the results of the student questionnaires.

The math of a moral judgment

The first comparative results were slightly different from expected. In his initial hypothesis, Barbosa had stated that the cognition process executed when signaling moral judgments would be updated following a neutral Bayes' Law or similar model, where people would not stick to their first impression of someone but would update it following Bayes' Law.

However, the researchers found that the type of model used would vary based on the information they received from *Andrés*. This apparently simple distinction became more complex when the respondent was faced with seemingly opposite behaviors. This incongruence between a person who at the same time could have two opposite attributes in different consecutive questions showed that the respondent often chose Bayesian models, the more complex ones.

According to Professor Barbosa, this happens because "when the information is more congruent, it is easier to be interpreted, since it all goes to the same side. When I have more

incongruent information, the more I use a Bayesian model . These models tend to be more accurate, but are more cognitively expensive. I would not strive to use these complex models when I have simple, easy-to-interpret information. I tend to use Bayesian models when the information is complex and I must make sense of seemingly incompatible elements."

For example: How can I state whether *Andrés is* a good or a bad person from my knowledge that he likes cooking, he spends a lot of money on gifts but also usually parks his car in handicapped spaces? What about if he also 'queue jumps' but treats the elderly with respect?

According to [Juan Samuel Santos](#), professor of the Faculty of Philosophy at the Pontificia Universidad Javeriana, this sort of study is useful to the extent that it allows us to understand and be aware of mistakes when making moral judgments, especially when they are influenced by particular circumstances. "Flesh-and-blood people often make mistakes or do bad things, and applying a simple model to judge only certain behaviors can lead us to misjudge the actual person," he says.

It is worth mentioning that, although mathematical models of this style allow for establishing aggregate trends, as in the case of this research, it is natural that they have a considerable margin of error when analyzing the decisions of specific individuals.

Scopes and risks

Reflection on human behavior is becoming increasingly important in academia, given the impact of external elements that can determine changes in points of view. Every day, cases of disinformation and media slander based on a video, an image, or a text in social media are widespread. In the public debate, it is even quite common to hear the term cancellation culture, which is based primarily on the rapid dissemination of judgments on the behavior of others.

In scenarios like that, the use of predictive models can be a very useful tool to better understand how the aforementioned phenomena operate. As psychologist William Jiménez Leal points out, "we are exposed to constant manipulation by social media that shape moral opinions. As long as we understand which are the things that are to be manipulated, we can make truly autonomous decisions."

New challenges also arise from this, as a predictive model can be created that is useful in detecting the nerves to hit and how to provoke indignation or favoritism towards a person or social group.

According to Professor Santos, manipulation is an inevitable condition in the discovery of new knowledge, but it can also be counteracted. "If someone wanted to manipulate the image of a public person to damage them, they would show situations in which that person appears negatively more often. This would lead the audience to use simpler models and lead to conclusions about that individual's behavior that are quicker and more susceptible to error," he asserts.

Hence, further study of predictive models in moral psychology can be applied to updating beliefs in matters of social

Bayes' theorem and similar ones allow us to calculate the probability of an event occurrence based on the new information known from other related events. For example, the probability of a rainy day may be 30 percent, but it changes if we also consider that it is winter and that the area is going through the La Niña phenomenon. Each new piece of information can modify and update the model.

reconciliation, xenophobia, or any kind of discrimination, phenomena that in countries like Colombia are still strongly present and that tend to be exacerbated in times of strong social commotion.

"We would be interested in modeling how people distinguish between *'I was told'* and *'I witnessed it.'* *'I was told about it by a source I trust, a neutral source, or a source I don't trust.'* This is one of the most important variables in today's communication, where people tend to only listen to certain sources, those that are more reliable, and discard the others. We are interested in going deeper into how this works in mathematical terms," emphasizes Barbosa.

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New challenges arise as a predictive model can be created that is useful in detecting the nerves to hit and how to provoke indignation or favoritism towards a person or a social group.

From his perspective, Santos urges us to consider that other research in the field of moral psychology has found limitations, because "human beings are rational, but bad calculators; and although they should update their beliefs according to theorems such as Bayes', the human mind does not actually work that way."

This perspective can also reduce errors when it comes to research and to further deepen their understanding.

This is why Professor Barbosa's work in the Psychology Program at Rosario will keep on studying how moral judgment updates work, especially for complex issues. And to achieve this, the joint work that he develops with his students within the Research Incubator of Moral Psychology and Decision Sciences is fundamental.

Within his initial interest in 2016, when he began this study, the effect of the peace process on Colombian society was absolutely present, and it is an issue that is still very current today. The challenge of reconciliation will continue to be a central issue in the country for the next few years, and to understand it, to better understand its development, the contributions by various social disciplines are essential. ◻

6

Leadership
and social
innovation

"Robins" Teaches Spanish to Deaf Kids

← Robins is covered with plush because children usually feel more attracted toward soft textures they can touch and that are similar to their favorite toys.

An interdisciplinary group of Engineering and Health Sciences from the Universidad del Rosario created the first interactive device to support children with hearing disabilities during their literacy learning process in a playful way. It is almost ready, and it is expected to be easily accessible to its target population.

BY Lina María Leal Villamizar
Photos Óscar Perdomo
DOI https://doi.org/10.12804/dvcn_10336.37600_num6

According to Instituto Nacional para Sordos (National Institute for the Deaf - Insor is the Spanish acronym), in 2020, 554,119 people with hearing disabilities were registered in Colombia, out of which only 42.6% school-age children (ages 5 to 16) were enrolled in the educational system. In other words, most Colombian deaf kids and adolescents do not receive formal education at an academic institution.

Why does this happen? Speech pathologist Rocio Stella Molina Bejar, professor from the School of Medicine and Health Sciences at Universidad del Rosario with a Master of Sciences degree in Disabilities and Social Inclusion, claims that the reading and writing learning process is difficult for the deaf population since it mostly depends on whether hearing loss was discovered at its early stages. Even so, in most cases, children end up communicating only through sign language, either Colombia's own or the sign language that they have created within their family or social bubble, without properly learning to read and write Spanish.

Molina Bejar explains that sign languages are not universal. Instead, they change from culture to culture since each culture may have their own particular expressions for constructing ideas, just as it happens with any spoken language. Likewise, many families with hearing parents and deaf children build their own internal communication systems.

However, when children first go to school and start learning to read and write, they discover, for example, that sign languages do not use pronouns or plurals, while written (and oral) communication does. For this reason, according to Molina, who has been working with this population for over 20 years, literacy generates "conflict" for these students.

Within this context, Karen Aguia Rojas, a teacher at the Occupational Therapy program, warns that the problem is bidirectional: "People without hearing disabilities lack the elements to be able to talk and communicate with that specific population. We are asking deaf kids to learn Spanish, but we are not learning sign language. Then, what are we doing to communicate with them?"

Joint Social Innovation Work

A group of researchers, including Molina and Aguía, have assessed this situation with a magnifying glass. This process was pioneered by Oscar Julián Perdomo Charry, a professor from the Biomedical Engineering program at Universidad del Rosario, who considered building an Artificial Intelligence (AI) device for educating vulnerable populations.

"We observed different virtual assistants on the market, but they were all voice activated, such as *Siri* or *Alexa*, among others. We walked a mile in the shoes of someone who cannot speak and we realized that these assistants are not functional for them," explains Perdomo, who along with Hernan Bernal and Alvaro David Orjuela, members of the Edu-Braille group, decided in 2021 to form a team aimed at finding possible technological solutions for the hearing-impaired population.

As engineers experimented in the labs with devices based on cameras and electronic cards, other researchers from different areas, such as Health Sciences, Occupational Therapy (Karen Aguía Rojas), Psychology (Sara CaDavid Espinha; Oliver Muller), and Speech Therapy (Rocío Molina Bejar) also started to heed the call. Even though these disciplines seemed very different from other, they all shared the same common ground: "Technology changes people's lives. That was the rationale that brought us all together; being able to see how these innovations can help people with disabilities is wonderful," says speech therapist Molina.

Hence, everyone contributed to the success of the project. Engineering, led by Professor Perdomo and Hernan Bernal, a Biomedical Engineering laboratory assistant, continued

Robins was the only Colombian *University Team* finalist at the 2021 *OpenCV AI Competition*, which was sponsored by Microsoft Azure, Intel, and OpenCV. This is the world's largest artificial intelligence competition, wherein researchers demonstrated the capabilities of both Colombia and Universidad del Rosario in this area of knowledge.


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Professor Óscar Julián Perdomo Charry, from the Biomedical Engineering program at Universidad del Rosario, considered building an artificial intelligence device aimed at educating vulnerable populations: Robins.

unravelling the programming and mechanical aspects to continuously improve the articulation of the prototype.

Meanwhile, the Health Sciences team studied the requirements for this device and wondered, What can be the best educational strategy to challenge? What does a child require and what can they do? What are the environmental elements needed to improve or maintain the child's motivation and what are the child's own elements? What are the instruments available to assess the child's learning process or motivation?

Based on this, throughout 2021 and 2022, this team conducted a rigorous study aimed at determining what has been done in the world in this regard. As part of their results, they discovered that although there are supporting devices for the deaf community, they need to be imported and their price is very high. In Colombia, there is little social innovation arising from Engineering and Health Sciences in the development of proprietary technology for deaf people.

Furthermore, the team collaborated with two Colombian institutions that treat children with hearing loss: the ICAL foundation for deaf children (ICAL) and Colegio Filadelfia, a Colombian school for the deaf. This helped them to better understand their learning needs and challenges faced by Spanish language teachers. In addition, they were able to learn more about existing pedagogical strategies for working with this particular population.

What is "Robins"?

Together they created a functional assistant named *Robins,* an interactive robot for deaf children. This technology supplements the reading learning process with an appropriate strategy specifically designed for children with hearing disabilities. For instance, the team programmed automatic facial expressions and sign language recognition into the device to ensure proper interactions.

According to Perdomo, *Robins'* structure was entirely printed using a 3D printer at the Universidad del Rosario, which means that it is affordable, portable, and customizable to individual needs. "The hardware comprises printed parts that can be adjusted depending on the needs of each particular user," the researchers explain.

The initial prototype is a vertebrate animal that protects and holds a depth camera, a touch screen, and an electronic card that automatically recognizes facial expressions and the sign language used by deaf children based on artificial intelligence algorithms.

Its upper structure (head) holds three motors for its eyebrows, cheekbones, and mouth. In addition, the robot's eyes have two color LED screens and an additional screen used to customize its eyes and their movement. Aguía comments that "adding eyes and eyebrows to the robot was critical because they are the main components used for transmitting emotions."

In addition, Robins is covered with plush because according to the Occupational Therapy and Psychology researchers, children usually feel more attracted toward soft textures they can touch and that are similar to their favorite toys. The team is still thinking about whether Robins should be shaped into a dog, a teddy bear, a cat, or a koala bear.

In its belly, *Robins* also has a camera that detects what the child is doing and a screen that projects images. The idea is that the robot can interact based on what it captures. "We have recorded videos of people signing the alphabet so that the 'dog' may learn to recognize certain signs as letters of the fingerspelling alphabet, the manual alphabet used by

deaf-blind people," comments neuropsychologist Cadavid Espinha, who adds that the robot may develop different phases at increasing difficulty (several sessions each) throughout the reading and writing teaching process.

Initially, the robot displays an image that corresponds perfectly with the text that is included, and the child must mark one of the letters of the word. For example, the robot displays the image of a bee along with the corresponding Spanish word ("abeja") underneath. The first letter of the word will be displayed in red.

The student will have to fingerspell the letter A. Thereafter, the child will be prompted to sign the remaining letters of the word.

Later, as the following phase, the robot will display signs recorded by a deaf person, so the student can work with more abstract words, such as "freedom," "justice," etc. Again, the corresponding word in Spanish will be displayed underneath, and the student will be prompted to fingerspell the letter displayed in red.

In the future, the research team hopes that the technology consolidated in *Robins* will be able to develop other tasks, such as helping children exercise and even interact in groups, always hand in hand with education, its most innovative function.

→ Initially, the robot displays an image that corresponds perfectly to the text that is included, and the child must mark one of the letters of the word.

Finally, the level of difficulty increases as the number of images and signs also increase, and the children start identifying more than one letter in a word. "The challenge is for each deaf boy or girl to start associating what they see (the images) with fingerspelling each letter or word," comments Cadavid.

The child will sign after each exercise, and the robot will immediately provide feedback with gestures or images: "Good!" or "Are you sure?" or a smiley face for correct answers and a surprised face whenever the answer is wrong. The robot will also display fun-filled animations and use a point-based system to encourage the child to obtain a prize or reward, such as playing with his/her favorite toy.

An assistant for learning to read and write

However, considering that all of this could also be done by a human, what advantage does the robot offer? Cadavid responds that "technology constitutes that extra mile or added value to motivate children since the learning process usually generates some resistance and with this technology, it can become more stimulating."

Professor Oliver Müller, from the Psychology program and who has previously worked on reading projects with deaf children, is also part of the team and points out that the robot seeks to foster motivation toward learning in a more playful way: "Not as your typical elementary education teacher but as an additional element, one that provides feedback with facial gestures and games."

The researchers plan to have *Robins* measure children's motivation through data collection instruments applied before and after using the technology. "We expect the robot to act as a mediator that can foster the child's motivation toward learning," says Professor Aguía.

For example, one of the tools measures 14 possible behaviors, among which are the child's imagination about new things, his/her proposed strategies, or his/her level of curiosity, among others. "Furthermore, we are working on how we finetune the activities in terms of difficulty: if an activity is very simple, it will not motivate the child, but if it is extremely difficult, it will generate frustration," warns Aguía. "There has to be a match between the child's abilities and the characteristics of assistive technology."

The researchers acknowledge that while the robot is almost ready for pilot testing in the real world, it has not yet been tested with children. These tests will be conducted during the first academic semester of 2023. This will also allow researchers to conduct a first statistical analysis with data. Müller indicates that the instruments will determine whether the robot is fulfilling the expected motivator role. "Otherwise, *Robins*' appeal (its ability to generate attraction) would have to be increased," he concludes.

Although this could happen, speech pathologist Molina is confident that there will be positive changes. For example, she believes that considering the robot's potential as an innovative and easily accessible technology, its daily use will surely improve the quality of life of deaf people. In fact, the initial phase of the project obtained recognition by becoming the only Colombian finalist in the University Team modality at the 2021 OpenCV AI Competition, a global competition sponsored by Microsoft Azure, Intel, and OpenCV (Open Source Computer Vision and Machine Learning Software Library).
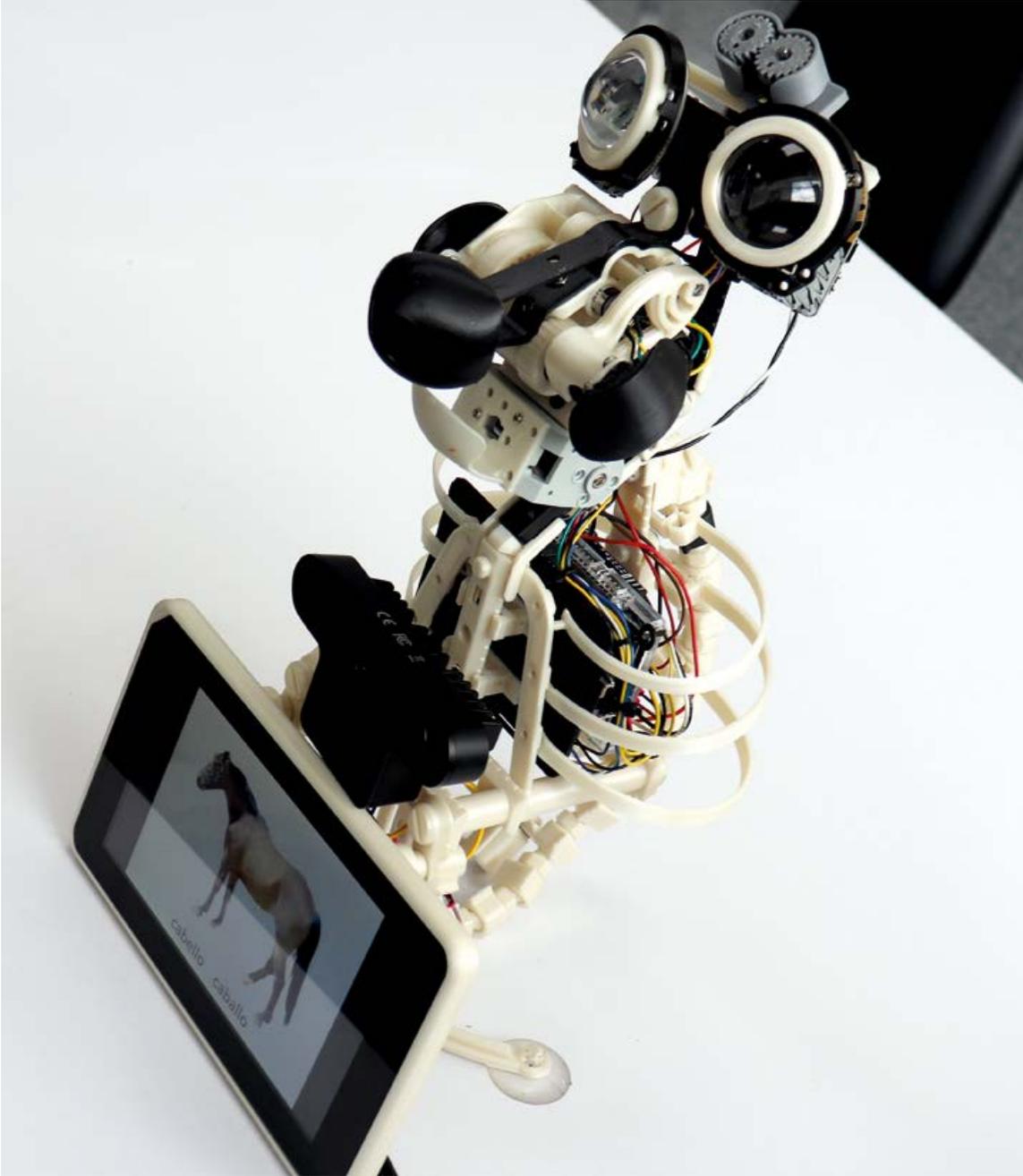
This is the world's largest artificial intelligence competition, wherein researchers demonstrated the capa-

bilities of both Colombia and Universidad del Rosario in this area of knowledge.

An Open-Access Technology

The research team wants the construction plans to be freely accessible so that anyone can print the device in a 3D printer and assemble it. According to Müller and Perdomo, there are some very good social robots on the world market, but they are also very expensive because they are purely commercial products. They conclude as follows: "This project has taught us to become more empathetic."

In the future, the research team hopes that the technology consolidated in *Robins* will be able to develop additional tasks, such as helping children exercise and even interact in groups, always hand in hand with education, its most innovative function. Moreover, Cadavid emphasizes that "even when there are plenty of social robots, very few contribute to the development of reading skills in deaf children. In this sense, we could say that *Robins* is quite special, perhaps even 'unique' since it motivates children with this disability to approach the universe of the letters of the alphabet in a more playful way."

The right to memory

Close to the sixth anniversary of the signature of the Peace Agreement with the FARC, the creation of the Museum of Memory in Colombia is still pending. Such establishment has been at the heart of political disputes and triggered a series of setbacks causing discomfort among the victims, according to an investigative analysis by Universidad del Rosario.

By Magda Páez Torres
Photos Alberto Sierra, Milagro Castro, Juan Ramírez
DOI https://doi.org/10.12804/dvcn_10336.36801_num6

Gladys Durán lost her brother and her nephew, on a day in January, 22 years ago, while they were making a living by carrying groceries to Bosconia (Cesar). Since then, she and her family face a never-ending calvary, crammed with questions that, up to now, have not been answered. "Because of the need for getting crumbs of money, they left and lost their lives. We want to know what happened to them, so we can, at least, recover their bodies. For the time being, there is no information, they have been swallowed by the earth," she states in a begging tone.

Just as she does, thousands of families in the country live in incomplete grief; they eagerly look for answers about the destiny of their beloved ones, who, rather than by the earth, were swallowed by violence. According to the final report by the Truth Commission, presented on June 28, over 400,000 people were fatal victims of the armed conflict in Colombia between 1986 and 2016, without taking into account kidnappings and forced disappearances.

Priest Francisco de Roux, president of that body, puts it in other words: "It would take us 17 years to offer a minute's silence to each victim." Today, as the Peace Agreement with the FARC is under implementation, the truth seems to be a balm for the poorly cured pain of so many Colombians who expect to give peace to their hearts by retrieving the bodies of their beloved ones, tracking their last movements, and leaving flowers at any vacant lot where they have exhaled their last breath.

Precisely, to go deeper into that structure implied in the right to memory and truth, professors Ana Guglielmucci and Esteban Rozo, from the Group of Studies on Identity and the School of Human Sciences, Universidad del Rosario (URosario), analyzed the advances and obstacles that came along for the creation of the Museum of Memory in Colombia, a place that will recount the events of the armed conflict, with a view to symbolically remedying both the victims and the Colombian society.

"We decided to observe how this future museum was getting in motion and the transformations it had

Thousands of families in the country live in incomplete grief; they eagerly look for answers about the destiny of their beloved, who, rather than by the earth, were swallowed by violence.

gone through because of the changes the Centro Nacional de Memoria Histórica, CNMH (National Center for Historical Memory) was undergoing, what situations were happening in that institution, that was going to take into their hands what has been constituted as a national memory of the armed conflict," Professor Ana Guglielmucci ascertains.

The road to the truth

Today, Colombia has a Comprehensive System for the Truth, Justice, Compensation and No Repetition, created by provision 5 of the Peace Agreement. This structure is made of the Truth Commission, CEV; Jurisdicción Especial para la Paz, JEP (Special Jurisdiction for the Peace); and Unidad de Búsqueda de Personas Desaparecidas, UBPD, (Unit for the Search of the Disappeared). All of this add up to the work of the National Center for Historical Memory, CNMH, whose accumulated results should be handed to the Museum of Memory. However, as the investigative work done by the scholars of URosario summarizes, the creation of this Museum, which was announced on April 9th, 2015 by President Juan Manuel Santos and the then director of the CNMH, Gonzalo Sánchez, it has been a road laden with difficulties, so the process has been stalled.

The greatest controversy broke out with the government change in 2018, during the four-year administration of president Iván Duque, with the appointment of Rubén Darío Acevedo as director of the CNMH, who has been strongly questioned because he would not recognize the existence of an armed conflict in the country.

"Denying the very existence of an armed conflict is problematic. That implies an act of epistemic violence, that is to say, it is assumed that everything was a conspiracy by the guerrillas or the terrorists that intended to put down the order, the State and so on; they are denying, for example, the victims of State crimes, of the armed forces, and a number of consequences come along after those acts," Professor Esteban Rozo argues.

That was just the triggering event of countless differences that would later get unleashed. A series of changes were made to the script that had been designed by the previous administration, which had been agreed upon with the victims.

"We did some research work in the archives and found that the military, other social and intellectual sectors which are sympathetic to the project of the Central Democratic party, among them former director Acevedo, were implementing an agenda in the CNMH

and putting their own policies of memory into practice," the researcher points out.

"They started to roll like a loose gear, to compose a script with a narrative that is contrary to what had been stated and agreed upon; they exploit that basic consensus from the inside, without sharing it with the JEP or with the Truth Commission, because, at the end of the day, they do not believe in what they are doing," he adds.

It is worth highlighting that, in 2013, the publication of the report: "Stop it: Colombia, memories of war and dignity" by the CNMH had already shown that controversy, since it exposed the Military Forces as responsible for selective murders, extrajudicial killings, massacres, disappearances, and forced displacements. Organizations such as the Asociación Colombiana de Oficiales en Retiro (Colombian Association of Retired Officers, ACORE) manifested their rejection as they deemed the report was an insult. And even many sectors requested the

The country is undergoing a process of social learning, which involves all actors. It was more than half a century of incubating violence, hatred, pain, and division.

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"The museum is in charge of broadcasting, among other issues, the findings of the Truth Commission of spreading a narrative of the armed conflict that may do justice to the claims of the victims"— Esteban Rozo, professor at the School of Human Sciences, of Universidad del Rosario.

National Government to withdraw it, but the claim was disregarded by the CNMH.

Professor Guglielmucci considers this type of disputes damage the truth. "What we are seeing here are government policies, not State policies, as a memory policy is supposed to be grounded in the remedy for the victims, due to all the violations to human rights. In general, this sort of museums seeks to achieve some learning from these experiences, instead of standing exclusively from the perspective of one of the actors. This is about elaborating narratives of the truth, but above all, boosting the recognition of the damages caused to them, and thinking about the role of everyone in the conflict, as part of a society and of the State, which should guarantee the rights," she emphasized.

Another turning point towards the creation of the Colombian Memory Museum was the organization, carried out by the CNMH, of the exhibition *Voices to transform Colombia*, a traveling fair about the armed conflict, conceived with the participation of different groups of victims. The idea of a "living museum," led by curator Cristina Lleras, started facing problems in 2017 due to the measures implemented at the end of Juan Manuel Santos' government and were increased with the change in the direction of the CNMH by the end of 2018.

The study explains, quoting the then rector (President) of the Museum of Memory, Rafael Tamayo, that "Acevedo erased the introductory texts of the exhibition, he changed the contents of the printed flyer and eliminated words like "war," "spoils," "resistance" and "resilience" and that, additionally, "in Cali, he intended to erase the whole chapter on the Patriotic Union," which finally did not happen, seemingly because the team opposed to that. Nevertheless, the research by Universidad del Rosario reveals that they erased the image of Pedro Antonio Marín, nicknamed Tirofijo, from one of the posters as they judged it as "proselytizing and pamphleteering."

Due to incidents like those, groups of victims like Asociación Minga and Madres de Falsos Positivos de Soacha y Bogotá (Mothers of False Positives from Soacha and Bogotá, Mafapo) withdrew the documents and objects they had contributed to the CNMH, as recorded by the investigation.

The armed conflict took a toll of over 400,000 fatal victims in Colombia between 1986 and 2016, not counting kidnappings and forced disappearances.

The disagreements were so many that the JEP enforced temporary preliminary measures on the exhibition (File 058 on May 5th, 2020) to preserve it. Although the CNMH submitted an interlocutory appeal, it was rejected.

"I think the JEP intervenes precisely because it is a way of saying that there are Colombian State guidelines that must be followed, and that the agreements made with society cannot be bypassed, counting on the international cooperation which has invested a lot of money to these kinds of policies and to compensate the victims of the conflict. Breaking constantly the accords –the collective work– causes damage, because the trust in this institution gets breached," as specified by researcher Guglielmucci.

Lessons learned amidst the pain

Today, as the country managed to reincorporate a good number of the oldest guerrilla in the continent and sought to heal the wounds, on the way to a post-conflict scenario, Univer-

sidad del Rosario's researchers agree on the need to recognize responsibilities to get to stop the spiral of violence.

"These hegemonic narratives recounting the past are connected with the present, with the capacity to build our lives in the future, and that is why they are important. For that reason, we want to show the relevance of the public policies regarding memory and these museums, of setting some narratives that are not just discourses, or statements without any kind of power, but as tools to legitimize other policies, like land restitution," Guglielmucci comments.

This thesis is complemented by professor Rozo, who claims that "depending on how these narratives on the past are told, the positions are taken, the very contents and all the topics related with the truths about the armed conflict in Colombia, we will stand some chances, or not, of building a different future."

Although a lot is said about reconciliation amidst the effort for peace, Guglielmucci underlines that it is a progressive process and that the first step for the victims is to find answers.

"Unlike the way these processes were elaborated in other places, like Argentina and Chile, where the victims' organizations have given more importance to the truth than forgiveness or reconciliation, I think the report by the Truth Commission and the hearings conducted by the JEP are going to enable, precisely, the achievement of this alleged reconciliation process in a much more realistic way.

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"We are seeing government policies, not State policies, whereas a policy of memory must be grounded on remedying the victims for all the violations to their human rights" — Ana Guglielmucci, professor at the School of Human Sciences of Universidad del Rosario.

Therefore, the museum is in charge of broadcasting, among other issues, the findings of the Truth Commission, of spreading a narrative of the armed conflict that may do justice to the claims of the victims and does not focus so much on the topic of reconciliation as a moral duty."

As Gladys Durán points out, the only redemption for the grief of loss is, eventually, the truth, although –regrettably– for the mothers of her brother and her nephew, the answers are late; they departed to their graves without comfort to their grief. "They left with that suffering, with the affliction of not knowing about their sons. That's very hard, I hope one day we get answers, and get to understand what happened to them. Our Holy God knows what a burden that would take off our shoulders; I'm very old, but I would go wherever it takes to pick up the remains of my dear brother," she confesses.

The role of academia

In the middle of this process that seeks the truth, academia plays a key role in delving into the diverse phenomena, analyzing the circumstantial realities and offering ways that may strengthen the construction of peace.

"Academia plays an important role, the whole educational issue of teaching the young, involving the students and motivating them to conduct their own investigations," Guglielmucci adds. "It is necessary to keep an eye on how academia goes out on the streets, gets to other countries, to other audiences. Above all, contrasting information, checking up, validating in some way the report on the truth."

Specifically, to contribute actively in this circumstance that Colombia is living, Universidad del Rosario has opened the Master's degree in Conflict, Memory and Peace as well as the Post-graduate degree in Education for Peace and Citizenship Competencies. The objective is that the young have a leading role in this matter.

The country is undoubtedly undergoing a process of social learning that involves all actors. It's been more than half a century incubating violence, hatred, pain, and division. Time and contributions from different sectors are required for the whole de-escalation of the conflict and the construction of stable peace, as the researchers remark. On this path, the Museum of Memory in Colombia, beyond its symbolic nature, takes on the dimension of a right and a space for construction and transmission for those who eagerly seek for the comprehension and recognition of the damages, suffering, and resistance, facing violent situations in the context of the armed conflict. As Father Roux has appropriately put it, "if there is future, it is because there is truth."

Tracing the tracks of "El hambre de los otros"

This is a story of public policies against hunger in Latin America and of food as a research matter. A version composed by historians and anthropologists who dug down in files to gain insight into how and what has been done by officials and nutritionists to recognize and fight food scarcity for Latin Americans in the 20th century.

By Lina María Leal Villamizar
Photos Freepik, Ximena Serrano
DOI https://doi.org/10.12804/dvcn_10336.36857_num6

Using magnifying glasses and searching through hundreds of documents kept in dusted—and most times incomplete—files, social sciences researchers trace down the history of how nutrition experts understood and tried to solve the food problems of Latin American populations throughout the 20th century.

"Food is a key element in the social and cultural life of Mexico, where we are always close to the kitchen. And I think it is an overall Latin American experience," professor Joel Vargas states. He is a postdoctoral researcher from the Universidad Nacional Autónoma de México (Unam), who approached feeding as a subject matter from the scientific point of view, with an interest in areas such as food chemistry, nutrition, and even thermodynamics.

As he reasoned that sciences themselves constitute a social construct set in a determined time and space, he learned

← Despite the constant presence of hunger throughout history, it was not until recently that it started to be a study and intervention matter for the nation States.

that someone was dealing with similar topics in Colombia. He was Professor Stefan Pohl Valero, an engineer who decided to get a doctorate in Science History from a critical and sociocultural standpoint. He is currently a member of the School of Medicine and Health Sciences of Universidad del Rosario.

Doctor Pohl Valero got interested in food as a scientific matter which was worth tracing down. "Studies on food are also related to the act of feeding. A product that becomes a subject of research and of political intervention is a fascinating object for historical analysis, whose meaning changes gradually from its production to its consumption... That is the power of feeding," claims the researcher who has already investigated milk and chicha (a kind of beer typically made from corn) for the case of Colombia.

His interest lies in the diverse sciences taking part in the food chain. Pohl Valero started discussing the topic with other researchers, like Juana Camacho from the Instituto Co-

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Professor Stefan Pohl Valero points out that, for example, during the Cold War, the world was divided into developed and underdeveloped countries. "One of the main numerical indicators supporting this classification, which is nowadays deemed derogatory and a continuation of a colonial hierarchization, was precisely the average caloric intake of each country's population."

lombiano de Antropología e Historia (Icanh), who recalls the discussions among flavors of food that they cooked and then consumed:

"We had informal and fun meetings where we chatted and ate trying to find a common ground to set forth projects, readings, or joint dialogues."

In 2019, the researcher dared to push forward an interdisciplinary team of 35 specialists of sciences such as anthropology, nutrition, sociology, and history of Hispanic America, United States and Canada, which eventually resulted in the creation of the Network of Historical and Social Studies of Nutrition and Feeding of Latin America (Redeshnal).

Traces of hunger

How are Latin America feeding problems profiled and what is the role of science and its connection with the nation States? This was the question posed by the team of researchers, each of them from their expertise area and country of interest.

With that purpose in mind, they started a process of searching hunger traces in physical and digital archives, both global and local, which could be accessed, and then they began putting the pieces together. After digging into the huge masses of documents, the researchers categorized and connected the information, interpreted and set forth hypotheses, and came up with their own versions of what had happened.

"History is a reconstruction of the past made by ourselves, with our omissions, biases, and perspectives. Each author has different interpretations about what happened, which lead them to new questions and possibilities of understanding that past," doctor Vargas claims.

It was then when the idea came up about developing and publishing the results of those varied investigations in the book El hambre de los otros. Ciencia y políticas alimentarias en Latinoamerica, siglos XX y XXI (Other people's hunger. Science and food policies in Latin America, 20th and 21st centuries), edited by professors Pohl Valero and Vargas who, after a thorough work during the pandemic, managed to put together 12 chapters by Redesnahl researchers about feeding policies in Mexico, Argentina, Brazil, Bolivia, and Colombia.

Documented feeding

Despite the constant presence of hunger throughout history, it was not until recently that it started to be a study and intervention matter for the nation States. When and how did that start in Latin America?

Pohl Valero explains that at the beginning of the 19th century in Colombia, it was common to associate food with people's traits. For example, it was thought that indigenous peo-

The book 'El hambre de los otros' (Other people's hunger) represents the view of feeding experts on people's diet. They are not evaluating their own diet but that of others, and, obviously, hunger is that of others," Joel Vargas explains, who is a postdoctoral researcher at the Universidad Nacional Autónoma de México (Unam).

ple were possibly strong because they could carry big loads, and it was attributed to the consumption of chicha.

Eating more vegetables than meat was also considered to have an influence on the moral behavior of people, and those who ate vegetables were thought to be calmer.

Furthermore, according to the geographic determinism of that time, the proximity to the sea level was related with a lower "blooming" of human intellect.

"These views that related feeding with the physical and moral capacities of people —as the Colombian researcher affirm— were transformed by the end of the 19th century. With the surge of modern nutrition, the nature of food and its effects on the body and on people's health began to be considered under a different light."

There appeared then, first in Europe and later in America, the concepts of proteins, carbohydrates, sugars, macronutrients, calories, and then vitamins. "All of that will transform the idea we have of the relationship between feeding, body, health, and work, as well as the discourses about cultural identity and hierarchization between different peoples," the professor claims.

This is so because specialized physicians at the end of the 19th century claimed that the most "civilized" peoples (like England or Germany, at that time) were the ones that con-

sumed more meat or, later, milk, and they supported those ideas with nutritional statistics or standards. A quantitative measurement appeared to assess feeding, as well as a new way of estimating the "degree of civilization" of human groups.

The book proposes that feeding standards, ranging from production to consumption make the feeding problem understandable, allow it to be known and quantified, and to establish whether it is "right or wrong" compared to other places.

The standards are not neutral indicators of a feeding reality, but rather help to build it, and simultaneously tend to materialize cultural assessments (like the alleged superiority of one people over another). These are social constructs, so they change constantly and depend on the cultural values of each circumstance.

For example, the calorie standard enabled not only to measure and compare, based on nutritional surveys, the quantity of energy of foods and of the diet in different populations, but also acted as a 'global technology of the government.'

In this line, professor Pohl Valero points out that, for example, during the Cold War, the world was divided in developed and underdeveloped countries. "One of the main numerical indicators supporting this classification, which is nowadays deemed derogatory

and a continuation of a colonial hierarchization, was precisely the average caloric intake of each country's population," he ascertains. It is worth mentioning that, in a 'developed' country, a person had to consume 3,000 calories, which today would be considered too high, as the World Health Organization (WHO) recommends 2,000 a day.

State Intervention

A common situation in many countries of Latin America is that, as from the 1930s, the idea of the State intervening in the feeding matter took on political importance. It was the time when experts –appointed by the different state agencies– were moved to shed light on the problem, to which they could mean educational, social or cultural solutions. And Vargas underlines: "Beyond the political spectrum of the government in office, they all intended to improve the liv-

← "'He who controls your bread, controls your identity'. So, by means of food, there are some power tools that also deserve to be studied from the cultural standpoint," Juana Camacho, Icanh researcher.

ing quality of the population and their feeding; they wanted to avoid hunger."

In the case of Colombia, these studies were similarly originated in the 1930s, when agencies like the State General Comptroller (created in 1923) began studies about the topic of feeding to know, for example, what people were eating and how many crops there were. In this period, the following idea gained momentum: poor feeding and malnutrition –a question that had been posed years before– could affect productivity and become a setback for economic advancement.

The editors of this research highlight that it is key to understand the power relationships in these feeding governments, which take it for granted that they have superior knowledge to pinpoint and manage the problems of whole populations, without taking their daily realities and local wisdom into account.

As for this issue, professor Camacho warns: "There is a very nice proverb that goes 'he who controls your bread, controls your identity'. So, by means of food,

"Traces of resistance of populations"

(Excerpts from chapter 1 of the book El hambre de los otros)

To the town of Atánquez, in the Sierra Nevada de Santa Marta, a program had arrived for the nutritional education and for the support to vegetable growing, in order to improve the diet of rural populations dedicated to agriculture livelihood. As part of a national policy developed in 1946 by the Ministry of Economy, the flyer "The home orchard" was widely distributed across Colombia, as government employees visited several populations delivering vegetable seeds (tomato, carrots, beetroot, etc.) and teaching how to grow them to indigenous people and peasants. By the time anthropologists Alicia Dussán and Gerardo Reichel-Dolmatof got to the place in 1951, the flyer was still around in the town, although there were no traces of the orchards. According to the anthropologists, the failure of the state effort was due to several reasons:

1. The program had neither taken into account nor previously studied the feeding habits, tastes and attitudes of locals, and assumed that they could be easily modified;

2. The flyer given was written in an incomprehensible language and talked about "people and situations that do not represent peasant life as it really is in the Colombian tropics";

3. There existed a series of "prestige factors" in the local culture, generating many tensions in the application of the program. For example, it was pointed out that the directions given by the government on how to grow and what to eat "were interpreted as an attack to the dignity of villagers who, by refusing to comply with it, intended to show that 'they were not savage Indians as the Government seemed to think.'"

El **hambre** de los **otros**

Ciencia y políticas alimentarias en Latinoamérica, siglos XX y XXI

Stefan Pohl-Valero
Joel Vargas Domínguez
EDITORES ACADÉMICOS

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there are some power tools that also deserve to be studied from the cultural standpoint."

The function of the State is precisely to regulate peoples, so the hunger and deficiencies in food provision by the governments are problems that must be faced because they may destabilize the power system. In that context, individuals are profiled based on what it is considered that they should eat.

As put by Vargas and Pohl Valero, this is about how the government food agencies profile and modify the conception of others, as they try to influence their conducts and impose particular ways of perceiving the world.

Whose hunger is it?

"The book *El hambre de los otros* (Other people's hunger) is the feeding experts' view on what people eat. They are not evaluating their own feeding, but other people's, and it is obviously their hunger," Professor Joel Vargas explains.

At this point, the Mexican historian reflects upon the setbacks of working with files, mainly official ones, which constitute the only available source, taking the period studied into account: "One ends up building a history from the view of the expert on other people. But it is very hard to think that one is going to give a voice to someone who was silenced and left aside by history. Their voices are not there precisely because of the silence and omissions in the files."
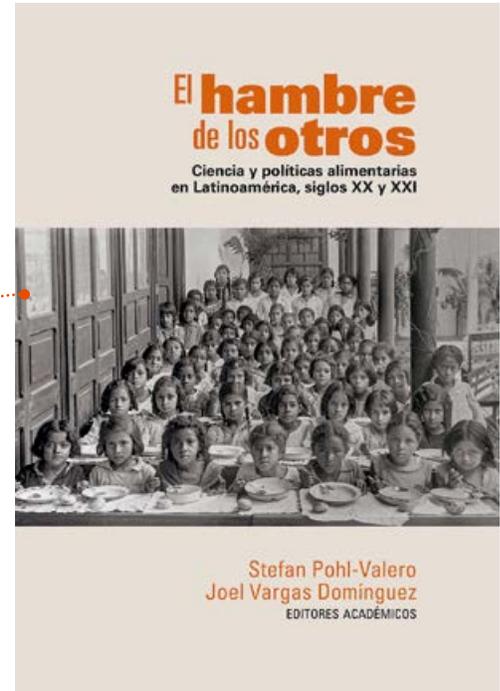
However, Pohl Valero points out that while that happens on few occasions, as for his case, he did find clues on how those feeding programs were deployed in everyday life.

In fact, the book invites to enrich the idea that those systems exercising power have totalizing effects on the social structures and human conducts they try to intervene in. On this line, the researchers warn that it is convenient not to lose sight of the spread and resistance of mechanisms of knowledge and power of populations.

Camacho claims that "observing feeding as a whole is very complex, so all these conversations, dialogues and interactions end up in an intertwined texture with some points of convergence. This is a turning point that unifies, collects and creates a field of study that has not been thought of in Latin America."

The researcher adds that food is a topic that has gained worldwide prevalence in the last few years. With the specific difficulties of the post-pandemic effect, conflicts, and economic crises, it becomes paramount today, more than ever, to trace hunger down.

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Efforts which transcend research
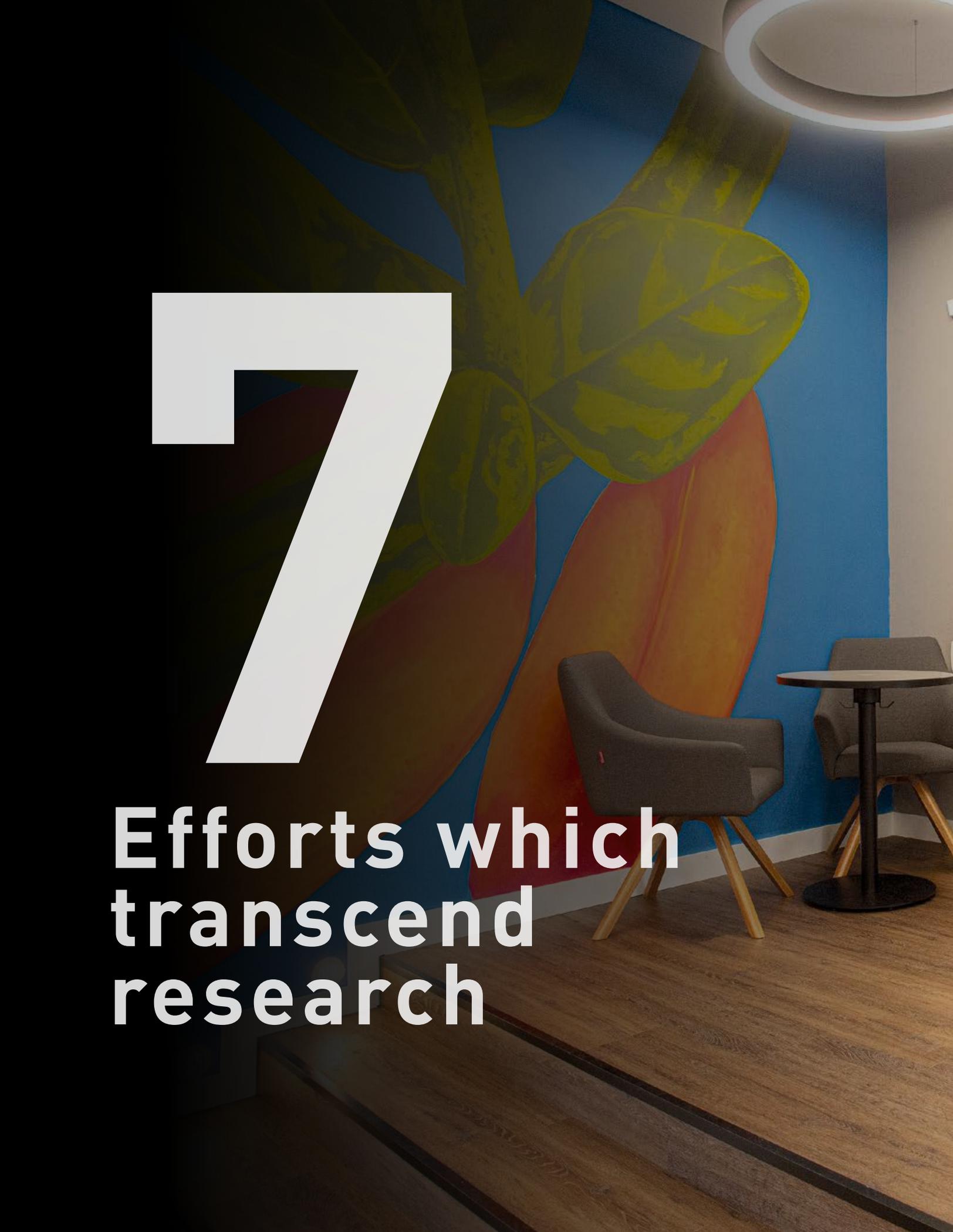
Israel Cruz Velandia
(1965 – 2022)
A Visionary in Physiotherapy

Within the classrooms of Universidad del Rosario, the echo of what Professor Cruz Velandia has taught us still resonates. He passed away early but left a robust legacy to physiotherapy, academia and, above all, his students. He taught them to persevere, question themselves on the realities of their patients, think with their whole bodies, and view their profession from a holistic and humanistic perspectives.

By Magda Páez Torres
Photos Nora Cruz Velandia, URosario
DOI https://doi.org/10.12804/dvcn_10336.35993_num6

The legacy of Professor Israel Cruz Velandia is present in every hall at Universidad del Rosario, in the DNA of his students, in his multiple academic papers, in his voice immortalized in dozens of podcasts, in the recurrent morning coffees with his peers, and in the soul of graduates who learned to connect body and mind from him. "Isra," as his friends called him, has not left us. His meticulous work in physiotherapy keeps him alive as an essential referent for a profession to which he tirelessly gave his days, up until April 14, 2022, when he passed at the age of 57 years.

The community of Rosario defines him as a visionary, a cheerful man who loved art, cooking, and good conversations.

He was a professional ahead of his times, a consecrated professor who was concerned about always providing content to physiotherapy.

"Israel, above all, was an educator *par excellence*, a teacher. He was always one step ahead of all of us, as the motto of Universidad del Rosario: 'ahead in time'. And it was like this in many fields: in rehabilitation, education... I think he was a visionary in different areas," commented, longingly, his colleague Luis Fernando Rodríguez.

In the universe of pedagogy, he was regarded as a leader in the full sense of this word. "I define him as a provocateur, an activator who not only transferred knowledge but also activated emotions," comments professor Karim Garzón Díaz.

"Isra," as his friends used to call him, has not left us; his meticulous work in physiotherapy keeps him alive as an essential referent of a profession to which he tirelessly gave his days. For the community of Rosario, he was a "transformative" person.

Her colleague Amparo Mogollón agrees as follows:
"Israel was a visionary in unveiling the possibility to transform the field of action of physiotherapy and of all professions related to rehabilitation sciences. From the very beginning, he developed a disruptive vision in terms of saying that we 'have to abandon that outlook of physiotherapy, speech therapy, or occupational therapy centered on a biological approach of the human being.'

He opened the door to a more humanistic vision."

Dedication to collective health

Professor Israel Cruz finished his undergraduate studies in Physical Therapy at Universidad Nacional de Colombia (1988), and at the onset of his career, he worked in the cardiopulmonary area. Later, he worked on a Master's Degree in Education at the Pontificia Universidad Javeriana (1995), and from there, as told by his colleagues, he set off on a journey towards collective health that he strengthened with a Doctorate in Public Health in Brazil (2001).

In the early 2000s, he returned to the country to teach at Universidad del Rosario and focus on the field that became his priority—disabilities, an interest that materialized since his participation in the Research in Rehabilitation and Social

Integration of People with Disabilities group. On this topic, he articulated several disciplines, such as medicine, speech therapy, occupational therapy, biomedical engineering, political sciences, and law since he conceived and developed a comprehensive concept for rehabilitation.

"He was always deeply interested in disability, understood from a very social perspective; he wanted to generate a different view on this topic," said his colleague Claudia Guarín. In this sense, he actively worked in the processes of creating public policies related to disabilities in the Capital District throughout 2006.

"We were convinced that our graduates could be very important agents to influence in the design of public policies, in how programs for people with disabilities are devised, in how organizations of people with disabilities are involved in decision-making," adds professor Garzón Díaz. "It was a practical and conceptual shift on how disability is a topic solved from different points of view: not only from a health perspective but also from the view of economy, politics, and human rights. That's when we started opening the horizon to generate other ways to think about the subjects in our curricula."

Undoubtedly, Israel was born to leave a mark, always restless to achieve a better qual-

ity of life for people. He was a representative of the national and international certification of the Physiotherapy course at Universidad del Rosario, which he was a part of for over 20 years. There, he promoted curricular adjustments to take the profession and the program through the diverse and inclusive social path. He strengthened the Faculty's research groups and participated in the design, formulation, and implementation of what we know today as the Centro de Rehabilitación Integral Inclusiva (CRI) for members of the Colombian Army and victims of the armed conflict, among other multiple contributions that will forever remain as an imprint of what his life was: a lesson of service.

"Thinking with the body"

Professor Israel will also be remembered for always pushing his students to have an attitude to transform their surroundings. "His disciples loved and appreciated him dearly, especially because of his great openness towards social issues. He was an excellent human being," said Sandra Fernández, administrative director of the School of Medicine and Health Sciences of URosario.

For Ana María Calderón, one of his students, professor Israel was an extraordinary counselor who encouraged his students to open the spectrum and to think beyond the physical factor. In her words, "Israel is physiotherapy." Today, she remembers him as the man who gave value to the career she chose for life: "I had my first class with him when I entered university: Introduction to Physiotherapy. He was always very respectful, willing to hear us regardless of what we had to say, not only related to the career but also with life in general. He broadened our mind." Ana María longingly recalls some of the wise lessons

#PensandoConElCuerpo

Las huellas de un visionario

Israel was a representative for national and international certification of the course on Physiotherapy at Universidad del Rosario; promoted curricular adjustments to rethink the profession and the program with a social approach; strengthened research groups at the Faculty; led the developing of public policies in Bogotá in 2006, and participated in the creation of what we know today as the Centro de Rehabilitación Integral Inclusiva (CRI).

that the professor highlighted: "Physiotherapy is not just exercises, heat and cold. If you like law and helping people, broaden your mind because the most beautiful thing about studying physiotherapy is that you can have direct contact with people; you're touching them, listening to them, and you have a wider, holistic approach. You must look at both sides of the coin."

As Professor Rodríguez adds, Israel's essence was to positively impact people's lives and make professionals engage in making the world a better place. "He had a phrase for us and the students: he said we should shape political subjects. He always said: 'We should take a step forward, look what will happen, and leave a thought so people always have something to wonder about'."

This is why Karim Garzón describes him as a scenario provocateur: "He wanted to debate different theories and contrast them. He always let that curiosity in students for them to explore and develop their interests, for them to discover their particular projections. I still see it like that because I still feel it quite vividly."

In similar words, the community of Rosario also thought that Israel Cruz was a "transforming" person. "I think that, when you have a conviction of what creates transformation, when you stimulate students to question themselves and question all things that surround them, you create transformation. In this sense, Israel promoted great change among students," reflects Claudia Guarín.

In 2019, within his quest for transforming realities, together with professor Victoria Molina, he created a radio show called *Pensando con el cuerpo* (*Thinking with the body*), where they highlighted the holistic perspective of the profession to reach more students and the general audience every day. Re-

cently, in the same space in the broadcaster at Rosario, his co-host paid homage to him with a special program titled *Las huellas de un visionario* (*The traces of a visionary*).

"Many feelings collide today... Let this be the space to honor his life and his work as a visionary man," said his microphone partner to open an acknowledgment that continued with a recap of the different podcasts they recorded together.

Yearning friends

Besides his vocation and the seeds of change that he sowed in physiotherapy and his permanent intellectual curiosity, Professor Israel will be remembered by his broad smile, his sense of humor, his deep and constructive talking shops, how much he loved his family, and his passion for sports and arts, especially music and painting.

"There was a time in which he liked swimming–he swam quite a lot–traveling, and cooking. He also liked going out to cultural events, theatre plays, the movies... he liked hosting talking shops in his house on different topics. He was a devoted scholar for anything he did," tells his friend Sandra Fernández.

Beyond that invaluable heir, his friends will remember the day-to-day talks. Professor Guarín still misses deep conversations that they had wrapped by a hot cup of coffee, conversations that now she cherishes in a special place in her soul. As she puts it, it's impossible for her voice not to break when remembering

In his friends, an infinite number of instants remains to feed their souls and lighten the absence of someone who honored teaching and the meaning of friendship.

him. "We talked about countless topics. Above all, we laughed a lot. We had complicity with loads of humor. We talked about the divine and the mundane of the things we were going through, our surroundings, friendships, professional reasons, and our views on the profession. He was an excellent friend," she comments.

In short, she misses the friend more than the colleague. "I feel the void when I arrive at university. I miss him. I miss having a cup of coffee with him. Without a doubt, he was one of those friends that were there for you for whatever you wanted. You just knew he was there. All these wonderful memories remain."

Rodríguez also feels that same absence. When meeting Israel, he was just a student. But later, they met again as teachers. "We

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Nowadays, the seeds of Israel Cruz Velandia still grow into a Yarumo tree that was planted at Bosque Humboldt, located on Quinta de Mutis, Universidad del Rosario, as a homage to his life and his academic contributions.

held 'productive wine chats'; we called them 'academic wine chats', always thinking about what he liked, topics to teach, how to improve things. We also laughed a lot. His laughter was explosive and contagious. He laughed from the heart."

Exactly there, in the heart, is where an infinite number of instant remains. Instants that will make people voices' tremble but that will feed their souls and lighten the absence of someone who honored teaching and the meaning of friendship.

An unforgettable legacy

Colleagues, friends, work peers, and students. They all want to immortalize the legacy of Professor Israel, make his imprint last, avoid it being forgotten in time, and take it beyond these lines. Thus, they decided to pay a tribute that represents his life for him to keep enlightening future generations.

Today, his seeds are still bearing fruits in a tree that was planted at [Bosque Humboldt, located on Quinta de Mutis, in the lands of](#) Universidad del Rosario, by the Dean of the School of Medicine and Health Sciences, Gustavo Adolfo Quintero, together with the director of the Physiotherapy Program, Ingrid Tolosa, and the university community. "It is a *yarumo*. We wanted it to be a tree that really lasted, that showed flexibility, that recalled that mixture of physical quality and the sense of humanity that represented the kind of physiotherapist that he helped shape. A tree that had an extraordinary growth and that would be the first tree we could look at whenever we entered Bosque Humboldt," comments Fernández.

That homage undoubtedly encloses the affection, gratitude, and industrious search to make professor Israel's colossal legacy for the universal academy and health world last.

"His intellectual heritage is a daily boost for university. His profound belief in students and their capacities and his commitment to motivate them follow their dreams are unfor-

gettable imprints." "He leaves a huge union demonstration in society." "He made several transformations at a Latin American level, marking a new direction for the profession, even with a global impact because he was part of the worldwide physiotherapy committees and a member of national and international union organizations." "He showed us how to go beyond the subject matter of this profession towards all aspects of people's lives." These and many other phrases from Professors Karim, Claudia, and Luis show how death is not necessarily the end when life was dedicated to sow and then reap prosperity and future.

"Isra" stays forever. His legacy is immortal. His laughter, unforgettable. Undoubtedly, physiotherapy carries his name. In each colleague, in each graduate that, day after day, mystically and ethically applies his lessons is the reflex of a man that broke paradigms, that dared defying visions of the career and the world, that cared for seeing in patients not just a body, but a soul with needs that require a holistic attention, a human look. ◼

The body:
A system in which thought and emotions converge

Two of the studies published in *Educación para la vida* (2022), by the Universidad del Rosario, propose redefining the body-mind relationship to provide a more comprehensive training and approach to health for young students.

By Lina María Leal Villamizar
Photos Milagro Castro

"We understand the body as an object that we have and not as something that we are," says the professor at the Universidad del Rosario and student psychologist David Roberto González Rodríguez, who, along with a group of researchers from different departments and with the support of Welfare Deanship (DMU), has been interested in reconsidering the role of the body, as well as that of the mind and emotions, in the educational setting.

Traditionally, the body has been considered a vehicle of existence and motion, waiting for the mind to think, arrange, and learn. In addition, another differentiation has been made:

Traditionally, the body has been considered a vehicle of existence and motion, waiting for the mind to think, arrange, and learn.

as if they were taking different paths, on the one hand, the rational (with the knowledge), and on the other, the emotional (with the personal, the individual, and the intimate).

"The latter (the emotional) has not been considered serious and important enough to dedicate time and effort to it in university life," says Dr. Rafael Bisquerra, President of the International Network of Emotional Education and Well-being (Rieeb). "However, there are university students who suffer from anxiety, stress, depression, suicidal ideation, drug use, or violence. People with university education are not 'vaccinated' against these risks," he adds.

Since 1946, the World Health Organization (WHO) has declared health as a "state of complete physical, mental, and social well-being, and not merely the absence of affects or illnesses." This was confirmed in 2020 with the

celebration of World Mental Health Day, when it was stated that "there is no health without mental health." Taking care of the mind, and with it the integrality of health, is increasingly recognized and necessary.

Since 2019, Dr. Viviana Angélica Sandoval Sánchez, at the Quinta de Mutis campus, worked with program students from the Department of Medicine and Health Sciences, as well as the Faculty of Natural Sciences. For her, the important thing is "seeing the patient as a 'whole,' as something comprehensive and not just by parts, organs, or symptoms."

As she explains, her office frequently receives cases of students with, for example, abdominal pain that leads to gastritis. And on several occasions when she asked about the relationship of the symptoms with the patients' eating habits, she found that they had only eaten fast food in the last few days, because they were away from their caregivers or did not have the opportunity to cook for themselves. When asked how that situation makes them feel, the most repeated word in their responses was: "sad."

According to the doctor, treating "the body" exclusively with a medication for gastritis would not remedy the root cause of this type of disease, as they are linked to the mental, social, or emotional situation of the patients. Hippocrates already said: "It is more important to know what kind of person has a disease than what kind of disease a person has."

At the University, they have numerous spaces dedicated to "thinking about the body" (one invitation to body, emotional y political motion to raise awareness of relationships and generate transformative experiences) in which more and more teachers, staff, and students participate.

The physical and mental health connection

In 2019 and 2020, Dr. Sandoval joined Dr. Heidy Tatiana Bacca to assess the presence and relationship between physical illnesses and mental health in the student community. They began by researching what had been studied and written about it in Colombia and around the world. Subsequently, the researchers created a survey aimed at local students who already had an established assessment of physical illness or who were asked what type of ailment they had.

They received 126 responses of which 45 percent corresponded to the respondents' indication of presenting some mental health condition. Among them, anxiety was the most frequent followed by depression.

Furthermore, 72 percent of the students in the sample confirmed they suffer from physical illnesses such as gastritis, migraine, dermatitis, or constipation. "All of these organic diseases can be impacted or exacerbated by psychosocial factors that increase the burden of disease by increasing the risk of disease by

According to WHO warnings and the research of the Rosario professors, for the total population, lifestyle factors account for up to 70 percent of the burden of disease.

→ Dr. Viviana Sandoval Sánchez mentions the importance of "seeing the patient as a 'whole,' as something comprehensive and not only for its parts, organs or symptoms."

increasing the intensity or frequency of symptoms," argue Sandoval and Bacca, adding that this may also reflect the existence of a mental condition. According to the WHO and the research of the Rosario professors, for the total population, lifestyle factors explain up to 70 percent of the burden of disease.

Sandoval and Bacca also wondered whether there was a temporal relationship between diagnosing mental illness and physical illness. Fifty-seven percent of the respondents were diagnosed with both mental and physical illness around the same time, with an interval of approximately three months between each diagnosis; 32 percent were first diagnosed with the mental illness and then with the physical illness; while for 7 percent it was the other way around, first diagnosed with the physical illness and then with the mental illness.

"Our university student population is definitely carrying the burden of disease in the physical and emotional spheres, and we must continue to make great efforts to treat the mind-body binomial integrally," Sandoval and Bacca conclude.

All these results are part of the *Connecting physical and mental health* chapter from the book Educación para la vida, from the Universidad del Rosario (2022). In this publication, the researchers state that if a patient requests a consult for a condition, in addition to the risk factors for its development, there may be some other underlying disease or cause that generates it.

That is why they increasingly work hand in hand with the areas of psychology, psychiatry, and social work, among oth-

→ "We are more like sentient bodies that we define as complex structures that describe our being in terms of a sensory, emotional, cognitive, space, culture and historical plurality," notes psychologist David González.

ers, in the promotion of health, but above all in disease prevention. "All of our activities are and will continue to be planned with the objective of building spaces and experiences for the student and transmitting a message that impacts their quality of life in a positive way and that not only promotes their physical health, but also their mental health," they say.

Thinking with the body

Psychologist and Researcher David González prefers not to differentiate between the physical and the mental. For him, the contributions of Philosopher René Descartes ("I think, therefore I am," in the *Discourse of the method,* 1637) helped explain the idea that we have something called "mind" that is distinct from what we call "body."

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"Three moments in which people evolve: the journey, the sense and the transformation. The three comprise a series of processes in this route of growth and of training"

"We are rather sentient bodies (closest translation of the Greek *soma*) that we define complex structures that describe our being in terms of a sensory, emotional, cognitive, spatial, cultural, and historical plurality," González says, "and therefore somatic education - the use of holistic, body-based approaches to bring about personal transformation - seeks to make people understand that it is not only the mind that needs to be trained. The body needs to be trained and has a lot to contribute!"

Under the leadership of Professor Israel Cruz Velandia, a renowned physiotherapist from the Universidad del Rosario who passed away in 2022, González and researchers Christian Rubiano and Laura Vanessa Rodríguez began to study thinking from the body and emotions in 2019 (See article: *The language of movement and emotions as a conflict-transforming focus,* in *Advances in Science*). To do so, they included concepts of philosophy,

The book *Life Education* proposes a series of 12 chapters that reflect on the wellbeing of the mind and emotions of young university students.

pedagogy, psychology, and psychoanalysis that allowed them to position the body as a learning vehicle to approach a state of wellbeing.

During the following two years, they held discussions in workshops and group practices that enabled the participating members of Rosario to break out of the passive roles that often occur in classrooms, corridors, and offices. Gradually, they have become more and more popular. Not only have more researchers joined, but numerous spaces dedicated to "thinking with the body" (an invitation to bodily, emotional, and political movement to raise awareness of relationships and generate transformative experiences) have also emerged, in which more and more teachers, staff, and students are participating.

González and his team prepared the chapter *Somatic education for ethical and emotional training*, which also forms part of the *Life Education* publication, for which the psychologist also served as editor. There, the team described the lessons learned from the project and proposed a formative route as a journey. "There are three moments in which people evolve: the journey, the sense, and the trans formation. All three comprise a series of processes in this route of growth and formation," explains the researcher.

In the first moment, the person is asked to review themselves and think about how they relate to their body and to the body of others. The second reflects on understanding and meaning: how do you inhabit the world from a full and conscious presence? With all of the above, we reach the last step, transformation, when we must enable the unleashing of motion, changes in habits, and ways of seeing and valuing daily life. "To build is to take care of ourselves, to arrange new senses and project them in our body, in the spaces that surround us and together with others," they point out.

It is expected that the path will lead to a strong focus on action. And with this active learning of the body, as well as a greater awareness of its management, one becomes more aware that there are others with whom one engages in relationships. "Humanism is an invitation to recognize ourselves as equals, to place ourselves on the same level. In this way, movement can help to reflect on connections with others, on how one can live in joint motion with others."

Understanding that every action has an impact around it that connects human beings with the world, where there are other bodies they can connect with. "If we all think of ourselves as part of something else and learn to relate to each other better, we can also make this world more meaningful and enjoyable to live in," the researcher concludes. ◘

"Bodies, places of peace"

The language of movement and emotions as a conflict-transforming focal point

Universidad del Rosario is committed to a pedagogical laboratory to construct peace based on somatic education: the body as a vehicle for learning.

By Ximena Serrano Gil
Photos Milagro Castro

I did know about the Universidad del Rosario since I used to hang out in the small square to sell marijuana to the preppy students who study there. But I never imagined that I would go there, much less as a student. This was the reflection expressed by a former street youth when they joined the Conflict for Peace, a space where young people from different places and with different realities come together to build and transform their relationships with themselves and society.

Today, Rosario students and young people affiliated with the Instituto Distrital para la Protección de la Niñez y la Juventud (District Institute for the Protection of Children and Youth [Idipron]) share and interact in trusting environments proposed for peacebuilding. There, they address different topics and content related to the transformation of conflicts that emerge in contexts of daily violence. The way to do this is through creative but non-violent dynamics and through the expression of the body and its movement, which is known as somatic perspective.

To talk about this innovative academic-social exercise and the approach of somatic education, the teachers and researchers of the project met on a cold and rainy morning in the warmth of a steaming and aromatic coffee.

With the enthusiasm, commitment, and knowledge that has driven them in designing this project, Beira Aguilar Rubiano, principal researcher and professor of the Philosophy Program of the School of Human Sciences at the Universidad del Rosario and the Center for Ethics and Citizenship Education Phronimos, Christian Rubiano Suza, coresearcher of Phronimos, and Lyner Bustos, Idipron co-researcher, explain the scope, impacts, and expectations of this pedagogical laboratory.

Body and movement for peace

To understand the world of somatics, Professor Christian Rubiano points out that "the first thing to understand is that we are not only a body with the skin as a limit, but we are a soma. The soma is the network of relationships that constitute us, which are broader than just the biological body. Therefore, we should not only take care of the body, but also of the relationships that sustain us."

In turn, Professor Aguilar explains that the work in somatic education consists of "making us aware of this network of relationships that we inhabit, transforming and strengthening it through curative work." One way to achieve this, the researcher continues, is through movement, through which emotions, citizenship training, and building places can be worked on.

Thus, since 2019, when the Phronimos Center and Idipron created the Conflict for Peace Chair within the framework of the management of social projects of the Office of Social Outreach and Alumni of the Universidad del Rosario, 150 students have had the opportunity to develop skills and strengthen project management. In this manner, through training and research exercises, they have been able to contribute to the transformation of their territories.

The realities of young people in cities are complex. They are mediated by injustices, structural inequalities, and various types of violence that determine social behavior and often interrupt people's life projects. "The chair is a space that arose to make the children understand that, despite all they have lived through, there are still opportunities to transcend with their life stories," says Idipron professor Lyner Bustos.
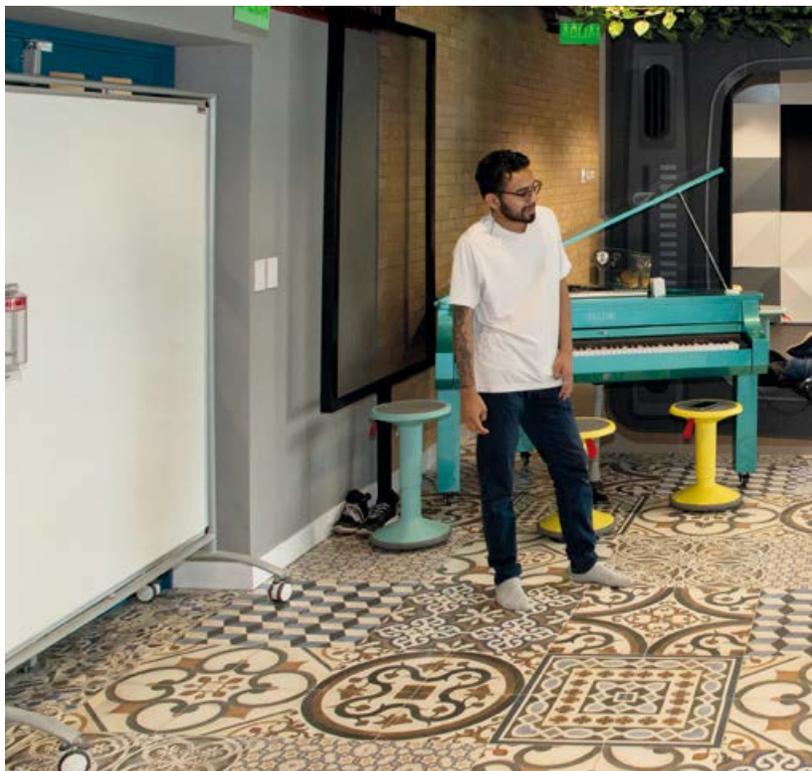
The purpose of the somatic experience as an educational process is not to achieve a certain physique or affective disposition, but rather to encourage openness to movements, self-knowledge, and self-care.

The concept of peace proposed by the project does not focus on the armed conflict since Bogotá does not have a strong recruitment or forced displacement process. Instead, it is a concept of everyday peace based on the fact that the rhythms of the street, the problems between neighbors, the invisible borders between neighborhoods, and the emotional confrontation between family members are the breeding ground for the different forms of violence experienced by these young people in their daily lives.

One of these creative windows for the solution and intervention of everyday conflicts is the top Pedagogical Route (Video) created in the project framework Thinking about the Body, thanks to which practices and spaces of care are constructed through somatic education and emotional management.

Based on these pedagogical models, the interdisciplinary team directed the training toward citizenship to enhance its scope. Then, there was a proposal to create a participatory and co-creation mechanism with young people to transfer knowledge and experiences of this pedagogical route. This is how the Interactive Primer Bodies, Territories of Peace was born, with the support of the Technological Innovation Fund of Universidad del Rosario.

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Professor Beira Aguilar, principal researcher of the project, explains that the work in somatic education consists of "making us aware of the network of relationships we inhabit, transforming and strengthening it through collaborative work. One way to achieve this is through movement, by means of which we can work on emotions, citizenship training and constructing territories."

This booklet is a resource to teach the different pedagogical actions, exercises, and skills. It proposes a transformative journey through the development of eight competencies: reflexivity, communication, somatic awareness, compression, presence, construction, care and recognition, and somatic experience. The aim is for people to reflect and deepen their self-knowledge from their own emotions, movements, and thoughts in relation to their life in community and the territories they inhabit.

The teachers emphasize that the booklet is the result of collaborative work between the young people affiliated with Idipron and the students of the University. For his part, Rubiano expresses that "our purpose is to develop an interactive and virtual booklet that promotes peacebuilding from a somatic perspective. Its development has been the result of the workshops to create peace, as well as a process of accompaniment and digital construction with the assistance of the Learning and Research Resources Center (CRAI by its acronym in Spanish)."

The completion of this educational prototype will be delivered to the population at the end of this year and will become a free access resource that seeks to strengthen the processes of territorial peacebuilding in Idipron. "A booklet is a tool for the work that young people do in their territories and

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To understand the world of somatics, Christian Rubiano, co-researcher of Phronimos at the URosario, states that "the first thing to understand is that we are not only a body whose limit is the skin, but we are a soma; and the soma is the network of relationships that form us, which are broader than just the biological body. Hence, we should not only take care of the body, but also of the relationships that sustain us."

Pedagogical Route

A trip inside ourselves

Exercises and skills addressed in the booklet for community work processes. The different activities young people participate in to build peace from somatic education are explained.

Reflexivity

Through movement and introspection, we enter a listening disposition. We pay attention to messages from our bodies, to what the emotions we feel tell us, and to what those around us tell us.

Presence

Presence is movement and action that is committed to what we live. It is not only being here and now but also knowing how to act in different times and territories.

Communication

Through language, we get closer to others and to the world to establish different types of communicative relationships.

Comprehension

It is a process of relationship and interpretation and multidirectional with the environment.
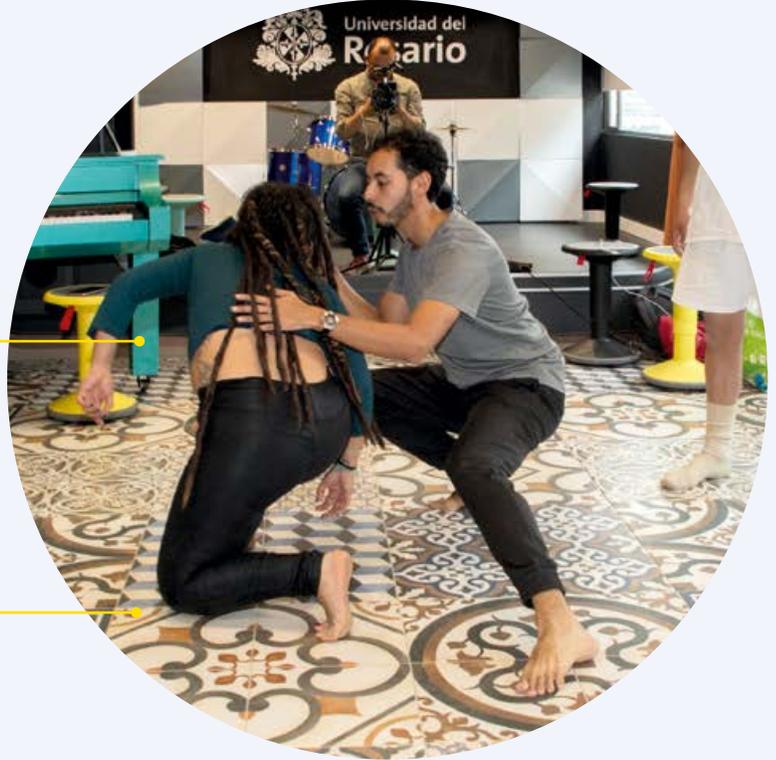
Somatic Awareness

Strengthening and developing our consciousness means deepening our perception of our corporality, our knowledge of our emotions, and our historical awareness.

http://tipoink.com.co/Pensandoconelcuerpo/index.php

Idipron's mission

The District Institute for the Protection of Children and Youth (Idipron) is an agency of the Mayor's Office of Bogota that seeks to build a project and a sense of life for children, adolescents, and young people living on the streets at risk of living on the streets or in conditions of social fragility in the city.

Construction

This is the process through which the work appears as a trace of a presence, a legacy charged with time and power that are in balance and harmony with the territory and with others.

Somatic Experience

It is a journey through movement using multiple types of activities that lead us to think with the body but also to feel with the mind. It supports the construction of habits and the promotion of wellbeing in the educational space.

Care and Recognition

This involves the relationship but also with separation. People take care of each other, they communicate, and protect the uniqueness that aspires to recognition.

it promotes the use of this knowledge as a strategy for conflict resolution," explains professor Aguilar.

Building an Environment of Trust

The anticipated course has been a stage for meetings and collaboration where work is done through activities such as yoga, dance, theatrical games, and design thinking methodologies. "We don't want to give them a particular teaching, but rather that everyone, in a reflective process, finds or proposes activities based on their experience and knowledge; something that represents them and helps them to enhance the process of creating daily peace, through the management of emotions and body awareness," Rubiano argues.

Approximately 150 students have participated in the course so far, thanks to the collaboration between a public organization, which seeks to guarantee the rights of young people, and the Universidad del Rosario, which, with an innovative pedagogical model, helps to generate new processes of transformation for peace. These participants will become multipliers and transformers who will disseminate what they have learned in these processes throughout the city. The first beneficiaries of the course today are linked to jobs in which individuals have the opportunity to apply what they have learned in their training. Some, for example, are teachers at Idipron, while others work at the District Institute of Recreation and Sports (IDRD).

This project provides an important opportunity for all those who participate in it. For Idipron, it becomes a tool to better understand the peacebuilding processes in different territorial spaces. For the academic areas involved, it provides a space to strengthen training models; for the University, it offers a significant contribution to its commitment to peacebuilding.

URosario, scientific dissemination, and visibility

MIGRATION CHALLENGES. REALITIES FROM DIFFERENT SHORES

María Teresa Palacios Sanabria, María Lucía Torres Villarreal, Fernanda Navas Camargo

Currently, all continents face situations related to the movement of people. According to the UN, 3.4% of the planet's population are migrants (economic, refugees, asylum seekers, even internally displaced), and the treatment that States give them constitutes a challenge that is part of government agendas. Furthermore, the diverse configuration of destinations and migratory profiles makes it necessary for States to propose responses to migration, even though it is not possible to find a perfect and complete policy that manages to balance the efficient management of migration that promotes safe and orderly flows and respect for migrants' rights, who hope to find optimal conditions in the host States that will allow them to achieve their life projects.

In this context, academia is called upon to reflect on the dynamics of migration, international standards, legislation, and the difficulties foreigners face regarding their rights. Thus, the authors joined forces to generate new knowledge, and in this book, they present society with the main challenges posed by the movement of people.
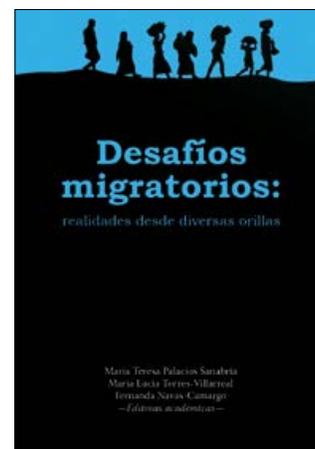
Página xx*

POLITICAL CONSTITUTION OF 1991. REFLECTIONS AND CHALLENGES THIRTY YEARS AFTER ITS ISSUANCE

Diana Carolina Valencia Tello

This collective work is the result of reflections and discussions held in December 2020, in the Faculty of Law, among academics, professors, researchers, and public officials, to analyze the progress, challenges, and unfulfilled promises from the application of the Political Constitution of 1991, thirty years after it was issued. The book was organized around three main themes: state legal pluralism, the social rule of law, and the fourth industrial revolution. The first point seeks to draw attention to the existence of different legal rationalities within the State itself, which lead to diverse interpretations and regulatory conflicts that require greater inter-institutional dialogue and improvements in the State's architecture. The second point, the social rule of law, analyzes transcendental issues for the completion of fundamental rights, such as constitutional actions, the decentralization process, state responsibility, the fiscal control regime, and legal training in Colombia. Finally, the third point, the fourth industrial revolution, seeks to reflect on the new challenges that the new technological revolution brings to the State in terms of personal data protection, employment, and social security regulation, the increase in risks, and the new uses of information and communication technologies in public administrations.

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* THE PAGES CORRESPOND TO THE ARTICLES RELATED TO THE SUBJECT
IN THIS ISSUE OF DIVULGACIÓN CIENTÍFICA NO. 6 - YEAR 2022

CLINICAL LEGAL EDUCATION. A LOOK AT COMPARED EXPERIENCE AS A MODEL OF TRAINING BASED ON SOCIAL JUSTICE

María Lucía Torres Villarreal y Paola Marcela Iregui Parra

As a result of an academic effort stemming from the work carried out within the Public Actions Group from the Faculty of Law at the Universidad del Rosario, in association with the Hanns Seidel Foundation, this work was initiated to commemorate the 22 years of creation and uninterrupted work of the GPA. This book has two objectives: to document the work of the clinic on various fronts and to review in a judicious and multidimensional way the perspectives that professors have about Clinical Legal Education today in various regions where the model has existed and has been seeking its place, recognition, and positioning. In this sense, when thinking about the book, the clinic's supervisory team organized a two-part structure, which would organize some outstanding strategic litigation actions advanced by the clinic between 2014 and 2021, which aligns with the completion of the case review covered in the previous book, and also has some writings on the current state of the clinical model seen from the experience of professors dedicated to the clinical education of law, who find the scenario to be a true space to transform the teaching of law, form social leaders and agents of change, and complete the ethical and social values that are the foundation of the legal profession.
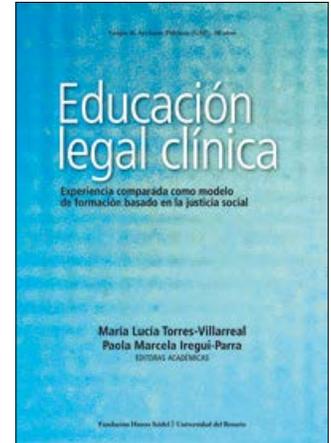
Página xx*

THE HUNGER OF OTHERS. FOOD SCIENCE AND POLICIES IN LATIN AMERICA, 20TH AND 21ST CENTURIES

Stefan Pohl Valero y Joel Vargas Domínguez

Food problems as well as the meanings of food and the bodies that consume it are not a given reality but the historical result of processes involving local cultural traditions, scientific and epistemic transformations, technological developments, new forms of governance over the social and the body aspects, as well as (increasingly global) industrial systems of food production, distribution, and advertising. These processes, in turn, include a wide range of actors and institutions—both locally and internationally—with different theoretical perspectives, political agendas, and economic interests. At the crossroads of science, technology, and medicine studies and social studies of food, *The Hunger of Others* is an effort to critically analyze the relations among science, state, and public policy in the processes of understanding and managing health and food problems in Latin America at the intersection of science, technology, and medicine and social studies of food over the last century. This book brings together scholars from America and Europe, who are the social construction of expert knowledge on nutrition in local contexts from Argentina, Bolivia, Brazil, Colombia, and Mexico, and their interactions with international scientific networks and with state, bilateral, and multilateral organizations, when it comes to making the question of food legible and manageable. It also explores the implementation of the resulting public policies through concrete programs and practices as well as their contingencies and real scope, the power relations involved (influenced by issues of gender, race, and class), and the agency of the people who are the object of the intervention. *The Hunger of Others* is an invitation to take into account the diversity of cultural, natural, political, economic, and technological elements that shape our food worlds at specific times and places and whose forms of management and improvement require comprehensive approaches and the construction of shared knowledge and practices among the actors involved.
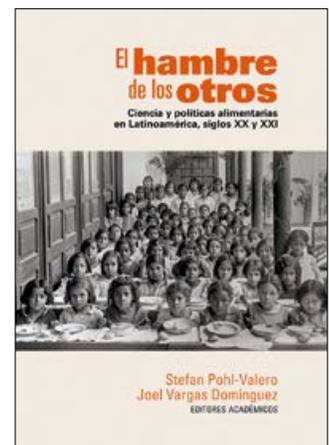
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ADMINISTRATION IN PHYSIOTHERAPY

Luis Fernando Rodríguez Ibagué y Claudia Liliana Guarín Espinosa

In writing this book, the authors have gained experience in management and entrepreneurship in physiotherapy and health throughout their working lives. With an in-depth analysis of the literature and professional experience, they examine the most relevant and useful aspects that should be considered when managing and administering physiotherapy, rehabilitation, and healthcare in general.
The book is organized into two sections. The first one corresponds to the administration in physiotherapy, with a focus on the quality of care. The second one focuses on the company's realization, with basic elements of the fundamental entrepreneurship and marketing for physiotherapy professionals, rehabilitation, and health services in general.

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COVID-19. CONSEQUENCES AND CHALLENGES IN THE COLOMBIAN ECONOMY. A VIEW FROM UNIVERSITIES

Darwin Cortés, Mauricio Villamizar Villegas, Christian Manuel Posso Christian

This book brings together different findings, perspectives, and effects of a phenomenon that, more than a year later, still represents a scientific, medical, and social challenge for everyone. In addition, this work represents the objective of the Red Investigadores de Economía: to join efforts to find answers and strengthen research in the country, increase the dissemination of quality work, and promote the meeting among academics, universities, and the Banco de la República. The studies included in this book underwent a selection process by the scientific committee, ensuring that there was a plurality of views and educational institutions, in addition to the bank, where the effects of the pandemic and economic activity in the country and the social and regional consequences are connected. The text is divided into four parts. The first part offers a macroeconomic analysis of the effects of the pandemic by examining the effects of the health emergency at the national and regional levels using macroeconomic models used to obtain answers to very relevant questions. The second section deals with the impact on the labor market, the effect of COVID-19 on income distribution, and the short-term effect on the urban market.

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BASIC PRINCIPLES OF PATHOLOGY FOR PHYSIOTHERAPY, VOLUME I

Guillermo Antonio Jiménez Tobón

Why is a tumor cell a good example of "survival of the fittest"? Why is a cell constantly fighting against entropy? Join me in this book to travel through the wonderful world of pathology. In this first book, we will explore basic pathology, starting with definitions, history, laboratory techniques, and we'll continue with the life and death of a cell. We will continue with the immune system and its diseases, genetics, hemodynamic disorders, infections, and neoplasms. The joint work between pathology professors and specialists in areas as diverse as physiology, genetics, microbiology has achieved this result. To explain each chapter, we have thought of it in the form of telling a story to guide the reader. The language used was clear, with metaphors and examples of daily life to illustrate and teach. We hope that this book will serve physical therapy students to have an understanding and overview of the pathology and that they find it relevant to their practice as physical therapists.

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NOT JUSTICE, DEMOCRACY AND TRANSITION IN LATIN AMERICA

Carolina Robledo Silvestre, Ana Guglielmucci, Juan Pablo Vera Lugo

This book asks why justice has not yet been possible in Latin American countries, which are facing new waves of amnesia, impunity, repression, and violence, without the wounds of the past being healed. The chapters explore the consequences of transitional justice programs, beyond the limits of law and institutions, to recognize the changes found in the languages, practices, senses, strategies, political repertoires, and lives of people who, with great creativity and resistance, yearn to overcome the violent past and achieve peace in their territories.

Página xx*

EDUCATION FOR LIFE. A COMMITMENT TO WELLBEING FOR THE MINDS AND HEARTS OF YOUNG UNIVERSITY STUDENTS

Laura Catalina García Mera y David Roberto González Rodríguez

Is there any real reflection on how to contribute to the formation of human beings in educational proposals? This is an essential question that preoccupies the i's, which becomes even more relevant and urgent in the midst of the 21st century, in a changing, globalized society that faces worldwide challenges. The Dean's Office of the University Environment of Universidad del Rosario has taken on the challenge of accompanying for 25 years generations of students in professional training and the discovery of their personal identity as well as strengthening their relationships with others, their ways of expressing themselves, and gaining self-care habits. The Vivir, sentir y disfrutar proposal of the Dean's Office of the University Environment guides them in outlining a life project with meaning and purpose, which allows them to act from their chosen profession with a maximum sense of responsibility and thus provide answers for the benefit of society and the world in which they live. This book shares proposals, reflections, and learnings about the transcendental value of thinking about an education project that goes beyond academic qualifications and invites young people, teachers, school counselors, and families to build an integral educational process committed to the wellbeing of the mind and heart of university students.

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BASIC PRINCIPLES OF PATHOLOGY FOR PHYSIOTHERAPY, VOLUME II

Guillermo Antonio Jiménez Tobón

How is seawater related to the colors of melanoma? Why does a gunshot make a sound? These questions, although seemingly unrelated to pathology, help us to marvel at this area of medicine. This second volume explores different diseases by systems most commonly observed in practice as physical therapists. In the final chapter, it presents the usefulness of pathology in physiotherapy and techniques that will help students to perform optimally as professionals. With a joint effort between pathology professors and medical and physical therapy students, each chapter tells a story that guides the reader with clear language, using metaphors and examples from daily life to illustrate and teach. This book will assist physical therapy students in understanding and overviewing pathology and finding relevance to their practice as physical therapists. It will also be useful as an introductory text for health science students who wish to explore the area of pathology.

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At URosario, we encourage our students to conduct research

Paula Andrea Pedraza

DAUGHTER OF THE ERA COMMITTED TO TRANSFORMING REALITIES

Forward-thinking and determined, with critical thinking, structured on equity and gender, this young researcher, a master's student in social studies at the school of human sciences, has defined her professional profile through her life stories.

INVESTIGATE WITHOUT STOPPING, JESÚS JAIMES MOTTO TO BE A SUCCESSFUL PROFESSIONAL

"We are what we do repeatedly; therefore, excellence is not an act, but a habit"
Will Durant

To promote and strengthen research training, the Vice Provost of Research and Innovation provides the research ecosystem of Universidad del Rosario with instruments and services. One of the major initiatives is set up by research incubators in response to the need to provide spaces aimed at favoring a culture valuing scientific research based on the application of methodologies of research training.

Journal
ADVANCES IN SCIENCE
Universidad del Rosario

Learn about some experiences from **#DivulgaciónUR** that make up our **Social Communication of Science Program**!

Women do science

An initiative that presents the work of **#InvestigaciónURosario** carried out by teachers in different knowledge areas to motivate young people to see science as a life option.

Universidad Ciencia y Desarrollo

Multimedia strategy that brings together contemporary science, technology, and innovation issues in different formats and with scientific support.

#InformalMENTES Podcast

Science without formulas. Put together and well made! InformalMENTES is a space presented by young people who deal with everyday, interesting, and even surprising topics using research analysis.

Find more initiatives from **#DivulgaciónUR!**

Directorate of Research and Innovation (DIeI)

Universidad del Rosario

VERY GOOD
★★★★
QS