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## **Supporting activism in Latin America: the role of science communication, science journalism, and NGOs in socio-environmental conflicts**

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### **Abstract**

This exploratory paper addresses the relationship of science journalism, science communication, environmental activism, and social movements. It draws on data from Latin America, exploring how journalists and activists use science communication as a tool for telling stories about environmental conflicts that frequently turn violent (more than 1600 land and environmental activists lost their lives between 2002 and 2020 in Latin America, more than three times that of all other regions of the world combined). The main goal of the paper is to understand how scientific storytelling by NGOs helps them present their points of view for journalists and to influence public opinion. Our data is drawn from the formal reports of four NGOs and from semi-structured interviews with representatives from each NGO's staff about their use of science communication. Our analysis suggests that Latin American NGOs use science communication tools such as scientific storytelling and scientific explanation to support journalists and to communicate with broad publics about complex phenomena such as socio-environmental conflicts, contributing to efforts to reduce the alarming amount of violence in the region.

Keywords: Latin America, science communication, environmental activism, socio-environmental conflicts, NGOs, public communication of science and technology

## **Supporting activism in Latin America: the role of science communication and NGOs in socio-environmental conflicts**

### **Introduction**

Scholarly attention to public communication of science—and especially science journalism—began in the middle of the 20th century. Since the 1950s, terms like “science literacy,” “public understanding of science,” “culture scientifique” [in French], and “apropiación social” [in Spanish] have attempted to capture the different goals of science communication, conveying meanings that sometimes complemented and sometimes conflicted with each other. Much of this research has taken place in the United States and western Europe, limiting its engagement with issues of global development.

In the 20<sup>th</sup> century, science journalists and other science communicators often described their goal as bringing to general audiences knowledge about scientific concepts and discoveries. In the last couple of decades, however, with the rise of what scholars call “public engagement,” science communicators have begun to see their practice as a tool not only for “educating” citizens but also as a way of making people an essential component of the process of science itself. These goals include public participation in the research process (Bonney et al. 2009) as well as in the governance of science (Irwin, 1995), ultimately helping people use science so they can become more capable of practicing citizenship in an independent and autonomous way.

Most research on public communication of science has focused on science journalists, science in the media, science museums, and public understanding of new and emerging science such as biotechnology and nanotechnology (Borchelt, 2012; Bauer & Howard, 2012; Suerdem et al. 2013; Jamison et al. 2017). But by focusing on “science” (especially as understood in the developed world), this work has missed a key area where scientific information interacts with public concerns: environmental activism. Recent scholarship has shown that activists can be understood as "alternative" science communicators (Fährnich et al. 2020), supplementing or even replacing science journalists. The research has identified many commonalities between how scientific institutions (as science sponsors) and NGOs ("non-governmental organizations," as activism sponsors) support public participation, using science as a persuasion tool. This shift towards linking science communication with activism is especially relevant for the developing world.

At least two characteristics are shared between “public engagement with science and technology” (PEST) and NGOs. The first is that both apply diverse strategies to engage people. Information campaigns organized by science museums and scientific institutions, for example, are attempts to inform individuals about the benefits and risks of science while seeking to negate pseudo-sciences. In this way, science communicators argue, citizens who are well-informed on scientific issues will be more independent, critical, and prepared to make decisions regarding scientific issues that have strong repercussions for everyday life. The same principle motivates NGOs that document and support physical activism on scientific issues. Their campaigns’ goals, whether focused on bringing attention to an issue or on protesting some position or action, are to persuade people about the value of their causes, both to recruit people to the cause and

to transmit the message of that cause to others. Many reports issued by NGOs draw on science to support their viewpoints, including reporting data, citing experts, or reviewing the literature about the issue. Though NGOs are not themselves journalists, they use the tools of journalism to achieve their goals. For both scientific institutions and NGOs, their work supplements and supports the work of journalists.

The second characteristic shared between PEST and NGOs is getting people active in the democratic process. NGOs, for example, build bridges between scientists and publics for the purpose of shaping public and political discourse.

PEST and NGOs both have the power to affect social changes, but very few publications discuss these subjects together. For this paper, we are focusing on NGOs as supporters of activists – that is, the NGOs may not themselves engage in physical activism, but they support the work of people who stage protests, present information to journalists, engage with universities, and put pressure on legislators and other actors. Activists can both value and be distrustful of science (Yearley, 1992), thereby dividing movement initiatives between criticizing science or engaging in scientific developments (McCormick, 2007). Recent publications have started to identify activists as "alternative" science communication (see Maesele 2009 and the papers collected in Fähnrich et al. 2020), but few detailed studies have appeared. This paper addresses this need by providing a detailed empirical case. We highlight the role of NGOs performing journalistic work to support activists and working journalists.

In science, there are many examples of controversy, with opposing sides and viewpoints (Lewenstein 2017). For environmental issues, in particular, different social values may

affect technical assessments in sciences such as geology, oceanography, ecology, and economics. For example, environmental economics may address the value of preserving natural areas in opposition to economic benefits for mining, logging or agribusiness companies. Different social values regarding the appropriate balance between extractive activities and protecting the environment and local communities may lead to different analyses. Thus “technical” issues may become socio-environmental conflicts, around which social movements can be built (Tarrow 2011).

For this paper’s purposes socio-environmental conflicts are defined as mobilizations by local communities (“social movements”), which might also include support of national or international networks against particular economic activities, infrastructure construction, or waste disposal/pollution when environmental impacts are a key element of their grievances (Temper, del Bene & Martinez-Alier, 2015).

Socio-environmental conflicts are a complex phenomenon with various actors involved: The state at different scales, from local governance to international agreements; economically and politically powerful private and public companies; marginalized populations who suffer different kinds of threats and killings and see their territory decreasing; NGOs trying to give assistance to those populations with support from scientific methods; and journalists trying to tell coherent stories that tie together diverse issues.

We are interested in studying social movements involving NGOs that use science communication as a tool to oppose powerful projects that generate socio-environmental conflicts – a general issue in global development. Many of these NGOs document

violence against activists, and use both journalistic storytelling and other communication tools such as advertising to combat violence in all its forms. Although groups of activists defending powerful interests, such as agribusiness, also exist, we are not considering them in this paper, though they must be studied in the future. For this paper, we are focusing on Latin America, which is the site of extensive violence against environmental activists.

We pose the following exploratory questions:

- 1) How do a sample of socio-environmental NGOs in Latin America use science communication to support activists by elaborating their technical materials in support of their campaigns and causes, and by providing formal knowledge to traditional communities in socio-environmental conflict areas?
- 2) How do NGOs understand the importance or helpfulness of formal scientific knowledge and knowledge drawn from traditional knowledge communities in supporting activists and raising awareness of socio-environmental conflicts?

## **Methods**

For this exploratory study, we chose one environmental NGO in each of three Latin American countries, and one transnational NGO. All of the NGOs focus on documenting human rights violations tied to environmental issues. They either have academic researchers in their teams responsible for making reports or they consult scientists to develop their data related to human rights violations against environmental

activists. All four use systematic scientific data to document the abuses committed against land defenders. They use these scientific data as part of their strategies for building arguments to attract media attention and change public opinion. None of the NGOs are directly engaged in protests or physical activism, but as one part of their work they are responsible for linking scientific institutions with broader environmental social movements.

For each NGO, we reviewed published reports and publicly-available documents from the beginning of the century through 2021, a total of 35. We chose this period for convenience, as this is an exploratory study. In many of the documents we analyzed, we found journalistic practices such as testimonies from victims in socioenvironmental conflict areas; articles and texts written in accessible form by experts in diverse scientific fields from academic institutions used for supporting arguments against violence and logging; and official data collected from the press and governmental institutions. For each NGO, we also conducted semi-structured interviews with one individual chosen by the department of communication of each NGO (one organization designated two people). Again, the exploratory nature of the study led to the small sample of interviewees. Their backgrounds were in advertising, sociology, journalism, communication, and human rights. Each interview took around 60 minutes and was made by audio conference via Zoom. The interviewers were in Ithaca, NY, USA, while the representatives were in Salvador, Brazil; Bogotá, Colombia; Mexico City, Mexico; and London, United Kingdom. One of us (DLO) transcribed and translated the

interviews. As we are interested in the institutional speech of each organization, and for safety reasons, we do not identify our informants by name or function.<sup>1</sup>

The NGO profiles and the reasons to select them are:

**Global Witness (GW)**<sup>2</sup>: Founded in 1993, GW considers itself as "pioneers in seeing the link between natural resources, conflict and corruption." This NGO has investigated and exposed environmental and human rights abuses in the oil, gas, mining, and timber sectors, and tracked ill-gotten money and influence through the global financial and political system. "We continue to focus on abusive actors, misuse of power and financial flows, but have turned our focus on some of the most urgent issues facing humanity: the climate emergency and attacks on civic space," according to the GW website. This NGO provides a broad view of socio-environmental justice, with data about environmental violence across the world widely seen as meticulous and trustworthy. Their data helped us have a global perspective on the conflicts before focusing on Latin America. We also collected from GW the number of killings of environmental defenders from 2002 to 2021, and all six in-depth reports about "Land and Environmental Defenders," which document violence against journalists (including both general assignment and specialized investigative journalists), indigenous people, traditional community members, and social movement leaders.

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<sup>1</sup> Because of our focus on institutions rather than individuals, the Cornell University Institutional Review Board for Human Participant Research deemed our research exempt from review.

<sup>2</sup> <https://www.globalwitness.org/>.

**Comissão Pastoral da Terra (CPT)**<sup>3</sup>: CPT was created in 1975, during a period of dictatorship in Brazil, at the Meeting of Bishops and Prelates in the Amazon Region summoned by the National Conference of Brazilian Bishops (CNBB). It was created “as a response to the serious situation faced by rural workers, squatters and peons, especially in the Amazon, exploited in their work, subjected to conditions analogous to slave labor and expelled from the lands they occupied.” Since 1985, the CPT Documentation Sector has collected and systematized information on violations of human rights in the country. These data are published annually in a report called Conflicts in Brazil, which is also known as the Conflict Notebook (CPT, 2019). We retrieved data from the “Conflicts in Brazil” annual reports – 20 total – from 2002 to 2021. CPT reports are cited by NGOs worldwide.

**Consejo de Redacción (CdR)**<sup>4</sup>: Established in 2006, CdR has developed a fact check tool called Colombia Check. A team of 50 journalists, developers and photo/videographers from ten countries (Argentina, Bolivia, Brazil, Colombia, Ecuador, Guatemala, Honduras, Mexico, Peru and Venezuela) work together to investigate episodes of violence against environmental leaders and their communities. The result of this investigative project is a database with 2,367 events in the years 2009-2019 and 45 in-depth reports (we counted this entire project as one report). The reporters often use scientists to help understand and describe the conflicts. CdR’s methods highlight the integration of journalism and journalistic techniques in NGO activities.

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<sup>3</sup> Pastoral Commission of Land, in free translation; <https://www.cptnacional.org.br/>

<sup>4</sup> Editorial Board, in free translation; <https://consejoderedaccion.org/> .

**Centro Mexicano de Derecho Ambiental (CEMDA)<sup>5</sup>:** CEMDA was created in 1993 “for the defense of the environment and natural resources.” Its mission is “to work for environmental justice, the well-being of people and development in harmony with nature,” and it describes its “fundamental axis of work [as] the strengthening, consolidation, harmonization, application and effective compliance of the current legal-environmental system.” CEMDA produces annual reports on the situation of environmental human rights defenders in Mexico. It has five regional offices across Mexico. CEMDA has published studies about water; air; biodiversity and woods; climate change; environmental defense; energy; seas and shores; and human rights. We analyzed all human rights reports from 2014 to 2021, eight total.

As we designed our semi-structured interviews, we drew on Jasanoff's (2003) theoretical concept of “technologies of humility,” which addresses the participation of experts, decision-makers, and publics in sociotechnical conflicts. According to Jasanoff, four "focal points... provide a framework for the questions we should ask of almost every human enterprise that intends to alter society: what is the purpose; who will be hurt; who benefits; and how can we know?" Those focal points provide the structure of our analysis: framing, vulnerability, distribution of benefits, and learning.

## **Results**

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<sup>5</sup> Mexican Center for Environmental Law, in free translation; <https://www.cemda.org.mx/>.

We report our interview data using Jasanoff's analytical framework:

- What is the purpose? (framing)
- Who will be hurt? (vulnerability)
- Who benefits? (distribution of benefits)
- How can we know? (learning)

### What is the purpose? Framing

The goal of many environmental activists – especially those from traditional communities – is to preserve their territory against exploitative and extractive infrastructure, mining and agribusiness projects. CPT, in Brazil, and CEMDA, in Mexico, draw on academic experts in different fields – such as Geography, Agrarian Sciences, Sociology, Pedagogy, Philosophy, and Law among others – to support the arguments of these traditional communities and to make reports that use science in the communications intended to impact public opinion. For example, when CdR issued its report "Land of Resistant" (Consejo de Redacción, 2019), journalists quoted academics that CdR helped identify to tell their stories. "To narrate an environmental catastrophe such as a breaking dam and floods in a territory, the experts that we need scientific information from are from Civil Engineering and Biology. The same happens to land subjects. Expert lawyers are required in land themes or Agrarian Law" (CdR interview, 2019). The conflict between environmental activists and their opponents often appears as an "emphasis frame" (Cacciatore et al. 2016, Scheufele and Iyengar 2015) contrasting "the importance of preserving the lands defended by traditional communities

to the necessity of progress from projects that impact the environment." The NGO and its reports serve as information sources for journalists, serving as "practitioners in the middle" (Rogers 1986).

One of the common goals of all three national NGOs is to raise awareness of the violence traditional communities experience in Latin America; all of them support journalists by producing reports in forms that can easily be picked up by major media, which frequently cover the importance of environmental preservation and the impacts of climate change. The main goals of these reports are to provoke individual behavior change and to pressure the State to act mitigating the violence against traditional communities.

Another frame highlights the structural and colonial aspects of the issue, making it more easily accessible to journalists. According to CPT, "the Brazilian agrarian question and all its conflicts and violence are structural. At the moment it expresses itself in a certain way, but it comes from far and tends to remain, re-creating itself in various ways.... Today's conflicts stem from recolonization. The trials of autonomy, of sovereignty that we had, were soon after prevented by a return to dependence. It [Brazil] is the region with the greatest intensity of natural resources: water, ore and biodiversity" (CPT interview, 2019).

The CEMDA representative said something similar: "In the end, there is a powerful struggle that is obviously totally unequal vis-à-vis the State, organized crime and also

business and investment interests also driven by development banks” (CEMDA interview, 2019). These concerns extend to most socio-environmental conflicts in Latin America. Making these social scientific frames available to journalists and publics is part of the science communication role of the NGOs.

These first two frames are inter-connected. According to CPT, national and global socio-political-economic alliances give the land economic value, and those who are in the areas of interest end up being the object of pressure and violence. “Today, according to our numbers, there is a drop of death cases related to the landless because there is a decline in land occupations and an increase in violence in relation to traditional communities and peoples: indigenous, quilombolas [descendants of enslaved Africans who had escaped their captors] and others” (CPT interview, 2019).

It is a project in which the public power creates special conditions of legislation and financing, encouraging the so-called development, the production of grains for export or cattle farming. Their capital ...operates in this way to attack in a violent way those on the land, on the field. Science is never an argument for them (CPT interview, 2019)

CdR points to another journalistic frame critical for stories about socio-environmental conflicts in Latin America: the patterns of threats and violence. Although this frame is not directly related to science communication, it clearly links to the earlier frames and, like the issues of colonialism and economic structures, the frame draws on social science communication. Many of the 35 documents we reviewed reported on more than an individual case. In ten Latin American countries there were patterns of violence,

criminal behavior, and lack of attention by public opinion and the State. CdR also identified patterns of impunity. “If you take the cases simply as individuals, you will not have the same ease to show precisely that they are systematic, they are constant and they are succeeding on a much larger scale than on an individual scale” (CdR interview, 2019). By calling attention to systematic data, the NGOs serve the needs of journalists to connect anecdotes to broader themes.

Although the NGOs often use “modern” scientific evidence, they recognize that another frame involves different knowledge systems. The traditional communities have a clear understanding “of the value of their territories and ecosystems, their own traditions and their own knowledge as a community and as an ethnic group. And also, the value of defending them. They are doing a work of resistance, which is cultural, social and of course environmental” (CdR interview, 2019).

Nonetheless, the NGO frames highlight scientific evidence, often combining it with journalistic storytelling. The reports from all four NGOs combine the reliable data provided by science tools (systemized data, interviews, previous research, among others) and the product of communication tools (e.g., emotional elements, storytelling, textuality) to persuade public opinion.

“The idea of making a special report about land defenders killings [first published in 2017] arose after one of our partners has been killed in Cambodia. When he was killed, we realized the importance of giving a voice to the people who were working with us. We’ve been working on mining, logging, natural resources extraction... All those problems, but not with the human element. It was in honor of that Cambodian partner.” (GW interview, 2019)

Our report is considered an academic publication. What CPT values is precisely to have a long period of analysis, a series of data that allow this monitoring, this comparison in time and space. This ensures that you can produce a scientific discourse and at the same time a political discourse. The reports are not made inside the academy and for academia. But scientific backing is fundamental if it is to have a political impact. It seeks the support of science to have the forcefulness and representativeness of what is said there. There is a quest to do the scientific method in data analysis. (CPT interview, 2019)

Thus the NGOs are using the tools of science communication – combining data with storytelling – to present their reports in support of activism.

#### Who will be hurt? - vulnerability

The range of people affected by megaprojects is wide and diverse: farm personnel from small communities, small farmers, small extractive companies, indigenous tribes, and others, all of whom are collectively called today “traditional communities.” Many of them are defined by ethnic, racial, or historical conditions. But other groups are defined by the environmental conditions of where they are or by their type of economic activity. “The number of occurrences of the various forms of violence against possession, property and the person, mainly in the Amazon Forest, is related to the land ‘regularization’ by federal and state governments on behalf of companies, the pressure of companies whether they are productive or speculative” (CPT interview, 2019).

The abundant natural resources of the region are themselves vulnerable to violence.

“The Latin American region has incredible pressure at the level of a geopolitical understanding of natural resources, which are strategic resources for investment. That is on the one hand. On the other hand, ...in terms of human rights defenders, violence is brutally concentrating on environmental defenders” (CEMDA interview, 2019).

Activism, journalism, and knowledge are intimately related, leading to another vulnerability: the leaders of traditional communities. They are the symbols of resistance and, therefore, the main people who receive attention from the media after being featured by the NGOs. (Unfortunately, non-activists are also victims, especially in massacres.<sup>6</sup>). Leaders combine the capacity to communicate and express themselves with accumulated knowledge about their people’s identity, the land, and the land’s importance for the community and for the preservation of the environment. The persons who have communicative skills and knowledge are more likely to be threatened. The leaders are also the ones who are more likely to appear on TV, or to be heard on the radio, or read in newspapers. Punishing them is also a way to intimidate others and send a message to remain silent.

Communication through the media is important for highlighting abuses in socio-environmental conflicts, yet simultaneously makes the leaders who are capable of communicating more vulnerable, by raising their profile. To combat this vulnerability, the NGOs need to first build relationships with traditional communities before they can help with scientific arguments.

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<sup>6</sup> CPT defines a massacre as when three or more people are killed for the same reason, at the same moment, in the same place.

In conflictual situations, solidarity comes first..... This is what we offer in the first place. We get there and check: Are there any wounded? Are there people who need to hide? Are there people starving? Are there people who need to get away? This is the first point: solidarity. But in a conflictual situation, it is not enough to put out the fire. The CPT can't be a firefighter as we often recognize ourselves. Often these victims were quiet there until they suffered some kind of violence. From then on, they awake to understand a little more about the world where they live, the role they play and why they are being the target of it. And then the CPT starts the process of formation, organization, and helps them create forms of organization. (CPT interview, 2019)

When the conflict breaks out that's the beginning of a process of discovery of the world, of engagement, empowerment, citizenship, and maintaining the heads up. Today, [they see] all these effects and beneficial consequences for everyone besides them and the planet itself. I find it harder today because when you can advance, the response on the other side is much bigger with all the barriers and limits. (CEMDA interview, 2019)

Once the relationships and deeper understanding are established, many environmental activists, especially the leaders, incorporate into their discourse with journalists material they get from scientists (through the NGOs). "They seize or use formal scientific discourse to compose their protective or attention-calling speech. We connect them to [data that] has to do with the right to justice, to information, to participation" (CEMDA interview, 2019). The scientific arguments help the activists create more institutional or formal defenses of their territory or their movement.

Another vulnerability is associated with place. Most socio-environmental conflicts take place in rural areas, far from large cities. The risk of the journalistic problem called

“Afghanism”<sup>7</sup> (Hungerford & Lemert 1973) is considerable. Much of the Latin American population is not aware of the numbers of threats and killings perpetrated far from the big cities. Among consumers of conventional media, there are few “fanatics” who care about the violent reality of rural traditional communities trapped in their own environmentally-critical lands. In fact, many media consumers may not think of the rural areas and the people in them as vulnerable, instead thinking of them as rich in resources. “We learn it all at school. You and I know that we have the [rich] Amazon. It is not a secret. Most people in our countries have never been there. But they know it’s there, they know it’s important” (CdR interview, 2019). The NGOs believe their role (through informing media stories) should be to explain to citizens the value of these collective assets.

It is clear that in almost all countries there is a very large vulnerability on the part of ethnic groups. This was something we did not have so obvious at the beginning. We weren't so aware. In fact, when we started, we saw that so many stories of ours were about indigenous people, or about the Amazon. Obviously, it is known that the Amazon is always very vulnerable, but that awareness arises throughout the project. I knew that in Colombia there was an acute phenomenon of violence against public environmental officials that was not counted. So, I sat down with many people from the environmental sector and thought about what stories I could tell about park rangers. Until one told me, there was a fundamental story to tell. And I started to investigate it. (CdR interview, 2019)

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<sup>7</sup> “The term “Afghanism” stems from an earlier, less-connected world, when an editor (around 1948) told his colleagues that “... many editorial writers can't hit a short range target...You can pontificate about the situation in Afghanistan in perfect safety. You have no fanatic Afghans among your readers.” Hungerford & Lemert (1973)

CdR wanted to expose the story of a person living in a very isolated place where something terrible happened, who media consumers could feel empathy for. “These people are defending a collective heritage of their own. They are the protection of this natural resource that must be relevant to them for these reasons. You should care as a reader. This variable we’ve incorporated within the report and the stories” (CdR interview, 2019).

All four NGOs reported that when the media – in many cases through the NGOs reports – calls attention to an issue, the number of killings and threats momentarily decreases in the conflictual region for as long as the media coverage lasts. The challenge for NGOs and victims of socio-environmental conflicts is to create an ongoing reduction in vulnerability. They believe that public opinion is the leading actor in avoiding violence. Public opinion involves consumers, which public companies don’t want to lose. Public opinion is also the basis for voters, which politicians fear.

#### Who benefits? – distribution of benefits

In many socio-environmental conflicts, powerful companies already have mechanisms to spread their viewpoint through the media. The reports that NGOs issue may be seen as counterpoints to the arguments broadly disseminated by companies that say “progress” requires impacting the environment to achieve well-being. The companies often, for obvious reasons, hide harmful consequences from their discourse. They highlight increasing population, the need for new jobs, and thus the need for new resources as arguments for allowing an impact on the environment.

The NGOs see their role as providing the counter-arguments for journalists, especially to highlight the benefits being taken from traditional communities. For example, there is constant pressure on traditional communities to relinquish their lands and be dislocated to other regions. But in many cases, they are being asked to leave areas protected by national, state or local policies, which scientific studies have shown to have important value (for example, as forests). The lands also have historical and sacred meanings for traditional communities, as well as being the source of economic activity for most of them.

The NGOs use science communication to highlight the different benefits. The CPT's journalists, for example, work "to make [clear] this repercussion of the struggles, the complaints and seek to form an opinion, public support and concrete support" (CPT interview, 2019).

Similarly, CEMDA argues that the State must recognize traditional knowledge from indigenous peoples. "We fight very clearly for the autonomy of communities. They must be able to manage and make decisions about their territory. There we see that it is also a necessary bridge between how the State builds public policies, taking scientific studies, but that it is also necessary to incorporate traditional knowledge" (CEMDA interview, 2019)

"We see that there is a distance between how the State conceives its policies towards traditional communities and traditional lands, but also the academy of science in those territories and how communities can make a synergy between traditional knowledge and academic studies. There is an important bridge that

we try to understand and build with communities between downloading and socializing technical, scientific information, but also incorporating traditional and ancestral knowledge in terms of human rights” (CEMDA interview, 2019)

### How can we know? – learning

The NGOs use their reports and other communication strategies to spread their studies and causes. As media sources, they use the tools of science communication to enhance their reach. For example, CEMDA carries out workshops, press conferences and breakfasts combining the presence of scientists and members of traditional communities when they want to approach a very complex theme or give it additional value and support scientific issues. “We have done it for a long time as a communication strategy. Especially for issues that have to do with climate change, we invite people from universities, institutes, sometimes foreigners. Then we combine it with the work that CEMDA is doing.... We use a lot, for example, to bring someone from the community to talk directly about the testimony of what they are living” (CEMDA interview, 2019).

Similarly, CdR’s project “Land of Resistant” is a communication project that aims to raise awareness, increasing its impact by gathering journalists from different areas of social expertise and different Latin American countries. “It is increasingly clear that the projects with the greatest journalistic impact, in recent years, are collaborative works. That is, we have slowly, but quite effectively left the stereotype or the tendency of many journalists that journalists only work alone” said CdR. Describing socio-environmental

conflicts with a group of journalists is also a way to “legitimize” the coverage and “increase the range of impact” (CdR interview, 2019).

In these campaigns about socio-environmental conflicts, NGOs provide evidence about risks to help journalists and citizens understand the inherent conflicts in discussions of progress vs. environmental conservation. All the NGOs emphasized the importance of data and scientific analysis.

If you are not anchored in science, legitimized by what the scientific evidence points out, you are mischaracterized, you are disrespected. The result is the opposite effect of what you intend to do in terms of reporting. This is the case of our reports. If you do not have the minimum rigor required by these people who analyze it from different fields of science, you do not have the maximum impact that the report can have. This ensures that you can produce a scientific discourse and at the same time a political discourse. Scientific backing is critical if it is to have a political impact. (CPT interview, 2019)

To ensure proper use of science in its activities, especially in its reports, CPT relies on the expertise of academic researchers who study social movements, agricultural planning, political theory, peasant agriculture, activism in the countryside, and other topics.

CPT builds their arguments from four cornerstones: ethics, pedagogy, history, and science. They justify the use of science:

Scientific [cornerstone]: because the rigor, the methodological procedures and the theoretical framework allow to systematize the data in a coherent and explicit way—. The concern to give a scientific character to the publication does not exist in itself, but so that access to these data can feed and reinforce the struggle of the workers themselves, in their confrontation with the large estates. It is not simply a matter of producing mere statistical data, but of recording the History of the struggle of a class that is secularly exploited, excluded and abused. (CPT interview, 2019)

CPT started working with academics “in a very close relationship” (CPT interview, 2019) from its beginnings. At first, at the end of 1970s and the beginning of 1980s, individual professors offered classes, seminars and talks on methodology, history, and sociology related to agrarian and rural perspectives. In the early 1990s, members of CPT participated in the first courses presented by the Landless Workers Movement (MST) in partnership with universities all over Brazil. Only in the mid-1990s did CPT start offering formal extension and specialized courses in topics like Popular Educational Methodology and Agrarian Law. Another initiative to unite academics and CPT personnel is its annual meeting. These activities extend the NGO beyond simple information transfer, and into the broader realm of public engagement with emerging knowledge.

We have an annual training meeting of around 40 agents with representatives from all states and national and regional coordinators. There is always a main related theme. There was a year when the subject was the resignification of the agrarian reform. We call professors like [provides a list]... People who are from

academia and science, who have lots of accumulated knowledge about it and update the subjects. That's a good example of how we qualify ourselves using science and, in the case, communication is interconnected. Therefore, they help us to improve the way we speak, what we speak with local communities from and to them. (CPT interview, 2019)

Similarly, CEMDA has ‘‘a lot of relationships with academics for many years: since CEMDA was created, it has been hand in hand with many academic institutions’’ (CEMDA interview, 2019).

Everything we have done to defend the heritage of the land and traditional communities was with researchers. They are those who have provided us with inputs and together with them we have produced reports that are supported by the University. In the case of these human rights communities, we also look for academics from the National University. Let's say several universities and academic institutions that we share the information with, they give their opinion, we take inputs from studies that they have done and that is how it is complemented. (CEMDA interview 2019)

CEMDA says that science and science communication regarding socio-environmental conflicts helps provide balance for understanding the tension between ‘‘preservation’’ and ‘‘progress.’’ But balance is hard to achieve, ‘‘since indeed the economic and political interests are very large, and we have many lags in ...access to justice.’’ According to CEMDA, Mexican justice institutions are sometimes neither effective nor timely in

providing the justice that communities require. “But, of course, science has contributed and of course it has been an instrument for us, a fundamental tool” (CEMDA interview, 2019).

The collaboration of academics and experts and the communication of science can be part of the solution to conflicts. Not entirely because the political and economic powers are quite strong, but it is part of the strategy of convincing people about the importance of the preservation of both territories and traditions. (CEMDA interview, 2019)

CEMDA says that it also works as a bridge connecting authorities and indigenous communities. “There cannot be two diversified knowledges, because the State is based on certain scientific.... [But] decisions are made in the territories where the communities are. In the end, the indigenous leaderships also fight for this recognition of ancestral knowledge. Decisions made regarding traditional communities’ territories should consider traditional knowledge.” (CEMDA interview, 2019).

To counter the arguments from big companies about environmentalists (such as “you are always opposed to everything,” “you always say ‘no’ to everything,” “you are against development,” or “you want to say no to jobs”) CEMDA is developing another communication strategy tied to science.

What we have tried to do also through science is ...speak in the language of money, because we can understand this business sector and some entrepreneurs with whom we want to approach. Then, with help from environmental engineers

and environmental economists from UNAM [Universidad Nacional Autónoma de México], . we are proposing to put an economic value on three cases. The first, we were taking in terms of mangroves, how much one hectare of mangrove is worth. Second, how much the destruction of a dune is worth. Third, how much would have to be invested to replace a forest, in terms of oxygen generation. We are trying to make them understand that it's not only because we like trees, because they are beautiful, but because environmental services generate economic value and by destroying it, they are also destroying their own interests. So, it has also helped us a lot to rely on biologists, environmental engineers, environmental economists ... specialists of these fields. (CEMDA interview, 2019)

Though the NGOs serve primarily as mediators, connecting the scientists with media and other publics, their self-identity can be ambiguous. The CdR's "Land of Resistant" is an investigative journalism project that depends on science; yet the journalists involved had no central or institutional scientific guidance. However, all the journalists consulted scientists while writing their stories. The CdR both facilitated those connections and helped shape them. "Most of us would define ourselves as journalists on social issues. But we all understood from the beginning that we should explain the value of these ecosystems and for that there is a work of scientific journalism," said CdR. "If I care about the story of the uru-I-wau-wau [an Indigenous community], I have to tell you how important is that territory they inhabit in Rondonia [a region of Brazil]. That was the point when I realized that scientific journalism was critical," (CdR interview, 2019).

Ultimately, the NGOs are integrating the learning that science provides with their own journalistic perspectives. They find that, in socio-environmental conflicts, they cannot avoid taking the victims' side. The journalists have lived together for weeks alongside the victims' relatives and the families have shared their memories with journalists. At the same time, a desire to make the population "to be aware" and "to have access" or "launching alerts" and "prevent threats" are fundamentally the same objectives as those pursued by activists.

Why is it important to know that there is a tree frog in a very particular corner of the Colombian Amazon? Why does it matter that it is in a desolate place or in a high mountain ecosystem from where the rivers come that end up nourishing the Amazon basin and why is that important for us not to lose it to mining? One question that must be permanently addressed in the Latin American continent is how to explain its value. In this sense, scientists are the ones who can best help us. For several reasons: first, because they have the answer, the wisdom. For most of [the scientists], in Latin America, they are not used to it because we have quite low levels of scientific communication from the sciences, from universities and researchers. We have to try to understand what that matters for. How can we make it clear why these stories should matter to us? The importance of being able to document and study, I feel that this is one of the hardest things that we have done in our work, in general, for Latin American journalists and also scientists as well. (CPT interview, 2019)

## Discussion

This paper is an initial, exploratory attempt to show the role of science communication and science journalism in the many social systems trying to affect public opinion about socio-environmental conflicts in developing countries, using examples from Latin America. We have seen that NGOs use science communication -- the ability to use communication skills to make science accessible and understandable in a wide perspective -- as a key tool in their work. But science communication is not the only tool. Sometimes, the NGOs' strategy for affecting public opinion uses other storytelling or narrative tools, especially for drawing on the emotional appeal of people truly suffering.

“Let's take the plastic case as an example. If you say: 'The plastic pollutes'. When you show images of marine dead animals because they have consumed plastic, people didn't have even considered reducing plastic use. As a communicational strategy, there is an emotional component used in the Land Defenders campaign or with animals that take more effect than scientific data” (GW interview, 2019)

In terms of campaigns' impact, we've noticed that the land defenders campaign has much more attention than the problems that are behind the conflicts: mining, logging, corruption.... We think that sometimes, scientific evidence or a super detailed investigation about the problems happening in a certain sector doesn't have the impact as much as showing that people are dying because of it.” (GW interview, 2019)

The results can be more direct: several of the interview subjects noted that media coverage often led to a decrease in the amount of violence for a while.

As Weingart & Pansegrau (1999) point out, reputation in science and prominence in the media are phenomena that can go together. Our initial evidence suggests that NGOs that deal with socio-environmental conflicts tend to combine the reputation of science and the narrative power of the media in a mutually symbiotic way. The scientific evidence in the NGO reports and the communication campaigns try to get space in the media and accomplish at least two main goals: denouncing a critical situation of people being displaced, threatened and even killed and raising awareness of possible partners and sponsors.

To achieve the power of combining science and narrative, the NGOs we studied use a variety of strategies. The analytical framework suggested by Jasanoff gives us a way to see those strategies: choosing different emphasis frames, highlighting the vulnerability of environmental activists, showing the competing benefits, and providing information for learning. The NGOs work closely with journalists or are themselves acting as journalists, making science communication fundamental to their work. In this way, we see “objective” science becoming fundamental to activist communication.

Each of the NGOs accomplished this work in different ways. CPT in Brazil, with more than 40 years of experience supporting marginalized communities, takes a holistic approach. Supporting local communities with offices distributed all over Brazil, CPT

uses a multidisciplinary team that addresses the whole conflictual process – from the first aid through to empowering traditional communities to be more aware and engaged (CPT interview 2019). CPT uses science as one of its cornerstones, combining it with more emotional forces such as the genuine spirit of popular religiousness.

In Colombia, CdR uses the tools of science communication in a different way.

According to international and national NGOs reports, Latin America is one of the most dangerous places for environmental defenders and members of traditional communities. However, the data capture is only possible because the region also allows civil society to publish and denounce the threats and killings, mainly in newspapers and other news media. CdR shows how journalism combined with scientific expertise works as a consciousness tool.

CEMDA, in Mexico, tries to defend traditional communities' rights and preserve the Mexican environment through the use of law. For them, using scientific reports to make companies involved in megaprojects understand the value of keeping forests standing, rivers flowing, animals living, and plants reproducing has a bigger purpose: demonstrating how the economic worth of the environment can reshape the problem. They also show how considering both traditional and formal knowledge is fundamental for seeking harmony and dialogue.

CEMDA's main function is to generate environmental technical inputs, especially for environmental law. According to CEMDA, their work is done very closely with local legislatures, to create proposals, legislative changes, implementation and generation of public policies on environmental subjects. This means that they push for "the adoption

or modification of laws in environmental policies in different levels of the State.'.

CEMDA uses science communication when it can play a role in CEMDA's purposes.

Another institutional task is to "recognize Mexico as a pluricultural State and the traditional and ancestral movement in indigenous communities,'. fighting for a recognition of local knowledge. "The importance of their territory, what are the impacts on it, and how it is formed. Since it is very important to us it is something that we have promoted from a political agenda" (CEMDA interview, 2019).

These examples show that the ideas of "public engagement in science" (including science journalism) and of environmental activism share traits. Both point to the need for an environment of respect and knowledge. Both seek to change social realities (or in the case of traditional communities to maintain their territories and habits), to help people to be critical, independent and free to participate in relevant debates of our time. Public engagement and activism merge when organizations like the NGOs described here use journalistic tools (of investigation and storytelling) to provide stories for the media and other audiences (like legislators) that will move those audiences to action.

But there is a cost of combining activism and science communication. Activism requires constant energy in the face of opposition. The CPT representative we interviewed expressed exhaustion, a need to recruit fresh activists. "I'm a little disbelieving. Thirty years ago, we had a lot better, positive expectations. We felt like we were changing the world. There was something much bigger, there was an *elán*, a reason, an involvement that was a little part of the meaning of life. I see that youth today do not have the same desire and many of the leadership activists are aging. In addition, no one tracks the

conflict, severity, and extent of problems in the same responsiveness” (CPT interview, 2019).

Similarly, CEMDA understands that science communication is only part of the process.

But there is a self-critical issue that we have valued is that in the end, by making visible we will not transform anything. In this sense of all these years we have made the annual report we have not seen a real change. We have not seen an impact on the change of the narrative, there has been no decrease in violence. What we have valued, reflected is that we need to generate spaces for dialogue with environmental authorities that have a fundamental role in how and when environmental conflicts originate in order to have an impact on policies and decision-making and especially on prevention issues. (CEMDA interview, 2019)

According to CEMDA, people who defend human rights are exposed to a series of aggressions, which can be increased to the highest visibility in the public sphere. “The stigma is a process of dehumanization, degradation, discrediting and devaluation of people from certain groups of people, due to the feeling of disgust, which they consider ‘inferior‘ to ‘abnormal‘ (...) Those who are in a situation of power, can use it to impose these stigmas.” For CEMDA and the other NGOs, science-based reports that are made available to audiences through the tools of science communication are one part of countering unbalanced relations of power.

Science communication provides a tool for calling attention to the violence perpetrated on vulnerable groups. CEMDA in Mexico, for example, calls attention to the high number of unpunished cases of violence. It is very difficult to document these types of cases when people decide not to speak about it. “It is a very deep issue and very difficult to study and locate those patterns. We can’t have an absolute reading of the problem because of the bias of sources and limitations in understanding it” (CEMDA interview, 2019).

The main objective we have with these reports above all is to make visible the situation of aggression and violence on defenders and communities. We are monitoring a situation and analyzing patterns identified at a national level and even at a regional level. For us, making it visible has been very important because in the end it is an approximation to a reality. We have made some recommendations of what could be done to take action on the matter.” (CEMDA interview, 2019)

Our study is an initial, exploratory study. More work is needed to further understand the use of science communication and especially science journalism by NGOs engaged in developing countries. We need much more empirical work across the globe. We might elaborate, for example, on the specific relations between traditional communities’ knowledge, formal scientific knowledge, and science journalism practices. We might study in greater depth the relationship of science journalism and activism in other socio-environmental conflicts, such as renewable resources projects. We hope these future studies might contribute to preserving the environment, to reducing inequality both in

Latin America and worldwide, and to providing evidence for the importance of communication about traditional communities' heritage for the world.

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