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Vulnerable populations in South America and facing the pandemic: what can our experiences reveal to the world?

Populações vulneráveis na América do Sul e enfrentamento da pandemia: o que nossas experiências podem revelar ao mundo?

Poblaciones vulnerables en América del Sur frente a la pandemia: ¿qué pueden revelar nuestras experiencias al mundo?

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Tális Pereira Matias
ORCID: https://orcid.org/0000-0002-3565-0295
Universidade Federal de Alfenas, Brazil
E-mail: talismatias12@gmail.com
Adriana Maria Imperador
ORCID: https://orcid.org/0000-0002-9755-2586
Universidade Federal de Alfenas, Brazil
E-mail: adrianaimperador@yahoo.com.br
Luciana Botezelli
ORCID: https://orcid.org/0000-0002-5916-0442
Universidade Federal de Alfenas, Brazil
E-mail: luciana.botezelli@gmail.com
Daniela Rocha Teixeira Riondet-Costa
ORCID: https://orcid.org/0000-0001-9355-6056
Universidade Federal de Itajubá, Brazil
E-mail: daniela.unifei@gmail.com
Vívian Ariane de Oliveira Costa
ORCID: https://orcid.org/0000-0002-1817-5381
Universidade Federal de Alfenas, Brazil
E-mail: vivi_ariane@yahoo.com.br
Letícia De Alcântara Moreira
ORCID: https://orcid.org/0000-0002-7880-3001
Universidade Federal de Itajubá, Brazil
E-mail: leticiamoreira@unifei.edu.br

Abstract
The new coronavirus (SARS-CoV-2) pandemic brought an unimaginable health and humanitarian crisis to humanity, in addition to the need to rethink our way of life in society. The objective of this paper was to present data on the evolution of the pandemic in South America and the first confrontation measures adopted by governments, highlight the importance of scientific dissemination and demonstrate how social inequalities, especially in traditional vulnerable communities, can further impact small isolated populations. The exploratory study used secondary data from scientific articles, legal regulations, and informational and/or official communications, in relation to the advance of the SARS-CoV-2 pandemic in the South American continent. The results showed the importance of science in the dissemination of measures to prevent the spread of SARS-CoV-2, the need for a prioritization and logistical plan for vaccination and disease prevention in traditional vulnerable communities, and that the lack of access to connectivity, as an alternative to educational actions in a moment of social isolation, can further increase social inequalities. It was concluded that environmental education can directly contribute to the democratization of scientific information, collaborate in the construction of strategies to face the pandemic in South American countries in partnership with Governments and Non-Governmental Organizations, and facilitate the resumption of social and educational activities, seeking the construction of inclusive public policies and environmental justice, besides reducing inequalities.
Keywords: COVID-19; Environmental education; Equality; Environmental justice; Public policies; Educommunication.

Resumo
A pandemia do novo coronavírus (SARS-CoV-2) trouxe uma crise sanitária e humanitária inimaginável para a humanidade, além da necessidade de repensarmos nosso modo de vida em sociedade. O objetivo deste trabalho foi apresentar dados sobre a evolução da pandemia na América do Sul e as primeiras medidas de enfrentamento adotadas

pelos governos, destacar a importância da divulgação científica e demonstrar como as desigualdades sociais, principalmente em comunidades tradicionais vulneráveis, podem impactar ainda mais as populações vulneráveis. O estudo exploratório utilizou dados secundários de artigos científicos, normativos legais e comunicações informativas e/ou oficiais, em relação ao avanço da pandemia de SARS-CoV-2 no continente sul-americano. Os resultados mostraram a importância da ciência na divulgação das medidas de prevenção à disseminação do SARS-CoV-2, a necessidade de priorização e plano logístico para vacinação e prevenção de doenças em comunidades tradicionais vulneráveis, e que a falta de acesso à conectividade, como alternativa às ações educativas em um momento de isolamento social, pode aumentar ainda mais as desigualdades sociais. Concluiu-se que a educação ambiental pode contribuir diretamente para a democratização da informação científica, colaborar na construção de estratégias de enfrentamento à pandemia nos países sul-americanos em parceria com Governos e Organizações Não Governamentais, e facilitar a retomada das atividades socioeducativas, buscando a construção de políticas públicas inclusivas e justiça ambiental, além de reduzir as desigualdades.
Palavras-chave: COVID-19, Educação ambiental; Igualdade; Justiça ambiental; Políticas públicas; Educomunicação.

Resumen
La pandemia del nuevo coronavirus (SARS-CoV-2) trajo a la humanidad una crisis sanitaria y humanitaria inimaginable, además de la necesidad de repensar nuestra forma de vida en sociedad. El objetivo de este trabajo fue presentar datos sobre la evolución de la pandemia en América del Sur y las primeras medidas de enfrentamiento adoptadas por los gobiernos, resaltar la importancia de la divulgación científica y demostrar cómo las desigualdades sociales, especialmente en las comunidades vulnerables tradicionales, pueden impactar aún más a los pequeños y aislados. poblaciones El estudio exploratorio utilizó datos secundarios de artículos científicos, normativa legal y comunicaciones informativas y/o oficiales, en relación con el avance de la pandemia del SARS-CoV-2 en el continente sudamericano. Los resultados mostraron la importancia de la ciencia en la difusión de medidas para prevenir la propagación del SARS-CoV-2, la necesidad de una priorización y plan logístico para la vacunación y prevención de enfermedades en comunidades tradicionales vulnerables, y que la falta de acceso a la conectividad, como alternativa a las acciones educativas en un momento de aislamiento social, puede aumentar aún más las desigualdades sociales. Se concluyó que la educación ambiental puede contribuir directamente a la democratización de la información científica, colaborar en la construcción de estrategias de enfrentamiento a la pandemia en los países de América del Sur en alianza con los Gobiernos y Organizaciones No Gubernamentales, y facilitar la reanudación de las actividades sociales y educativas, buscando la construcción de políticas públicas inclusivas y de justicia ambiental, además de reducir las desigualdades.
Palabras clave: COVID-19; Educación ambiental; Igualdad; Justicia ambiental; Políticas públicas; Educomunicación.

1. Introduction

In early March 2020, the World Health Organization (WHO, 2020) declared the new coronavirus SARS-CoV-2 pandemic. A global race then started to understand the transmission dynamics of the new coronavirus, COVID-19, the name given to the disease caused by the new coronavirus, spread through Asia, Europe, and finally reached South America and other continents.

The speed with which the pandemic has spread across the world has caused a great deal of effort by scientific institutions in the search for effective control measures, seeking treatment for patients and the development/production of a vaccine. However, the precarious socio-economic scenario of South American countries and the vulnerability of their traditional populations have become the greatest challenges in fighting COVID-19 (Cunha, 2021; Freitas et al., 2022).

In addition, less privileged social groups suffer most from the lack of basic resources to protect themselves from the COVID-19 pandemic, which highlights the importance of fair environmental governance with an understanding of the conceptions of justice and integration between science and education environmental, politics and society (Figliozzi & Unnikrishnan, 2021; Gurney et al., 2021).

The objective of this article is to make a historical review of the evolution of the pandemic in South America, through the survey of data from government and research institutions, comparing social, economic, environmental, scientific dissemination and emergency public policy aspects. In addition, to compare the effectiveness of environmental actions and scientific communication that favored the protection of vulnerable communities and the environment.

2. Methodology

For the writing and discussion of this article from the perspective of the authors, bibliographic and documentary research were used to achieve the proposed objectives. The bibliographic research was developed considering the period from 2016 to 2021. The documentary research was supported by the methodology presented by Estrela, et al. (2020). An exploratory study was conducted, with secondary data from scientific articles, news releases, official releases, and legal regulations.

The databases consulted were the Scientific Electronic Library Online (SciELO), Our World in data, Google Scholar. In SciELO, the following descriptors were used: COVID-19, vulnerable communities, traditional communities, traditional communities in South America, impacts of the pandemic, pandemic in the Amazon. The platform Our World in data creates, from official data, global panoramas of COVID-19. In this context, the research was used as a filter to the area of interest, in this case South America. In Google Scholar, the terms: connectivity and pandemic of the new coronavirus were used. The Ministry of Health websites of all the countries mentioned were also consulted about control and monitoring of COVID-19. All articles selected, consulted, and used, as well as the official government websites, are referenced at the end of this manuscript.

The study, based on the aforementioned documents, presents reflections by the authors based on the proposed objectives. According to Estrela et al. (2020), reflection is inherent to the researcher, since knowledge depends on it to be built, and reflection is an essential method for rethinking and reorganizing care. The documents must be analyzed by the researcher, who will expose their interpretation of the object of study (Pereira et al., 2018). The documents used were selected based on a systematic search on websites of government and research institutions, comparing social, economic, environmental, scientific dissemination, and public policies.

The inclusion criteria were articles that dealt with the proposed objectives and the period considered. Manuscripts were selected after reading the title, abstract and conclusion. After this step, the articles were read and analyzed, and only those manuscripts most relevant to the objective of this research were used. As an exclusion criterion, the unavailability of the article in full and free of charge was considered, as well as the chosen time frame. The results of this research showed the main government actions in the countries of South America and their main social and environmental implications.

3. Results and Discussion

3.1 The Beginning of the New Coronavirus Crisis and the First Government Measures

In South America, the first government actions taken to contain the spread of the virus started in March 2020, as soon as the World Health Organization declared the pandemic. At first, the measures focused on isolating and minimizing contagion among people and, later, on measures of economic assistance, according to Table 1.

Table 1. Main initial measures taken by South American governments against the new coronavirus pandemic in South America.

Measure	Countries that have adopted
Creation of mechanisms to control the economy	Argentina; Bolivia; Chile; Brazil.
Creation of social assistance mechanisms	Bolívia; Brazil, Chile; Ecuador; Peru; Suriname; Uruguay; Venezuela
Expansion of health services	Suriname; Venezuela

Source: Argentina (2020); Bolivia (2020); Brasil (2020); Chile (2020); Ecuador (2020); Peru (2020); Suriname (2020); Uruguay (2020); Venezuela (2020).

When analyzing data on the fatality rate (ratio between confirmed deaths and confirmed cases) at the beginning of the pandemic in South America, it is observed that Ecuador is the country with the highest mortality rate due to the disease, followed by Colombia and Peru (Our World in data, 2021). However, it is worth mentioning that there may be underreporting of cases, especially in isolated regions.

The first country on the continent to force the population to adopt the isolation, with few exceptions that allowed the movement of people, was Venezuela, also in early March 2020. In April of the same year, Argentina, Chile and Paraguay adopted lockdown with minimal exceptions (Our World in data, 2021).

In this scenario, using different strategies and platforms, scientific dissemination builds bridges and dialogues between science, health, media, culture, and society in the world (Almeida et al., 2020). Based on that, the government authorities of countries in South America also showed concern to broadcast relevant information on official websites and social networks and, thus, to spread knowledge about COVID-19 to the population. The lack of understanding about the etiology of the coronavirus, associated with its rapid spread around the world, has resulted in fear, rumors, and prejudice among the population. There were fallacious theories verified in Chile, Colombia, Venezuela, and Argentina (Ceron, et al., 2021).

In this context, there was a significant increase in cases in South America after June 2020. Brazil started a strong growth in the number of notifications and deaths resulting from COVID-19. Considering the number of deaths, Brazil was the epicenter of the pandemic in South America, followed by Peru and Colombia, in the same period. In the country, there was a significant increase in the number of deaths as of February 2021, it is worth mentioning that Brazil is the country with the highest number of deaths since August 2020 within the continent study. However, in number of cases, Argentina, followed by Peru, are the countries with the highest numbers, with Brazil in third place (Our Word in data, 2021). In this context, such data shows that Brazil has limited response mechanisms and resources, compared to Argentina and Peru.

3.2 Socio-Environmental and Economic Vulnerability in South American Communities

Since mid-1995 there have been intense transformations in the public, socio-political, economic, cultural, and environmental sectors in South America, with serious consequences for human rights and the environment. These changes led to conflicts and strengthened the fundamentalism that threatens democracy in several countries and places vulnerable and less privileged social groups at the mercy of adverse conditions to face the COVID-19 pandemic, highlighting the social inequalities in several regions of South America (Cunha, 2020).

In the absence of dialogue and cooperation among countries, public and private authorities and society, different social groups are being increasingly marginalized and affected by the effects of the pandemic. Furthermore, the difficulties in meeting the determinations of the World Health Organization (WHO) in countries with social and environmental weaknesses aggravate the exclusion and vulnerability of certain communities, which lack water in sufficient quantity and quality, energy, hygiene, housing, work, transportation, health, leisure and a preserved environment, which highlights the emergence of sustainability and opens up simple facts, such as washing hands with soap and water, to have become a privilege (Estrela, et al., 2020; Matias, et al., 2020).

In general, traditional communities are those consisting of culturally differentiated groups of people who recognize themselves as such, occupy a territory, have their own forms of organization, cultural, social, religious, ancestral, economic reproduction and intimate relationship with nature, excluding the standard of humanity determined by the sovereign subject for these communities (male, White, cis/straight, Christian, landowners and without disabilities) (Cunha, 2020; Gomes, et al., 2020). These communities are considered vulnerable since they are on the margins of society, with little or no social representation, fragile socioeconomic situation, without stability and commonly with difficulties in accessing health, education

and housing (Cunha, 2020; Marín, 2020). Are groups that have suffered attacks, with rights denied and dismantled, contempt and silence in the current context (Gomes, et al., 2020; Porto, 2020). Among these groups, many fishermen who had their activities interrupted and did not have the necessary subsidies for their survival, ended up carrying out illegal fishing and sales, unreported and unregulated, putting their lives at risk (Bennett, et al., 2020).

Indigenous peoples, quilombolas and other minorities have also been suffering severe impacts resulting from various forms of exclusion, such as racial discrimination, intolerance, lack of assistance from governments, loss of territory and conflicts with large landowners, which may include invasions from grileiros (description of groups that hold land with false and illegal documents), illegal loggers, miners and missionaries, who act as vectors of the new coronavirus (Escobar, 2020). All of this, intensified by the growing scenario of authoritarianism and the attack to human rights and democracy of some governments (Gomes, et al., 2020; Marinho, 2020), increase the vulnerability of these groups to the effects caused by the pandemic and the measures necessary for its control.

The rampant capitalism that results in deforestation, pollution and environmental impacts has been spreading in South America, facilitating the exchange of microorganisms and pathogens that can contribute to the spread of diseases with damage that can be irreversible (Ardila, et al., 2020). There are strong indications of the systemic origins of the pandemic in the mode of production that destroys nature, eliminates biodiversity and creates agrifood systems that, according to the Indian Vandana Shiva, does not produce food, but commodities (goods), environmental degradation and diseases (Joly & Queiroz, 2020; Porto, 2020). Urbanization in the metropolises of Bogotá, Lima, Santiago, and Rio de Janeiro are examples that highlight this reality (Ardila, et al., 2020).

In the Amazon Rainforest, which spans Bolivia, Brazil, Colombia, Ecuador, Guyana, Peru, and Venezuela and houses several traditional communities, in addition to deforestation and the risk of zoonoses, the feasibility of domestic isolation in rural areas hardly happens, due to the lack of external supplies and public support, thus occurring a continuous transmission in the community, emphasizing the importance of promoting basic hygiene, using masks and other precautionary measures. It is worth mentioning that transmission in these environments is frequently caused by the irregular invasion of territories occupied by traditional communities. In both the Peruvian and the Brazilian Amazon, the spread of the virus was highly dynamic and rapid (Orellana, et al., 2020; Reinders, et al., 2020).

In this scenario, how can we promote sustainable conditions to ensure that there is justice and equity for all? This is a question that highlights the importance of transdisciplinarity for solving complex problems. They demand challenges that must be addressed by different social groups, with interaction, partnership, communication, encouragement from public authorities, and attention to traditional communities, which clearly has not been happening in many South American countries.

Although Convention 169 of the International Labor Organization (ILO), ratified in 1989 (Brasil, 1989), addresses the rights of indigenous and tribal peoples in the world, the challenges faced in 2020 show that there is still much to be done until better conditions are met, seeking the achievement of social, environmental, economic justice, and the sustainable development of traditional peoples and communities.

3.3 Protective Measures for Vulnerable Communities and Environmental Justice

We live in a moment of great scientific advances due to pressure in the search for solutions to face the pandemic. As we seek answers, new measures are adopted and communicated. However, some obstacles contribute to the slowness of measures to prevent and reduce the spread of the disease. One of these obstacles is the spread of fake news, which divides the opinions of the community in relation to measures such as the use of protective masks and social isolation. These opinions do not converge with the measures determined by the scientific community.

The vaccine has also become a major target for fake news. According to data collected by Ceron, et al. (2021), the proportion of misinformation about COVID-19 vaccines was higher in Brazil, Colombia, and Venezuela (Ceron, et al., 2021). In Venezuela, there was a number of false contents related to the use of the bacillus Calmette-Guérin (BCG) vaccine against COVID-19, in addition to false narratives that criminal groups were applying vaccines with the aim of robbing the population. In Brazil, the participation in several vaccine trials has generated rumors and fear in the population with false information about vaccine ineffectiveness (Soares, 2020), resulting in misleading and false information about the testing of the Sinovac vaccine only in monkeys (Afonso, 2020).

After the first positive results of vaccination in developed countries and pressure from the scientific community regarding the effectiveness of the results obtained, several South American countries started vaccination plans. Due to the high demand for vaccination, countries around the world have adopted strategic vaccination planning, where priority groups have been defined. In South America, as mentioned earlier, vaccination has been slow when compared to other continents.

In Brazil, an order of priority in vaccination was created, stimulated by the risk that the disease offers to each group. Among the groups vaccinated in the first months of vaccination. were Indigenous peoples, traditional riverside communities, and traditional quilombola communities (Brasil, 2021). Peru's plan is similar to Brazil's and also included these communities as priorities (Peru, 2021). Argentina's plan, on the other hand, does not mention these communities as priorities (Argentina, 2021). Chile follows the same line as Argentina. However, it includes professionals linked to education (Chile, 2021).

Colombia, Bolivia, Paraguay, and Ecuador do not have a defined plan that includes different groups, but they are vaccinating according to the risk of the disease to individuals (Bolivia, 2021; Colombia, 2021; Ecuador, 2021; Paraguay, 2021). Venezuela announced that vaccination takes place primarily with risk groups and health professionals, including immigrants from any country in this group; the plan also provides for vaccination of indigenous peoples (Venezuela, 2021).

In Uruguay, there is an aspect to be highlighted in its vaccination plan which, in addition to the risk group and health professionals, includes people in social vulnerability (Uruguay, 2021). In Guyana, a second batch for vaccination arrived in the first week of March 2021, 20,000 doses were received, which will be destined for health professionals according to the country's Department of Public Information (DPI) (Guyana, 2021). As for Suriname, no official information was found on the vaccination plan used by that country.

It is noteworthy that the difficulty of access to traditional communities isolated from urban centers and the need for sanitary measures and logistics necessary for the vaccination of the vulnerable population has been a great challenge for public managers and health professionals. Therefore, several support networks were created for priority groups included in vaccination plans. Even with the slowness of the immunization process, it is necessary to consider many advances in the process.

Although fake news circulates on a daily basis through the media, there is a greater interest by the population in reliable information about science and health during times of a health crisis. The pandemic highlighted that science and scientists have a lot to say. In this context, it is possible to observe that researchers are increasingly using their social networks, with an accessible language, in order to inform the public about the new coronavirus (Almeida, Ramalho & Amorim, 2020). Using different strategies and platforms, scientific dissemination builds bridges and dialogues between science, health, media, culture, and society (Almeida, Ramalho & Amorim, 2020). It remains clear that the situations reported are only some of the a few examples in view of the entire arsenal of fake news that is constantly being spread, but they summarize and raise the need for verification and a proper communication of the facts, still underestimated by the population, thus preventing more people from being affected by false narratives in the future.

However, this communication is not accessible to several traditional vulnerable communities, especially when they

are related to the issue of connectivity. We have lived a period of drastic transformation of human behavior never before experienced, even in other pandemic times. The technological revolution is one of the factors that directly influences these transformations, making society more connected and increasing economic alternatives and access to education during social isolation when facing COVID-19.

However, this technology is not accessible to everyone, especially vulnerable populations, making it a strong ally to the increase in socioeconomic inequalities between the holders of connectivity, that is, those who have an access device and adequate connection speed.

The document prepared by the Economic Commission for Latin America and the Caribbean of the United Nations (ECLAC), entitled "Universalizing access to digital technologies to face the effects of COVID-19", points out that, in 2018, in countries such as Chile and Uruguay, 50% of the rural population did not have access to the internet, while in Bolivia, Paraguay and Peru, the rates soar to 90% (ECLAC, 2020). This scenario makes remote work and access to information impossible. Still, according to the document, with data referring to the year 2017, in countries such as Bolivia, Paraguay, and Peru, more than 90% of low-income children, between 5 and 12 years old, do not have access to the internet, while in countries as Brazil and Argentina, the index is below 40%. These data demonstrate that access to remote education is restricted to a small part of the population.

Remote education was a strategy adopted by several South American governments, from public and private networks. Many of the Brazilian Federal Universities are included in this panorama (Castioni, et al., 2021). Even though it is possible to share content, teaching materials, online classes and assessments, the quality of access to education is extremely compromised due to the lack of connectivity. This scenario, in addition to the difficulty in occupying spaces suitable for remote education and the emotional distress of isolation and mourning of several South American families, decreases the prospect of social inclusion, reducing access to education for a large part of the population.

A document was prepared by Instituto Unibanco (Instituto Unibanco, 2020) with the objective of offering information and subsidies to qualify the public debate about the academic promotion policy adopted in countries of different contexts, including in this study Bolivia, Chile, Colombia, Peru, and Uruguay. Of these, only Bolivia canceled classes throughout 2020, with its elementary and high school students automatically approved for the following grades. Automatic approval also took place in Peru, with the school calendar consisting of classroom and remote classes and an assessment system with flexibility. All countries surveyed cited the difficulty with remote education as one of the factors that led them to choose this policy and signed their intention to expand and/or maintain emergency remote education.

As for the presented data, it is possible to conclude that the negative impacts of the pandemic will have a greater impact on certain social groups. In addition to the issues discussed above in relation to coping with COVID-19, differences in accessibility of educational platforms and materials can further increase socio-economic inequalities in South American countries, with opportunities and resources to be concentrated in economically privileged classes and the negative impacts on the most vulnerable.

Considering the adoption of emergency measures related to access to education, this vulnerability becomes even more accentuated, since the panorama of social isolation has created technologies for access to remote education hat frequently do not reach the most isolated places and small communities. In this context, the lack of access to pedagogical technologies and knowledge causes even more concern to educators, foreseeing a scenario of few opportunities and an increase in social inequalities (Bozkurt, et al., 2020).

The concept of environmental justice (Alier, 2007) considers that no social group should disproportionately bear the negative environmental consequences caused by specific public policies or even by the absence or omission of actions and

programs developed by the State. Considering this concept linked to sustainability and the development visions connected to economic, social, and environmental issues, the need for multidisciplinary interventions in decision making is clear. Environmental education has always been directly linked to social movements in South America. Some countries present some advances as a set of laws for orienting environmental policies (Pereira, 2020). Despite the existence of public policies, it is observed that the low level of education associated with extreme poverty has a direct impact on non-compliance with public health instructions (Estrela, et al., 2020). One way to put public policies into practice is through environmental education. It has become a strong ally in the implementation of regulations, that is, to make citizens aware of rules, changing their behavior towards more effective law systems (Carreira, 2020).

At this time, environmental education is necessary, especially when it stimulates criticism and reflection. According to Carvalho (2004), critical environmental education is a model for the formation of individuals and social groups capable of identifying, problematizing and acting in relation to socio-environmental issues, having as a horizon an ethics concerned with environmental justice (Acselrad, 2010). Carvalho (2004, p.5), complements that "the political-pedagogical project of a critical environmental education would be to collaborate for a change of values and attitudes, contributing to the formation of an ecological subject". Critical environmental education, reflexive and emancipatory, stimulates the disposition to treat the conditions of vulnerability as a human rights issue, stimulating and enhancing the mobilization of people to transform the conditions in which we find ourselves (Acselrad, 2006).

As an ally of environmental education, we find educommunication. In South America, research and practical experiences in communication/education emerged from the 1980s, through scholars such as Paulo Freire, Jesús Martín-Barbero, and Mário Káplun (Marques & Borges, 2016). According to Soares (2000), educommunication can be understood as a field of planning and implementing educational communication policies, aiming to facilitate the production and dissemination of information, to promote the interactivity of teaching-learning processes and to provide the necessary theoretical and methodological references to the analysis of cultural production for the purpose of an adequate formation aiming at the relationship with the massive system of means of information.

It is worth remembering that, for Guimarães (2004), this is not an individual process, but a process that the individual experiences in the exercise of citizenship, in the participation in joint collective movements for the transformation of the socio-environmental reality. Consequently, this produces a pedagogical practice aimed at the individual (in part) and in the transformation of their behavior (individualistic and behavioral education).

The development of environmental policies encompassing the diversity of environmental impacts and the interdisciplinarity between economy, environment and society is also a process that can assist public authorities in the context of the pandemic and post-pandemic, seeking integrated solutions, and strengthening environmental education (Buck & Weinstein, 2020). The analysis of indigenous knowledge in environmental systems are examples that strengthen the importance of ecological policies, as they promote the participatory construction of knowledge (Meek & Lloro-Bidart, 2017)

In agreement with Porto (2020), we do not know to what extent the current crisis will be an opportunity for transformation for more sustainable, fair and healthy societies or, on the contrary, if new conditions of extreme oppression, despair or deprivation will take place and undermine the continuity of life of the most vulnerable groups and, consequently, life as a whole. Furthermore, corroborating the author's speech, we will need to reinvent ourselves in an emancipatory perspective. The pandemic intensifies previous injustices and vulnerabilities that mark capitalist and colonial, exclusionary and racist modernity, as well as reinforcing and intensifying pre-existing social, health and environmental injustices, making ideologies and manipulations that hide certain interests more evident.

4. Final Considerations

Regarding the initial thoughts that inspired the writing of this article, it is emphasized that environmental education can contribute to effective scientific communication and dissemination actions for facing possible future scenarios similar to those experienced during the pandemic, inspired by the fact that it allows integration of man-environment-social justice concepts, as well as the democratization of information in order to approach the various social spheres. Recalling the history of the evolution of the pandemic in South America allowed to review events chronologically, in order to rethink them from the perspective of what is known for the future and, if necessary, revisit the actions seeking improvement and not repetition of mistakes.

As for comparing the effectiveness of environmental actions and scientific dissemination that favored the protection of vulnerable communities and the environment, their importance for our evolution as a society is emphasized, seeking knowledge and a sustainable alliance within the ecosystem. Knowledge and science are fundamental for us to be successful in cohabiting the planet with other species. Therefore, it is suggested that interventions consider environmental justice as a fundamental element in the resumption of post-pandemic activities and the strengthening of more egalitarian social relations.

In this context, Universities and non-governmental organizations from all over South America are mobilizing for this proposal to materialize, even though many of these institutions are immense in the economic crisis caused by the reduction in resources allocated by governments.

Still in this context, the popularization of science is an indispensable action for the alignment of the discourse between science, society, and political managers. This fact stems from the improvement of access to education at all levels, from the effective execution of university extension projects and from scientific dissemination in accessible language in the popular media. Efficient public management is also essential to achieve these goals. It is essential to bring safe and effective information to face the new pandemic of coronavirus, unifying the prevention posture according to scientific data and understanding the real dimension of the consequences of the pandemic on health, environment, economy, education and other areas of public interest. Thus, we highlight the importance of further research on the subject, and suggest the inclusion of other continents and carrying out global comparisons and analysis.

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