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Prediction of Impacts on Public Health: Analysis of Environmental Impact Reports Submitted to Ibama[1] (2012-2022)

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Keywords: health impact assessment, environmental licensing, public health.

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Prediction of Impacts on Public Health: Analysis of Environmental Impact Reports Submitted to Ibama[1] (2012-2022)

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Abstract- This article, of an analytical and exploratory nature, aimed to evaluate the frequency of the "impacts on public health" component in the Environmental Impact Reports (EIR) submitted to the Brazilian Institute of the Environment (IBAMA) to obtain environmental licenses. To meet this objective, we made a random selection of RIMA submitted to IBAMA to obtain environmental licensing between the years 2012 and 2022, regardless of the type of project, totaling 10 RIMA analyzed. When reviewing the RIMA, the documents were read in full. We then sought to identify in the RIMA (1) the inclusion of "Impacts on Public Health" and associated risks, (2) the adoption of some type of methodological tool for health impact assessment (AIS) and (3) the incorporation of a health professional in the technical team that prepared the RIMA. The results point to (1) a pattern of absence of health impact assessment methodologies clearly identified in the RIMA, (2) the Terms of Reference themselves are vague regarding the criteria involving impacts on human health that guide the EIA-RIMA, (3) there is a systematic absence of professionals in the areas of Health Sciences in teams that produce EIA-RIMA. We conclude that by not identifying the impacts on health (and their respective orders of magnitude and temporality, for example), the forecasts and risks involving the activities of the projects potentiate the underreporting of health impacts, which will result in reactive and non-preventive measures detailed in the EIA-RIMA themselves[1].

Keywords: health impact assessment, environmental licensing, public health.

I. Introduction

Any economic activity has an impact on its biophysical and anthropic environment, especially the impacts on public health. The institutionalization of the Impact Assessment in Brazil was carried out by the regulations of the National Council for the Environment (CONAMA), which issued Resolution No. 001 of 1986 and Resolution No. 237 of 1997, which established the Environmental Impact Assessment (EIA) as a tool for carrying out environmental licensing and the criteria for both environmental licensing and environmental studies[1,2]. As for the "public health" component, only CONAMA Resolution No. 286/2001 established the need for specific malaria studies for enterprises located in the Legal Amazon[3].

Resolutions No. 01/86 and 237/97 of CONAMA require the private or public entrepreneur who may demand the installation of a project to prepare an Environmental Impact Study, called EIA, and its respective Environmental Impact Report, the RIMA. As the main instrument for communicating the impacts of the project, the RIMA must be objective and accessible to anyone, especially to those affected by the project [1,2].

Since 2008, AIS has advanced in knowledge in Brazil, with systematized guidelines regarding AIS procedures in licensing. Illustrative of this advance is the publication of the guide "Health Impact Assessment – AIS Methodology adapted for application in Brazil", published by the Ministry of Health in 2014. The absence or ineffectiveness in identifying and predicting health impacts is parallel to the lack of health professionals in the technical teams and the absence of Health Impact Assessment methodologies of the EIA-RIMA [4].

To evaluate this scenario of scarcity of identified and predicted impacts on health, a random selection of RIMA submitted to IBAMA to obtain environmental licensing in the last ten years was carried out, regardless of the type of enterprise, totaling 10 RIMA analyzed. When reviewing the RIMA, the documents were read in full. We then sought to identify whether there was clearly (1) the "Public Health Impacts" identification, (2) whether any type of health impact assessment tool was adopted, and (3) whether the profile of the technical team that prepared the RIMA had any health professionals involved.

II. Environmental Licensing as a Public Management Instrument

Environmental licensing, derived from the National Environmental Policy, is a public management instrument that is characterized by marked

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[1] IBAMA is the Brazilian Institute of the Environment, the agency responsible for environmental licensing at the federal level in Brazil.

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transversality, contemplating both social and environmental aspects that may be affected by projects whose activities may produce environmental degradation and may impact local communities (RODRIGUES, et al., 2021; SILVEIRA, M. et al., 2014). In this way, through the regulation instrumentalized by the Terms of Reference, the public administration guides applicants for environmental licenses who submit the Environmental Impact Studies and Environmental Impact Report to identify, predict and evaluate the risks that the respective projects would cause, potentially or effectively, in the indicated locations.

The concept of environmental impact in Brazil is described by CONAMA Resolution 001/86 as any physical, chemical and biological alteration of the environment caused by human activities that directly or indirectly affect the health, safety and well-being, whether of the population, socioeconomic activities or the aesthetic and sanitary conditions of the environment, in addition to the environmental quality of the place. To this end, the Environmental Impact Assessment appears as an evaluation tool before any decision is taken[5].

Every process involving environmental licensing demands technical and scientific responsibilities on the part of both the requester and the issuer. It is in the issuance of the Term of Reference that the criteria and technical parameters to guide the environmental impact study are established, in addition to the definition of the scope and methods to be used for each type of project to be evaluated. This occurs through the measurement and communication of risks, advantages and disadvantages, as well as the alternatives and mitigation measures envisaged [6].

Resolution 001/86 – CONAMA exemplifies situations in which the EIA is necessary, making it mandatory for the activities described in its article 2, as it considers them to cause possible significant environmental impacts[1]. Thus, the EIA regulation itself exemplifies activities that cause significant environmental impact [7].

To perform EIA, the most common methods identified in the specialized literature are: Ad *Hoc*, Checklist, Interaction Matrices, Interaction Networks and Simulation. As previously noted, however, these methods are aimed at identifying and predicting impacts of a biophysical and anthropic nature, but although they have the capacity to assist in the identification and prediction of health impacts, these tools are underutilized for this purpose, with more prominence, as is usual to detect in RIMA documents, the use of these tools to assess positive anthropogenic impacts. classified in terms such as "social progress" and "local and regional development", although the projects that cause them produce negative and significant socio-environmental impacts.

In Brazil, the "public health" component is still identified in an incipient way during the environmental licensing processes of large enterprises, despite the provisions related to human health described in the environmental legislation according to the National Environmental Policy (PNMA) and CONAMA Resolution No. 001/86, which write on the basic criteria and general guidelines for environmental impact assessment[1,8]. What is the reason for this incipient character? One of the hypotheses we worked on is the lack of standardization regarding the health impact assessment (SIA) process in environmental licensing, especially regarding the methodologies used for the collection of epidemiological data, for example. This lack of standardization, we believe, will result in the absence or reduction in the identification and prediction of public health impacts.

Understanding that most of the environmental resources are limited, it is perceived that the degradation provided by the economic system on the ecological sphere can have as a consequence both its own joint deterioration and the affect of the populations that are part of it. Regarding the health aspect of the EIA and RIMA, the approach is more restricted to the generalized environmental and socioeconomic consequences, consequently leaving components such as the health of groups of individuals missing. In addition, there are shortcomings in the process of considering the interactions between the project to be analyzed and other existing anthropogenic activities [9].

In this context, the ISA is evidenced as a mechanism for balancing environmental preservation and socioeconomic development, and environmental management is important to minimize the impacts arising from large projects[7, 10]. The environmental agencies responsible for environmental licensing do not have direct attribution to analyze health aspects. To add to this scenario, health agencies are formally absent from the environmental licensing process for infrastructure projects, for example, unlike other agencies such as ICMBio (Chico Mendes Institute of Biodiversity) or IPHAN (National Institute of Historical and Artistic Heritage) that are formally consulted (and with veto power in the authorization or not of any project) in these cases involving infrastructure projects that cause high-magnitude impacts.

In order to reduce the limitations related to health in environmental licensing, the General Coordination of Environmental Health Surveillance was created in 1999 and the National Subsystem of Environmental Health Surveillance was constituted, a health surveillance tool of the Unified Health System (SUS) whose main objective is to prevent and control health problems of populations exposed to the impacts of polluting enterprises. In 2001, the Ministry of Health established a Technical Cooperation Agreement with the Ministry of the Environment for the operationalization of integrated health and environmental actions, which established a national agenda for Environmental Health,

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with the identification of priority areas for cooperation. In 2008, Interministerial Ordinance 882 was signed between the Ministries of Health and the Environment, establishing guidelines for integration through the implementation of common actions and a bilateral agenda [11].

III. The Adoption of AIS Methods to Correct Flaws in Environmental Licensing

According to the World Health Organization (WHO), HIA combines methodologies as well as procedures and tools to assess potential health impacts of economic endeavors. Its purpose is to provide politicians and other decision-makers with information about the likely health and welfare effects of a particular proposal. In addition to supporting this information with suggestions on how the proposal can be modified to optimize health gain through health protection, improved health, and reduction of health inequalities, working with the principle of equity. It acts as a way to integrate health concerns and considerations at the community, member state, and regional levels, acting as a mechanism to allow health implications to be taken into account during the process of developing policies and projects [12].

On the other hand, for Sicily and Purroy[13], the main objective of ACN is to maximize health benefits and reduce inequalities and negative impacts as much as possible. It is fundamental as a tool that establishes strategies for application in future actions, and therefore its execution should ideally occur in the planning phase, before the implementation of policies, programs and projects.

Among the AIS methodologies, some procedures should be highlighted.
Screening: Determine whether an SIA is necessary and justified;

1) *Scope:* Identify potential health impacts and target groups;
2) *Evaluation:* Assess the significance of health impacts, qualify and quantify the potential costs and benefits between different populations and any alternatives;
3) *Reporting:* Engage all relevant stakeholders and recommend preventive and mitigation actions to deliver the greatest possible health gain;
4) *Monitoring and Evaluation:* Include indicators and mechanisms, and establish processes and resources for the local authority and/or with the planning applicant to carry out and act on the results of regular monitoring.
5) Quality assurance step – those responsible for agreeing to the recommendations of an ISA (the local planning and/or public health team) review the quality of the final ISA submitted as part of the planning request.

Initially, in Screening, the need to perform an SIA should be evaluated in the face of an intervention proposal, evaluating the ability to answer a series of questions related to the possible impact. Then, in the definition of the scope and design of the process, the terms of reference and the plan prepared by those involved in the constitution of the AIS will be defined. In the Identification, the profile of the population and the environment should be constructed, highlighting the aspects that are important for the problems identified during the definition of the scope. Situational Analysis, on the other hand, synthesizes and critically evaluates the information collected, making a diagnosis and prognosis of the potential impacts on health, through qualitative and/or quantitative methodologies. Finally, in Evaluation and Monitoring, the impacts on the health of the community are considered based on pre-established indicators, creating a follow-up process for continuous development [4, 13].

From a legal point of view, the Federal Constitution, in its article 200 in item VIII, attributes the participation of the SUS in collaboration in the protection of the environment. This openness allows for greater institutional inclusivity in environmental licensing, which was reinforced in the Organic Law of the SUS itself (No. 8,080, of September 19, 1990) and through Conama Resolution No. 237 of 1997 and Conama Resolution No. 286, of August 30, 2001. [14, 15, 2, 3]

The institutionalization of public health in environmental licensing advanced, in an illustrative and operational way within the competences of IBAMA, in the consolidation of the Interfederative Committee and the Technical Chamber of Health (CT-Saúde). In this case, the various technical guidelines for establishing the basis for epidemiological and toxicological studies of the population directly and indirectly affected by the mining disasters that hit the states of Minas Gerais and Espírito Santo are highlighted, and it is valid to take this institutionalization as an indicator of the importance of public health as a component of the environmental impact assessment [16, 17].

Governments, health agencies and other users of the evaluation emphasize different aspects in their methodological process. Thus, there is currently no consensus on the specific definition and legislation regarding ISA, with the exception of malaria-endemic areas and settlement and agrarian reform projects [8.] In this way, the evidence produced by AIS plays a fundamental role in the definition of complex strategies and decision-making, thus strengthening the process of transparent information and scientifically based recommendations, providing an opportunity to build professional learning.

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For Green (2021), the interaction between AIS expert leaders and staff (policy researchers, health professionals, and the community) in this construction represents a real gem, since it improves the understanding of the method, its component parts, evidence, and necessary data, in addition to mitigating the negative impacts identified beforehand [12].

As previously contemplated, in Brazil, although environmental licensing and EIA instruments of the National Environmental Policy represent an advance for the prevention and control of environmental impacts resulting from development, there is still a need for a systematic structuring of the participation of the health sector in this process, through instruments that contribute to encourage companies to mitigate and compensate for their impacts on the health of the population. The Ministry of Health has already established the need for specific regulations for the participation of the health sector in environmental licensing processes, however, currently only CONAMA Resolution 286/2001 presents the direct participation of the health sector specifically in the regulation of the licensing of enterprises in malaria-endemic regions [3,11].

In the next topic, we will seek to observe to what extent the "Impacts on Public Health" component was incorporated (or not) in the demands for Brazilian federal environmental licensing, whether there was the adoption of AIS methodological tools and how this communication took place through the RIMA of the projects selected for this study.

a) What about Health in Environmental Impact Reports (EIR)? 10 Cases Selected for Exploratory Analysis

When we evaluate the "Impacts on Public Health" component, we can identify both positive and negative impacts from the installation, implementation and operation (and decommissioning) of a project such as a thermoelectric or wind power plant, for example. Such impacts are distributed throughout the implementation phases of the project. Among the negative ones, those described in Table 1 4 can be listed.

Table 1: Overview of types of Medium and high Magnitude Impacts Related to Health Involving Projects that Require Environmental Licensing

Pre-installation Phase	Installation Phase	Construction Phase	Operation Phase
Migration (disorderly occupation in the cities and towns near the development.	Displacement of populations (stress, reduction in sanitation and housing conditions, exposure to diseases and risks in resettlement areas).	Increased pressure of grievances in the areas surrounding the project (alcohol and drug use, violence, sexual exploitation).	Change in the dynamics and perennialization of breeding sites of vectors and disease hosts.
Epidemiological pressure on the local population).	Possible increase in health problems in areas without major disruptions due to migration.	Possible increase in health problems in areas where there were no problems due to migration to other municipalities and other states.	Permanence of the population agglomerations related to the project.
Increased demand on the current health service.	Increased risk of accidents to the workers of the enterprise.	Increase in the number of workers with infections and avitaminosis, limiting their ability to work and socialize.	Reduction of concern with control measures on the part of the entrepreneur.
Increase in the number of people susceptible to disease.	Increased risk of accidents with the community related to the transportation and movement of vehicles.	Increase in STIs.	Increased demand for health services.
Insufficient structure of health services.	Increase in demand for the current health service.	Change in the dynamics and perennialization of breeding sites of vectors and disease hosts.	Increase in diseases related to exposure to atmospheric emissions, effluents and waste disposal.

Source: Ministry of Health (2014)[4]

This classification above is proposed to be generalist, extending from infrastructural impacts (such as the insufficiency of infrastructure to provide health services) or epidemiological impacts (such as the increase in STIs in the communities that will be directly affected by the project). However, it is an important starting point to begin the identification of health impacts invariably described in the RIMA (here analyzed only those under IBAMA's responsibility, as previously highlighted), as well as to ascertain the variation in the classifications involving what we characterize as "Public Health Impacts" [4, 22].

Rodrigues *et al* (2021) note that every EIA-RIMA should, in some way, explain the criteria adopted in

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attributing the importance of the expected impacts[6]. Which results in two questions: how to define the importance of a health impact? Could it be that impact that exceeds environmental standards?

The answers to both questions lie in the subjectivity of the process of assessing the importance of impacts. In addition to CONAMA Resolution No. 01/1986, we have other regulations that deal with health as a component of impact assessment, such as CONAMA Resolution No. 465/2014 as well as CONAMA Resolution No. 237/97, which seek to guide the protection of human health or the integrity of ecosystems, establishing norms for certain standards for the protection of human and environmental health that should guide methodological procedures to identify and predict health impacts. Around this orientation, Barbosa, Giongo and Mendes (2022) observe that the continuous implementation of projects involving hydroelectric plants, which produce high environmental impacts, did not reinforce the importance of the impacts on public health and did not highlight the need for the insertion of multidisciplinary teams with health professionals [1,18,2,19].

The specificity of the type of project may incorporate other impacts specific to the type of project proposed to obtain bidding. We believe that this aspect is the difference in the inclusion of AIS methodologies in the preparation of EIAs and in the quality of RIMA communication, which fundamentally involve the entrepreneur's ability to identify and predict impacts on those who live in the areas directly affected or areas of direct and indirect influence of the project under licensing. Therefore, AIS methodologies can determine a greater scope in the identification and prediction of impacts on public health, as well as methodologically refine the risks to public health involving the types of enterprises evaluated [18].

For this analytical-exploratory exercise, we seek to restrict the RIMA only to those related to environmental licensing, under the responsibility of IBAMA. The reason for this restriction of cases is supported by Complementary Law No. 140/11, article 7, item XIV and Decree No. 8,437/15, which guides IBAMA's especially exclusive competences in environmental licensing. When reviewing the 10 selected RIMA, the full readings of the documents were performed. We then sought to identify whether there was clearly (1) the identification of "Impacts on Public Health" and associated risks, (2) whether any type of methodological tool for health impact assessment was adopted, and (3) whether the profile of the technical team that prepared the RIMA included any health professional involved [16, 20, 21].

We understand the descriptor "Impacts on Public Health" as the expected result of public health conditions in the municipalities of the area of direct and indirect influence after the installation of a project, identified through indicators of hospital morbidity, hospitalizations and diseases by compulsory notification, for example. As can be seen in Table 2, the selected RIMA included the following types of projects: mining, transmission lines, port infrastructure, energy (wind, thermoelectric and hydroelectric plants). Based on the reading of the RIMA, we classified all the projects within a category of "producers of medium and high magnitude impacts in the anthropic environment", which we understand would indicate the significance of impacts foreseen and described in the RIMA involving public health [22].

Table 2: Typification of Projects and Identification of Health Impacts and the Adoption of AIS Methodologies in RIMA Presented to IBAMA to Obtain an Environmental license

Type of Venture	Project Name	Public Health Impacts Identified/Predicted in the RIMA	Adoption of AIS Methodology in EIA-RIMA	Presence of Health Professionals in the Technical Team	Health Risks Identified in the RIMA
Hydroelectric Power Plant	AHE TABAJARA	YES	NO	NO	YES
Mining	Canga Southeast PDE Project to be implemented at the Conceição Mine	NO	NO	NO	NO
Renewable energy	Bojuru Wind Generation Complex	NO	NO	NO	NO
Mining	Project N1 and N2: iron ore extraction/current Carajás Iron Mining Complex	YES	NO	NO	YES

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Renewable energy	Dom Inocêncio Sul Wind Complex Ventos de Santa Rosa Energias Renováveis S.A	NO	NO	NO	NO
Energy	Thermoelectric Power Plant (UTE) PAMPA SUL	YES	NO	YES	YES
Port infrastructure	Braskem's Private Use Terminal Project	YES	NO	NO	NO
Transmission Line	230 kV Transmission Lines Oriximiná - Juruti, CD, C1 and C2 / Juruti - Parintins, CD, C1 and C2 / Associated Substations	YES	NO	NO	NO
Mining	Minas-Rio Pipeline	YES	NO	YES	NO
Port infrastructure	Paraguaçu Shipyard, Bahia	YES	NO	NO	YES

Source: IBAMA (2022) [22]

By observing the set of health impacts foreseen in the 10 selected RIMA, we identified that there is a pattern of absence or reduced participation of professionals in the areas of Health Sciences in teams that produce EIA-RIMA. According to the Article 7 of CONAMA Resolution No. 1, On January 23, 1986, the teams should be multidisciplinary, however, there were only two (02) health professionals in the RIMA (Minas-Rio pipeline and PAMPA SUL Thermoelectric Power Plant). Although there is no legal provision for the inclusion of health professionals in the technical teams that produce the EIA-RIMA, this absence presumably directly interferes with the ability to identify and predict impacts on public health [22].

Another point that drew attention was that there is a pattern of absence of methodologies for assessing the impact on health clearly identified in the RIMA. The most common EIA methodologies were those identified in the documents as the adoption of *ad-hoc*, spatial analysis using satellite imagery and superimposition of charts, *Check-list*, use of Leopold's matrix with the adoption of an attribute scale for the evaluation of the criteria established for the evaluation of impacts. However, none of the 10 selected RIMA provided any methodological explanation of the partial or total use of any AIS method for the identification and prediction of impacts on public health [22].

In common in the identification of "Impacts on Public Health" are also the risks of occupational health and safety and, for all the RIMA analyzed, the risks involving accidents with third parties on construction sites and fronts. In projects that have in their areas directly affected or in their areas of direct and indirect influence, there is a pattern of identification of waterborne diseases associated with urban areas, especially due to the living conditions in the poorest neighborhoods, without adequate sanitary infrastructure, strongly associated with the infant mortality rates of the localities, potentiating their increase if mitigation measures are not adopted. Also noteworthy are infrastructural projects that require significant environmental changes and the incorporation of workers from other locations without clear parameters for identifying health impacts [4, 22].

In the RIMA analyzed, risks associated with the increase in the number of possible carriers of infectious diseases, such as STIs (HIV, hepatitis B, herpes, syphilis, gonorrhea and candidiasis), viruses and parasites, were identified due to the greater presence of migrants during the works. In addition to the increase in the number of cases of contracting endemic diseases (malaria, dengue and leishmaniasis), identified only in the case of environmental licensing involving a hydroelectric plant. However, for the spread of infectious diseases, such as STIs, other types of projects classified as "Hydroelectric Power Plants", "Port Infrastructure" or "Mining" also involve the greater presence of migrants during the works, but there is no identification or prediction of this type of impact on public health in any of the RIMA analyzed [22].

In the case of the identification of "Impacts on Public Health" involving hydroelectric power plants, in

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addition to diseases transmitted by biological vectors (zoonoses), such as malaria, yellow fever, dengue, leishmaniasis, filariasis (all by mosquitoes), schistosomiasis (freshwater snail), Chagas disease ("kissing bug") and spotted fever (tick), there was also the identification of diseases transmitted by ingestion of water and food contaminated by etiological agents, such as worms, amoebiasis, dysentery, typhoid, hepatitis and poliomyelitis, or by contact with contaminated water and soil, such as leptospirosis and hookworm [22].

Only in the RIMA of the AHE TABAJARA project were epidemic risks specifically identified. We believe that this greater care in identifying and predicting impacts is due to CONAMA Resolution 286/2001, which guides EIA-RIMA projects involving projects in malaria-endemic areas. It is important to highlight this aspect due to the fact that licensing is tripartite, which implies the request and obtaining of three environmental licenses without, however, ceasing to occur health impacts regardless of the phase of operation. Epidemics can be categorized as follows: (1) explosive or (2) progressive. As for the first, the epidemic was characterized by its rapid spread and decline, while the second epidemic was characterized by a slower speed in its dissemination. The latter portrayed an enterprise in the phase of obtaining the installation license, given that the region where the TABAJARA AHE is installed is qualified by recurrent epidemics of malaria [3, 22].

An important absence among the impacts foreseen in the RIMA analyzed is related to the displacement of the populations affected by the projects, especially in cases of significant socio-environmental impacts of mining or the installation of hydroelectric plants. The literature confirms this reduction in the importance of displacement in the production of impacts on public health by not considering that the losses due to this displacement outweigh the changes in the territory. There is a loss of family and community affective ties, with the loss of their homes, churches, workplaces and shared leisure spaces [23].

However, the lack of identification and prediction of impacts on public health predominated in the RIMA, in addition to the limited perspective of interaction between physical and biotic impacts in the promotion of anthropogenic impacts, especially on public health. In this sense, we highlight that both the RIMA of the "Canga Southeast PDE Project to be implemented in the Conceição Mine" and the RIMA of the "Minas-Rio Pipeline" foresaw "alteration of air quality" as a negative and significant impact in the implementation phase of the project without, however, implying the identification and prediction of impacts on public health [22].

In the RIMA of the Pampa Sul Thermoelectric Power Plant (UTE) project, there is the identification of impacts on public health such as respiratory diseases, in addition to nuisance due to noise and vibrations, however in its RIMA the physical impacts such as "Contamination of surface water due to the discharge of effluents and solid waste", "Changes in surface water quality" or "Noise emission" are not associated with specific impacts on human health. Although the impacts are identified, there is no prediction or risk assessment specifically focused on human health involving these impacts, although there is the presence of a medical professional in the technical team that produced the EIA-RIMA. Health impacts are included within an umbrella called "public health" without discriminating the specific types of impacts resulting from the enterprise's activity [22].

The absence of the interaction effects of biotic and physical impacts on public health, for example, occurs both in enterprises involving activities such as mining and hydroelectric plants. The risks of contamination of waterways are predicted, however, there is no prediction of how these impacts affecting the ichthyofauna result in human health. It is one of the most serious flaws identified when thinking about the systemic and interdependent nature of environmental impacts on public health.

In another of the RIMA analyzed, involving the Private Use Terminal of Braskem in the municipality of Candeias in Bahia, there is only a description of an impact on public health that would involve pressure on urban services, but none involving fishermen and riverside dwellers affected by the project. Impacts of a biophysical nature are not associated with impacts on health, maintaining the standard of the RIMA analyzed. For example, "Reduced fishing production" is not associated with any impact on mental health due to changes in habits, livelihoods, and loss of income [22, 24].

The impact is described, but its mitigation does not incorporate the effects that this reduction in fishing production can result in, such as an increase in anxiety disorder or depression among fishermen and/or shellfish gatherers in a directly affected area or under an area of direct influence, which is identified as recurrent in the specialized literature [24] Impacts on mental health, invariably among the 10 RIMA, they are invisible.

The results corroborate the conclusion of Silveira and Araújo [25] who evaluated 22 projects with 36 environmental studies analyzed, of which only 18 incorporated some condition involving public health in the environmental licensing, attributing this low absorption of public health components to the reduced orientation of the TR to aspects involving impacts on public health. In common with all 10 RIMA analyzed are the proposition of environmental management or education programs, social communication or monitoring programs.

There is a pattern of underreporting of public health impacts in the RIMA that, due to the nature of

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publicity and accessible language to those affected, should discriminate the impacts on health. In general, the exceptions involve the impacts related to hydroelectric plants in the field of health and occur, especially, due to the epidemiological control of arboviruses. By not identifying the systemic and interdependent characteristics of the impacts (and their respective orders of magnitude and temporality, for example), the forecasts and risks involving the activities of the projects potentiate the underreporting of health impacts, which will result in reactive and non-preventive measures detailed in the EIA-RIMA [22] themselves.

Also in common in the Terms of Reference themselves is the character of vague guidelines regarding the criteria involving impacts on human health that guide the EIA-RIMA analyzed, (as a kind of "copy and paste" in the use of measures such as the creation of programs to mitigate impacts on health in the midst of other types of impacts). The physical or biological impacts described in the RIMA are not associated as potential risks in the development of impacts on public health, which ends up generating the invisibility of the effects of biophysical impacts to the anthropic environment, especially including public health.

Thus, we are faced with an increasing degree of institutionalization of health in environmental licensing, as previously observed. However, if, on the one hand, there is a greater institutionalization of this demand for the "public health" component in environmental licensing, there is no correspondence of this "agenda" on the part of the applicants for environmental licenses that do not incorporate the AIS tools and do not even identify and predict the epidemiological or toxicological impacts of the projects to be licensed, reinforcing a pattern of future underreporting of diseases and health problems derived from the activities involving the stages of prior licensing, installation and operation of the licensed works.

IV. Final Considerations

We consider that by not identifying the impacts (and their respective orders of magnitude and temporality), the forecasts and risks involving the project's activities potentiate the underreporting of health impacts, which will result in reactive and non-preventive measures detailed in the EIA-RIMA itself.All the projects whose RIMA were analyzed in this study were characterized as "producers of medium and high magnitude impacts in the anthropic environment", and therefore the significance of impacts foreseen and described in the RIMA involving public health was expected. However, the results point to (1) a pattern of absence of health impact assessment methodologies clearly identified in the RIMA, (2) the Terms of Reference themselves are vague regarding the criteria involving impacts on human health that guide the EIA-RIMA, (3) there is a systematic absence of professionals from the areas of Health Sciences in teams that produce EIA-RIMA.

According to the WHO, health impacts should be considered within the legislation in which the Environmental Impact Assessment applies. In Brazil, despite the provisions related to human health described in the environmental legislation according to the National Environmental Policy (PNMA) and CONAMA Resolution No. 001/86, there is still no legislation that standardizes the Health Impact Assessment, and only in Conama Resolution No. 286/2001 did the need for malaria studies for enterprises in the Legal Amazon establish.

The lack of legislation and standardization of effective institutional and technical mechanisms for the systematization of the health component in the environmental licensing processes of enterprises was evident in the present study. Several countries have incorporated the Health Impact Assessment with the objective of introducing the health perspective in the elaboration of public policies, proposing to meet the needs that we have highlighted.

Once the impacts were properly identified, the risks foreseen and described, the Unified Health System (SUS) could carry out its task of promoting actions to improve the quality of life, reducing the vulnerabilities and health risks linked to large enterprises.

Given the magnitude of impacts caused by large works and the relevance of such projects for the socioeconomic development of the country, it is of paramount importance that the discussion of regulatory changes be on the agenda of government agendas aimed at socio-environmental sustainability.

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