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AVIAN RISK: A REFLECTION ON POPULAR PARTICIPATION AND PUBLIC MANAGEMENT

***[1]Ana Keuly Luz Bezerra and [2]Éthynna Marina Corrêa Santos**

[1] Professor and researcher linked to the Management and Business of Instituto Federal do Piauí and to the Postgraduate in Development and Environment at the Universidade Federal do Piauí, Brazil.
[2]Researcher in Development and Environment at the Universidade Federal do Piauí, Brazil.

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****Corresponding author:***
1Ana Keuly Luz Bezerra

ABSTRACT

In a systemic approach, the bird strike can be considered an integrated whole, and the understanding of its nature and of its operation involving several conflicting variables that are initiated from the location alternatives for cooling airport site to its operation. In this sense a broad view of the avian risk highlights the complexity in the relationship between public institutions, communities and bird life, with regard to social, environmental damage and economics arising from the damage caused by the collision between birds and aircraft. Thus, this article aims to offer a rewiew qualitative the aviary risk from the analisys and the participation collaborative airports, public agencies and community in mitigation the aviary risk. For this we used the methodology qualitative through an abor saddled inductive about the issues socioenvironmental and economic related risk aviary**.** The study showed that given the complexity of the risk avian your management needs to be done through cooperation efficiently between the community and public entities, because all are entered in this problematic. He further pointed to the need for disclosure broad and efficient as possible new research and assessment of the effectiveness of their collaborations.

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INTRODUCTION

The General Theory of Systems proposed by Ludwing Von Bertalanffy, in 1937, emphasizes the interrelation and interdependence between the parts that form a system seen as an integrated whole, making it impossible to study its elements in isolation. In this sense, the problem of avian risk - here understood as the existence of bird or flock in the ground or in certain delineation of airspace, capable of causing damage to both the aircraft in operation as the people involved (ICAO, 2009) - it cannot be reduced to just reports of collision and near collision numbers. In a systemic approach, the aviary risk can be considered as an integrated whole, and the understanding of its nature and its operation involving several variables conflic sented that is start from the location alternatives for airport site facilities to its operation. Mendonça (2009) emphasizes that the management of avian and fauna danger is a complex that involves science, art, techniques and a lot of professionalism on the part of those who constitute the aeronautical industry.

In addition, the author suggests the participation of legislators and regulatory agencies to establish norms and standards to be followed by airlines, crew, air traffic control professionals, aircraft manufacturers and airport administrations. On the other hand, Costantini (2019) points out that the problems related to fauna risk should integrate actions not only from the airport administration, but also from external bodies, such as city halls, secretariats of the environment and the local community, since all they are inserted in the same social context, since the sets of human actions can directly impact flight safety and the preservation of lives. Thus, a view global risk avian highlights the complexity in the relationship between the public institutions, communities and avifauna, in regard to social losses, environmental and economic arising d the damage caused by the collision between birds and aircraft. And that makes it necessary to n will lis and d collaborative efficiency of airports, government agencies and the community to mitigate the risk associated with avian to sustainability. This article aims to offer a qualitative review of avian risk based on the analysis of the collaborative participation of airports, public agencies and the community in mitigating avian risk.

The work carried out at Brazilian airports is still scarce. Moraes (2016) applied environmental management as a measure to mitigate avian risk in Manaus-A M. Novaes (2007) carried out a study on the presence of black vultures (*Coragyps atratus)* to the security of the airport of Ilhéus-BA. Ribeiro (2017), conducted a study in the city of Parnaíba-PI on the presence of the risk of collision at the International Airport of Parnaíba before the regularization of flights. According to Serrano *et al*. (2005), between 1995 and 2001 the Bird Monitoring Center (CEMAVE), carried out a survey of avifauna in 13 airports in Brazil, by means of land and air censuses. This was the only major work on avifauna at Brazilian airport sites. In order to coordinate efforts to mitigate avian risk, the Aeronautical Accident Prevention and Investigation Center (CENIPA) created the Avian Hazard Control Program in Brazil and also the Local Fauna Hazard Control Commission (CCPFL), which is composed of city halls, offices of the Brazilian Institute for the Environment and Natural Resources (IBAMA), public and private universities and National Civil Aviation Agency (ANAC) representative. In 2009, the CCPFL was installed at the airports of Belém - PA, Recife - PE, Salvador - BA, Teresina - PI, Vitória - ES, Corumbá - MS, Rio de Janeiro - RJ, Natal - RN and Petrolina - PE. Although m been taken s many efforts to minim ize the aviary risk, according to ANAC (2011), some problems still persist, such as:

> the lack of reports of all collisions by the airport community, the fulfillment of all items of the fauna danger management plan, insufficient identification of outbreaks of attraction of birds around the airports, lack of inspection of attractive bird activities and the presence of these activities in Area of Security Airport (ASA) as dumps, illegal slaughterhouse, etc. (ANAC, 2011, p. 1).

According to INFRAERO (2006), fauna management plans consist of an efficient airport management instrument, determining the interventions necessary to control birds inside and around airports (MENDONÇA, 2009; LINHARES & SOUZ A, 2011). It is understood that partnerships with universities are a relevant support for the mitigation of avian risk, such as that of Ribeiro (2017) at the airport of Parnaíba-PI, verified that the constant cutting of vegetation carried out with the intention of fleeing it. avifauna coincide with the reduction and the consequent fluctuation of some species, for example, southern english police (*Sturnella supercilliaris*) and gray dove (*Columbina passerina*), however, they observed that some birds feeding on carcasses of dead animals and broken eggs during this process, for example, caracarás and yellow-headed vultures. Such information will assist the responsible authorities in the elaboration of mitigation measures that seek to reduce this risk for the region, according to the legislation; what can m make even necessary and immediate interventions in the airport environment and its surroundings, to identify and control the main attractive spots for birds. These actions can contribute to one inventory of avifauna d the city and reduce the gap studies on the risk poultry in areas where they are reduced, as in the state of Piaui.

METHODOLOGY

Using hypothetical-deductive methodology of bibliographic and exploratory character, first theoretical aspects about avian risk in airports are approached, in a second moment, the importance of popular participation and public management is presented as mitigating actions of these risks.

RESULTS AND FINDING

The environmental perception as a risk assessment tool at airports: Different species of birds represent different risks to aviation because of their ecological niche. In this regard, avian risk management must prioritize the most relevant species for airport security (VILLAREAL, 2008). There are several methodologies for assessing this risk in airports, and although they have different specific parameters and objectives, they all have a single purpose, which is to reduce or eliminate the danger of fauna in these places. The choice of methodology depends on the researcher, but having alternatives available helps a more complete analysis for each region and, thus, allows a better view of the results of each method for the reality of the airport (ANAC, 2011). The concept of environmental perception can be defined as a methodology used to improve people's quality of life and maintain the preservation of nature in studies involving environmental and social aspects; in order to understand local knowledge and the relationship between man and the environment (MARIN *et al*, 2003). Based on the assumption that each person perceives the environment differently, this type of study is relevant to understand the relationships between human beings and a given location, as divergences in perceptions between residents help to bring reality closer together, encompassing aspects positive and negative according to the vision of each individual (FAGIONATTO, 2007). The environmental perception can be classified in two lines: the perception of environmental impact, which aims to understand the community's understanding of the surrounding environment and its changes; and the perception of risk, which is linked to the problem of potential accidents involving the group of birds and aircraft (FREIRE, 2011).

The concept of environmental perception can be defined as a methodology used to improve the quality of life of people and maintain the preservation of nature in studies involving environmental and social aspects; in order to understand local knowledge and the relationship between man and the environment (MARIN *et al.*, 2003). Starting from the supposed that each person perceives the environment so different, this type of study is relevant to understanding the relationship between humans and a particular locality beings, for the differences in perceptions among residents help to approach the reality, encompassing the positives and negative according to the vision of each individual (FAGIONATTO, 2007). The environmental perception can be classified in two lines: the perception of environmental impact, which aims to understand the community's understanding of the surrounding environment and its changes; and the perception of risk, which is linked to the problem of potential accidents involving the group of birds and aircraft (FREIRE, 2011). In the perception of environmental impact, each individual observes their relationship with the environment and how much they know about the characteristics of their location, in addition to mentioning how they use it and highlight its changes over time; and the perception of risk comprises the way in which each person interprets the risks to which they are exposed. The latter requires members of the studied community to take into account not only the probability of an event occurring, but also to assess the severity of the event and its possible consequences (ANDRADE & MICCOLIS, 2012).

Man, Bird and Aviation: The risks of accidents with birds can vary from one airport to another, even when their bird communities are similar. One of the first steps to reduce the risks is to recognize the items that attract people to ves such as increasing proliferation of degraded areas and sanitation deficiency close to airports (CENIPA, 2011). These factors, when acting together, are responsible for the presence of birds at airports (GODIN, 1994), and when combined with the greater number of flights and airports surrounded by cities with disordered growth, they contribute to the increase of this problem (OLIVEIRA & PONTES, 2012). The installation of airports in urban peripheral areas under the justification that they would function as economic growth poles is becoming more unfounded because over the years it is observed that cities end up suffocating airports due to the real estate valuation of the surroundings and the disorderly urban growth. Another relevant aspect is that the expansion of airports brings several conflicts with the expropriation of residents. In this context, Oliveira (2017) highlights the growing need for planning actions that aim to mitigate situations of conflict with the communities surrounding the airports and, above all, that there is respect for them in the case of expropriations for installation and expansion of this sector. The airport Senador Petronio Portella, Teresina-PI, would be an example for such conflicts, since its expansion demand would the expropriation and transfer of thousands of families, which would generate a great social impact, economic and environmental. Before, it was away from the center of the city, but currently sees its surrounding area busy to for activities commercial and residences with great populacional concentration and hence there is household waste buildup, which serve as attractive for various bird species. In addition, there are also natural focuses of the geographic structure of the city of Teresina , such as rivers, a set of lakes and parks with native vegetation, all located around the airport. What leads us to believe that the choice of airport location ignored these natural aspects associated with avian risk.

Dolbeer (2007) considers two types of costs associated with avian risk: direct and indirect. Direct costs are those related to damage suffered by aircraft, which include repairs to aircraft equipment and damage to other people's properties. Indirect costs, on the other hand, cover those that insurance does not cover and are usually higher than direct costs . According to the Flight Safety Foundation (2002), indirect costs can exceed more than twenty times direct costs. In addition, accidents caused by avian danger influence the confidence of air transport passengers in relation to the companies that offer this service, which can lead to economic losses. The birds awakens people's attention for its beautiful plumage and the variety of corners, but also play a role critical to the equi líbrio ecosystem. They are responsible for flower pollination, seed dispersal, pest control and are excellent indicators of the environmental quality of a region (AGUIAR & CAVALCATE, 2002). Birds are a good group to be used as an environmental indicator due to easy visualization and sound recording; most species are diurnal; already have standardized fieldwork methodologies; and its ecological function is already well established (SILVA & MAMEDE, 2005). In Brazil, birds are of great economic and cultural value, being used mainly as a source of food and kept as pets, and it is common to find homes with species in cages (TEIXEIRA *et al.*, 2014). Ethnoornitology works as a tool for generating knowledge from the contact of communities with the birdlife of a region, and should be considered when adopting measures for the conservation and control plans of these species (ALVES *et al*., 2010). Souza (2001) points out that any presence of birds in air traffic must be considered risky. He claims that due to high speed and its resulting kinetic energy, generated s the plane, either a large bird, as a small, isolated or even a bunch inte iro of any size represent a high risk of accident. The relationship between birds and aircraft is continuous, both in the airspace and on the ground, as airports and one of the largest urban facilities have places for watering, foraging, shelter, perch and nesting. In this sense, about 90% of accidents involving birds and aircraft occur within or around airport sites (VILLAREAL, 2008). So the great diversity and number of birds no longer just one aspect of environmental and pass plow to merit the attention of the Brazilian authorities for their interaction with the air navigation (MORAIS, 2010). In Brazil, there is an increase in the risk of collision between aircraft and bird species, mainly due to the ecological imbalance. Studies in airport sites are fundamental to understand the influence of this scenery on the bird community, and to make the hazard listing that this group can cause to air traffic.

Popular participation and public management: The popular participation is a constitutional principle that guarantees the people the right to effective participation in governance and decision-making (DALLARI, 1996). This right of active participation by the population, groups or associations in government management was enshrined in the 1988 Constitution, which states that the political regime in Brazil is also participatory and not just representative (MONTORO, 1999). The benefits of popular participation are great, as it strengthens the actions of governments for the elaboration of public policies. Among some forms of society or its associations to be part of the management, are the following: direct form (popular initiative, plebiscite and referendum); indirect way (performance of councils, ombudsmen) (DI PIETRO, 2002). With respect to public participation, the actions of measures mitigating the aviary risk and partnerships with public, Infraero and environmental agencies, are still held in isolated form. The actions as seminars, courses, lectures, posters aimed at raising the awareness of crew, staff and the surrounding community for the dissemination of knowledge and d actions that reduce the attractive spots for birds are held sporadically. Public management, which is related to all organizations that work on topics of public interest or that may affect the general population, can act in some ways in studies of avian risk.

The generation of public policies aimed at reducing this risk to the community around the airport, together with the local population, and the evaluation and inspection of the bodies responsible for the airport site, to see the situation of the requirements established in the legislation are some measures that public management can act in this case. INFRAERO, environmental agencies and public institutions must act jointly and permanently, taking responsibility for the safety of passengers and residents of the region, with measures to control bird populations at the airport; thus avoiding possible problems in accidents, such as indemnities, lawsuits, interdiction, among others. As discussed in the systemic view, the management of avian risk involves aspects that are divergent from the operation of activities in airports to the alternatives of places to install this type of enterprise. In addition to all professionals from the most diverse areas that make up the aeronautical industry and public agencies, it would be important for the population or community

associations where the airports are located to participate in these discussions. Alves (2018) established criteria for the proper location of an airport site. Among the procedures he highlighted the inconvenient factors for the installation of this type of activity, among which are ecological impacts, various types of pollution and avian risk. The ideal location will depend on many factors, where fulfilling all of them would be very difficult, but which is basically close to the passenger demand, has a good locomotion structure , space for expansion and distance from housing areas.

Conclusion

The magnitude and dynamics of avian risk require a systemic and continuous approach to efforts (MENDONÇA, 2008). It is necessary to recognize that the responsibility is of everyone involved in air transport, from the choice of the location of implantation, until its operation. In this sense, it is suggested to efficient cooperation between the community and public entities, in addition to the membership strongly integrated actions that should m be better publicized, as they allow for further research and evaluation of the efficiency of their collaborations. It is understood, then, that pressures conflict of communities d the surroundings of the airports in the event of expropriation tend to disadvantage those comunid adhesion along the decision-making because they are alien to it, once the upper middle class, who is the main clientele of air transport, is the one who influences decisions. Thus, for collaborative participation in the mitigation of avian risk, integration between public agencies, airport administration and popular participation is necessary; everyone has their contributions to reduce this risk and thus avoid major incidents. University's research are of paramount importance, as they help in the efficient identification of birds most likely to cause collisions, just like in the understanding of the ecological niche of the species, contributing to better planning of mitigation measures for avian risk. In addition, the scientific studies provide the knowledge of species diversity of the locality. It is suggested that practices airport management and planning in Brazil follow one urban sustainability through environmental urban policies socially fair and that offer quality of life to the population.

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