HEALTH REGION, AGROCHEMICALS, AND HUMAN HEALTH: AN EXPLORATORY READING OF LAND USE AND THE HEALTH-DISEASE PROCESS

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ABSTRACT

This article is the result of research conducted on the impacts caused by the intensive use of pesticides in agriculture in Goiás, and aims to provide an analysis of the impacts of agrochemical use in the municipalities of the health regions of Northeastern Goiás, highlighting the main challenges faced by the local population. This is an exploratory and descriptive research of bibliographic analysis and secondary data on diseases related to pesticide use, with a quali-quantitative approach. Thus, data collection was carried out by surveying information from database systems, such as the Digital Information Systems of the Mauro Borges Institute and DataSUS. The analysis covers the period from 2010 to 2023 and has as its primary focus the health regions Northeast I and II in Goiás. Furthermore, the research revealed that there was an intensification of pesticide use in the state, reflected by the increase in cultivated areas and the quantities produced of soybeans, corn, and sugarcane, which has profound implications for public health. Therefore, the implementation of effective monitoring, education for rural workers, and reviewing pesticide policies is fundamental to ensure sustainable and safe agriculture in Goiás and Brazil.

Keywords: Agrochemicals; Human Health Risk; Public Health.

INTRODUCTION

The use of pesticides in Brazil began in the 20th century, driven by the "Green Revolution" in the 1960s and the National Program for Agricultural Pesticides, which sought to increase agricultural productivity. Although these products brought benefits to production, the intensive use of chemicals generated significant concerns regarding the environment and public health. Intended for pest control, pesticides have negative impacts on human health, ranging from acute symptoms to serious chronic diseases, such as cancer and neurological disorders (DUTRA; SOUZA, 2022).

Pesticides cause damage to both the environment and human health, especially affecting farmers and nearby communities. The impacts range from acute symptoms to serious diseases, such as cancer and neurological disorders, with

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prolonged exposures being more common in monoculture areas. In Brazil, pesticide consumption is unequal among regions: the Southeast leads with 38%, while the North accounts for only 2% (SPADOTTO; GOMES, 2021).

The debate on changes in pesticide regulations and toxicological classifications is central and polarized, with some advocating for stricter measures for environmental and health protection, while others argue that the introduction of more active principles can benefit the agricultural sector. The lack of an effective protection policy and inadequate monitoring of the substances used remain significant challenges (DAUFENBACK *et al*., 2022; HESS; NODARI, 2022).

This article aims to present a study on the impacts of pesticide use in the municipalities of the health macro-region of northeastern Goiás (Northeast I and II health regions), highlighting the main challenges faced by the local population.

METHODOLOGY

The study is an exploratory and descriptive research with a quali-quantitative approach, combining bibliographic analysis and secondary data on diseases associated with pesticide use. It began with a literature review in the PubMed, Scielo, Google Scholar, and Lilacs databases, focused on the last five years and using terms related to agricultural production, pesticides, and health. Furthermore, secondary data from 2010 to 2020 were analyzed, collected from systems such as the Mauro Borges Institute, CIT-GO, SINITOX, and SINAN. The preliminary data analysis was followed by the application of descriptive and spatial statistical techniques. The focus was on the health region of Northeastern Goiás, covering 22 municipalities and a total population of 139,264 inhabitants, using descriptive statistics to summarize data and spatial statistics to study phenomena over time.

RESULTS

The use of pesticides is essential to increase agricultural productivity, but their inadequate application can generate serious risks to health and the environment, constituting a public health problem. Between 2010 and 2023, Goiás recorded a significant increase in cases of pesticide intoxication, with 4,326 occurrences of single acute exposure, 418 of repeated acute exposure, and 25 of chronic exposure. This

growth highlights the need to improve monitoring systems and education on the safe use of these products. Underreporting is a serious problem, aggravated by the lack of access to healthcare and ignorance of the risks, underestimating the real impact of pesticides on public health (DATASUS; OTERO *et al*., 2024).

In Goiás, the municipality of São João D'Aliança stands out as the main soybean producer, reflecting significant growth. However, the region still adopts traditional agricultural practices and lacks advanced infrastructure. The increase in pesticide use is associated with the growth in intoxication cases, impacting the health of rural workers and neighboring communities. The situation is aggravated by the smuggling of pesticides, with almost a quarter of the products used in Brazil being smuggled and often falsified (SILVA, 2015).

The production of pesticides with arsenic, such as insecticides and cotton desiccants, is associated with an increase in skin and prostate cancer, due to genetic mutations and DNA damage. The relationship between pesticides and cancer is complex, involving genetic and environmental factors. It is crucial to implement public policies to reduce pesticide use and promote sustainable agricultural practices. In Goiás, the incidence of cancer varies among municipalities, with Posse, Alvorada do Norte, and Abadia presenting the highest rates in the areas of the health macro-region of northeastern Goiás (INCA, 2022).

The municipalities of Posse, São Domingos, and São João D'Aliança have a high incidence of neurological disorders, possibly related to the intensive use of pesticides, such as paraquat and glyphosate, which are associated with neurological diseases. Furthermore, pesticides such as organophosphates and carbamates are known to cause and aggravate neuropathies, with organophosphates inhibiting acetylcholinesterase and causing delayed polyneuropathy (SANTOS *et al*., 2020; MARQUES e CAIXETA, 2016).

The municipalities of Posse, Alvorada do Norte, and Cavalcante, in Goiás, which have high rates of reproductive disorders, also stand out as major agricultural producers. Thus, it becomes essential to establish correlations between pesticide use

and intoxication cases to develop effective prevention and control strategies (SILVA, 2015).

CONCLUSION

Goiás, one of the main producers of grains and sugarcane in Brazil, faces an increase in cases of neoplasms and congenital malformations, possibly associated with the intensive use of pesticides in sugarcane, corn, and soybean crops. This scenario highlights the need for an interdisciplinary approach that links agricultural expansion to health problems, including acute and chronic intoxications. To balance economic development with the protection of health and the environment, it is fundamental to implement effective monitoring, promote the education of rural workers, and review agricultural and pesticide policies. These measures are essential to ensure sustainable and safe agriculture in Goiás and throughout Brazil.

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