Bioinputs: a sustainable alternative to traditional pesticide cultivation

Bioinputs: uma alternativa sustentável ao cultivo tradicional de pesticidas

DOI: 10.55905/oelv21n12-073

Recebimento dos originais: 11/11/2023
Aceitação para publicação: 11/12/2023

Luana de Miranda Santos
Master in Environmental Sciences
Institution: Universidade Evangélica de Goiás (UNIEVANGÉLICA)
Address: Avenida Brasil. N1000, Covoá, Goianésia - GO
E-mail: luanna_miranda01@hotmail.com

Jadson Belem de Moura
Doctor in Agronomy
Institution: Universidade Evangélica de Goiás (UNIEVANGÉLICA)
Address: Avenida Brasil. N1000, Covoá, Goianésia - GO
E-mail: jadsonbelem@gmail.com

Luiz Cesar Lopes Filho
Doctor in Agronomy
Institution: Universidade Evangélica de Goiás (UNIEVANGÉLICA)
Address: Avenida Brasil. N1000, Covoá, Goianésia - GO
E-mail: lopesfilholuizcesar@gmail.com

Maisa França Teixeira
PhD in Geography
Institution: Universidade Evangélica de Goiás (UNIEVANGÉLICA)
Address: Avenida Brasil. N1000, Covoá, Goianésia - GO
E-mail: maisa.teixeira@faceg.edu.br

Josana de Castro Peixoto
PhD in Environmental Sciences
Institution: Universidade Evangélica de Goiás (UNIEVANGÉLICA)
Address: Avenida Brasil. N1000, Covoá, Goianésia - GO
E-mail: josana.peixoto@unievangelica.edu.br

ABSTRACT
This research aims to identify the existence of legislative regulations for the production and use of bioinputs in the national territory, given the growing use of bioinputs as a
sustainable alternative when compared to the use of pesticides. The objective is to analyze the conceptual and defining parameters of bioinputs, going into sustainable aspects and outlining an overview of the beneficial points when compared to pesticides. Based on the definitions presented, the study focuses on the following question: Are there laws in Brazil that regulate the use and manufacture of bioinputs in view of the exponential growth of the productive market? To answer the central question, the research makes use of the qualitative method that guided the search for bills in progress regarding the theme and enabled the analysis of the viability of the contents presented. As a result, the effectiveness of bioinputs as agents to combat pests is demonstrated, being an environmentally sustainable resource with demonstrated efficacy. Thus, with the demonstration of beneficial implications in management, a legislative gap is identified that permeates the production of bioinputs, including on-farm production, which reflects the lack of regulation regarding production, registration and especially supervision. Although the National Bioinputs Program is in force, laws need to be created from a regular legislative process aimed at regulating the sector that is in notorious growth, which demonstrates the need for the analysis of Bills 3668/21 and PL658/21, currently being processed in the Brazilian legislature.

Keywords: bioinputs, pesticides, regulation, laws.

RESUMO
Esta pesquisa visa identificar a existência de regulamentações legislativas para a produção e utilização de bioinsumos no território nacional, dado o crescente uso de bioinsumos como uma alternativa sustentável quando comparado ao uso de pesticidas. O objetivo é analisar os parâmetros conceituais e definidores de bioinsumos, abordando aspectos sustentáveis e delineando uma visão geral dos pontos benéficos quando comparados aos pesticidas. Com base nas definições apresentadas, o estudo se concentra na seguinte questão: Há leis no Brasil que regulamentam o uso e a fabricação de bioinsumos em vista do crescimento exponencial do mercado produtivo? Para responder à questão central, a pesquisa utiliza o método qualitativo que norteou a busca de notas em andamento sobre o tema e permitiu analisar a viabilidade dos conteúdos apresentados. Como resultado, a eficácia dos bioinsumos como agentes de combate às pragas é demonstrada, sendo um recurso ambientalmente sustentável com eficácia demonstrada. Assim, com a demonstração de implicações benéficas na gestão, é identificada uma lacuna legislativa que permeia a produção de biofatores, incluindo a produção na exploração, o que reflete a falta de regulamentação no que respeita à produção, ao registro e, em especial, à supervisão. Embora vigente o Programa Nacional de Bioinsumos, é preciso criar leis a partir de um processo legislativo regular voltado à regulamentação do setor que está em notório crescimento, o que demonstra a necessidade da análise das Promessas 3668/21 e PL658/21, atualmente em tramitação na legislatura brasileira.

Palavras-chave: bioinsumos, pesticidas, regulação, leis.
1 INTRODUCTION

In the current Brazilian conjuncture, agriculture is one of the major factors responsible for the generation of wealth, occupying a prominent role in national income. It should be noted that we are facing a sector that contributes significantly to the growth of the national GDP, which accounts for 21% of the sum of all wealth produced, a fifth of all jobs and 43.2% of Brazilian exports, reaching US$ 96.7 billion in 2019 (EMBRAPA, online). However, the current agricultural model is closely linked to the excessive use of pesticides and chemical fertilizers that pollute the environment and the beings that inhabit it.

Sustainable development is currently the dominant paradigm that guides development planning, and in search of sustainable alternatives, there is a need for a way to establish changes to this aggressive and derogatory reality of the environment, operated by the large-scale use of pesticides. That is, wealth must be generated, but betting on increasingly sustainable and efficient mechanisms, which combat harm but operate with maximum responsibility and environmental commitment.

In the search for options to replace conventional pesticides used in increasing proportions and causing damage at physical and social levels, we find bioinputs as an innovative potential revolution in Brazilian agriculture. These are agricultural inputs developed from an active ingredient that is natural, considered biologically active, and able to combat effectively without causing great environmental impact (ABBÉY et al., 2019).

The current interest in the use of bioinputs is linked to the numerous benefits associated with them. Within the range of favorable aspects, low toxicity and less damage to the environment are identified when compared to conventional agrochemicals. In addition, biological activities can be quite specific to pathogens, resulting in environmental safety, and are useful for resistance management, further reducing the use of conventional pesticides when used as a component of integrated management programs (CROPLIFE, 2020).

In addition to the benefits listed, bioinputs are effective in small quantities and decompose quickly, without leaving residues in the crop, which is extremely beneficial in terms of less environmental degradation. Thus, inputs for agriculture developed from
Beneficial microorganisms are born in response to the demand of world markets for high-quality food, produced in an ecologically correct, traceable and innocuous way, reflecting a trend of sustainable consumption (Altier et al., 2012).

Because Brazil is a country that stands out as one of the largest consumers of pesticides in the world, the use of large quantities of these pesticides in Brazil is the result of numerous factors. The tropical climate is one of the main reasons since Brazilian agriculture does not rely on the defined winter period to interrupt the cycle of pests, as occurs in places with temperate climates (Vasconcelos et al., 2018).

Thus, there is a need to use skillful mechanisms to combat the proliferation of various pests; however, the use of pesticides in crop management is one of the most controversial points in the national scenario in terms of impacts on the environment. The great controversy about the use of pesticides lies mainly in the fact that the effects of their use are perceived only in the long term (Ferreira, 2008). Additionally, its performance is complex since it is not possible to measure all the consequences that its use can cause in the environment as a whole (Serra et al., 2016).

This chapter introduces the concepts used to characterize pesticides, presenting their main characteristics and possible harm to the environment, as well as addressing bioinputs and their less harmful use. The use of these biological pesticides as a sustainable alternative to combat pests and greater ecological preservation is verified, demonstrating a viable and less harmful alternative.

2 THE TRADITIONAL USE OF PESTICIDES IN BRAZILIAN AGRICULTURE

When in 1962, Rachel Carson published the book Silent Spring, where she denounced the dangers of the chemical industry and the excessive use of "poison" due to the Green Revolution, in addition to the harmful effects on human health and the environment, the author was considered an alarmist who brought to the scene a very distant and impossible future. Carson (2002) warned that, for the first time in the history of the world, every human being is now subject to contact with dangerous chemicals, from the moment of his conception until the moment of his death:
In less than two decades of their use, synthetic pesticides have been so widely distributed throughout the animate and inanimate world that they occur everywhere. They have been recovered from most major river systems and even from groundwater streams. Residues of these chemicals remain in the soil, in which they were applied a dozen years earlier (CARSON, 2002, p. 15).

Initially, it is necessary to understand the concept and characteristic elements of pesticides, also known as agrochemicals and chemical pesticides. These persist due to the ease of being found in the market and the efficiency in controlling the target pathogen, even though they do not have rapid degradability and accumulate at levels that can cause effective damage to the environment (VALICENTE et al., 2018).

In conceptual aspects, according to article 1 of Decree No. 4,074/2002, pesticides are understood as follows:

Art. 1º- For the purposes of this Decree, it is understood that: (...) IV - pesticides and related - products and agents of physical, chemical or biological processes, intended for use in the production sectors, in the storage and processing of agricultural products, in pastures, in the protection of forests, native or planted, and of other ecosystems and urban, water and industrial environments, whose purpose is to change the composition of flora or fauna, in order to preserve them from the harmful action of living beings considered harmful, as well as the substances and products used as defoliants, desiccants, stimulators and growth inhibitors (...) (BRAZIL, 2002, online).

Thus, they are considered pesticides, according to the Food and Agriculture Organization (FAO):

any substance or mixture of substances used to prevent, destroy or control any pest – including vectors of human and animal diseases, unwanted species of plants and animals, causing damage during (or interfering with) the production, processing, storage, transport or distribution of food, agricultural products, timber and derivatives – or which is to be administered for insect control, arachnids and other pests that affect the bodies of farm animals. The term pesticide includes insecticides (insect control), fungicides (fungus control), herbicides (combating invasive plants), fumigants (fighting soil bacteria), algicide (fighting algae), avicides (fighting birds), nematicides (fighting nematodes), molluskicides (fighting mollusks), acaricides (fighting mites), growth regulators, defoliants (fighting unwanted leaves) and dissecting agents (BAIRD, 2006; SMITH; FAY, 2004, online).

Entering into a historical context and extremely important for the understanding of terms used, it is denoted that the growth of the use of pesticides was driven by the
desire of man to improve his living condition, seeking to increase food production. Since the beginning of the civilizing era, man has been primarily responsible for the transformations that have occurred in nature due to the evolution of his species and the growing search for space and food. Approximately 10,000 years ago, with agricultural development, population density began to increase, and consequently, the relationship between species changed (BARBOSA, 2004).

Humans began to stock up, and the cultivated fields became food sources for the most varied species of insects and rodents, also being attacked by fungi and bacteria. These species proliferate rapidly, in view of the large amount of food and thus began to interfere with the well-being of people, being, therefore, considered pests.

In this way, man sought ways to combat the pests that attacked the plantations, from religious rituals to the development of the so-called pesticides, which are commonly known for their action in the fight and prevention of agricultural pests and can be found in the market in the form of insecticides, fungicides, herbicides, nematicides, acaricides, rodenticides, molluskicides, ant killers, regulators and growth inhibitors (BELCHIOR et al., 2014). Its use is in the fight against the harmful action of harmful and derogatory living beings of plantations and native flora, which are highly harmful to countless plantations.

It should be noted that pesticides have advantages and are able to propagate improvements, especially an increase in productivity and a reduction in food insecurity. However, enormous attention should be given to the numerous manifested disadvantages, such as human health, degradation of nature and serious violations of human rights (SERRA et al., 2016).

Going into the regulatory aspects in Brazil, the main legislative norm that regulates the use of agrochemicals is Law No. 7,802/89, regulated by Decree No. 4,074/2002. The aforementioned legal provisions bring an essential approach regarding research, experimentation, production, packaging and labeling, transportation, storage, marketing, commercial advertising, use, import, export, final destination of waste and packaging, registration, classification, control, inspection and inspection of pesticides and their
related components. The aforementioned law establishes in its first articles the conceptual aspects of pesticides, as we have seen previously.

In differentiating terms, it is noted that there are pesticides considered agricultural, being those destined for agricultural production, and nonagricultural pesticides, which correspond to those destined for the preservation of the native flora, ecosystems and water environments and those destined for use in industries, households, water treatments and campaigns (PERES; Moreira, 2003).

The Regulatory Decree now mentioned establishes, in its articles. 2nd and following, who is responsible for establishing the guidelines and the inspection according to the type of pesticide considered, precepting:

Art. 2º is up to the Ministries of Agriculture, Livestock and Supply, Health and the Environment, within the scope of their respective areas of competence:
I - establish the guidelines and requirements regarding data and information to be presented by the applicant for registration and re-evaluation of registration of pesticides, their components and the like;
II - establish guidelines and requirements aiming to minimize the risks presented by pesticides, their components and the like;
IV - establish specifications for labels and package inserts of pesticides and the like;
V - establish official sampling and analysis methodologies for the determination of pesticide and related residues in products of plant and animal origin, in water and soil;
VI - promote the re-evaluation of the registration of pesticides, their components and the like when there are indications of the occurrence of risks that discourage the use of registered products or when the country is alerted in this sense by international organizations responsible for health, food or the environment, of which Brazil is an integral member or signatory of agreements;
VII - evaluate requests for cancellation or challenge of registration of pesticides, their components and the like;
VIII - authorize the fractionation and repackaging of pesticides, etc.
IX - control, supervise and inspect the production, import and export of pesticides, their components and the like, as well as the respective establishments;
X - monitor and inspect the quality of pesticides, their components and the like regarding the characteristics of the registered product.
XI - develop actions of instruction, dissemination and clarification on the correct and effective use of pesticides and the like;
XII - provide support to the Federation Units in the control and inspection of pesticides, their components and the like;
XIII - appoint and maintain representatives in the Technical Advisory Committee for Pesticides referred to in article 95;
XIV - maintain the Pesticide Information System - SIA, referred to in article 94;
XV - publicize the summary of applications and registration concessions; and
XVI - evaluate the requests for registration of equivalent technical products (BRASIL, 2002, online).

Analyzing article 5 of the Decree, it is noted that it is up to the Ministry of Agriculture, Livestock and Supply (MAPA) to evaluate the agronomic efficiency of pesticides classified as agricultural and to grant their registration, meeting the guidelines and requirements of this Ministry.

See:

Art. 5º is incumbent upon the Ministry of Agriculture, Livestock and Supply:
I - to evaluate the agronomic efficiency of pesticides and related products for use in the sectors of production, storage and processing of agricultural products in planted forests and pastures; and
II - grant the registration, including the RET, of pesticides, technical products, premixes and the like for use in the sectors of production, storage and processing of agricultural products, in planted forests and pastures, meeting the guidelines and requirements of the Ministries of Health and Environment (BRASIL, 2002, online).

With regard to territorial and geographical aspects, it is noted that according to the Ministry of Agriculture, Livestock and Supply (MAPA), the State of Goiás is 5th in the national ranking of the gross value of pesticide production (MAPA, online). Thus, it is noted that its spraying indiscriminately, contrary to article 11 of State Law 19.423/16 that determines that aerial spraying is not carried out less than 500 meters from villages, leads to massive contamination, including of children, as was the case of the students of the rural municipal school São José do Pontal in 2013 (BRAZIL, 2016, online).

Let us see what Article 11 of Law 19.423/16 establishes:

Art. 11. In the use of pesticides, their components and the like, of agricultural use should be observed, at least, the following distances:
I - for aerial spraying:
a) 500 m (five hundred meters) of villages, cities, towns, neighborhoods, water sources for population supply;
b) 250 m (two hundred and fifty meters) of water sources, isolated dwellings and groups of animals;
II - for sprays with mechanized terrestrial application:
a) 200 m (two hundred meters) of water sources to supply the population;
b) 100 m (one hundred meters) of the springs, even if intermittent, cities, towns, villages, neighborhoods, water courses;
c) 50 m (fifty meters) of isolated dwellings and groups of animals;
III - for application with a costal sprayer or other manual application technology:

a) 20 m (twenty meters) of villages, cities, towns, neighborhoods, isolated houses and animal groups;
b) 50 m (fifty meters) of water sources for population supply.

Single paragraph. For application with costal sprayers, in the case of watercourses, the distances observed must be at least equal to the range defined for permanent preservation areas (BRASIL, 2016, online).

There are several reports of contamination and degradation caused by the indiscriminate use of pesticides in Brazil. Among those harmed are indigenous and quilombo-las who find themselves in a situation of total helplessness.

This statement is corroborated by the following reports:

On both sides of the red dirt road, corn fields stretch out of sight. The scene could be on any farm in Mato Grosso do Sul, but we are in the Panambizinho Indigenous Land (TI), in Dourados (MS). There, at least 80% of the area is taken over by monoculture. Unlike agricultural property, indigenous villages are home to many people, which increases the risk of human contamination by pesticides.

In Panambizinho alone, there are approximately 400 people exposed to the poison in the backyards of their homes. In the Dourados Indigenous Reserve (RID), one of the most populous in the world, the risk affects more than 16,000 residents of the Guaraní Kaiowá, Guaraní Nhandeva and Terena ethnic groups. "It is difficult to control the pesticide. There's a crop here, another there... In every corner there is," says Ramon Fernandes, captain of Jaguapiru, one of the RID villages. In the estimate of the indigenous leadership, approximately 30% of the reserve is occupied by corn and soybean plantations. "We have already acted on the use of pesticides within indigenous lands, very close to people's homes, and we have already sued indigenous and nonindigenous people for leases," says the prosecutor of the Republic Marco Antonio Delfino de Almeida, about the performance of the Federal Public Ministry (MPF) in relation to the subject. According to him, among the most common irregularities in the villages are the importation of counterfeit agricultural pesticides from Paraguay, on the border with Mato Grosso do Sul, and the use of pesticides during the day. "The application carried out at noon is criminal, because it occurs at a temperature higher than that determined in the package insert, up to 25°C." (MEDINA, 2022, online).

Residents of the Velame quilombo also report:

There's no way to sleep at night. The smell is very strong, it gives a headache. Even with the door closed, that stench enters the house. We get dizzy, we feel the eye, the lips, as if it were pepper. I must have allergies because whenever this smell comes, I go bad, vomit, I stay in bed.

The testimonies are from residents of the Velame quilombo, in Morro do Chapéu (BA), in the Chapada Diamantina. In the community, there are 33 families, some less than 700 meters from onion farms where pesticides are applied up
to twice a day, with greater intensity from October to February. Velame was one of the three quilombola areas visited by the report that are exposed to the effects of chemicals applied to medium and large properties (GIOVANAZ, 2022, online).

According to the reports listed above, it is evident that associations between health problems in traditional communities and pesticide abuse in neighboring farms have been notoriously coined. Thus, researchers from different areas seek to investigate this relationship and raise strategies that minimize the problem.

In 2014, social scientist Maria Letícia de Alvarenga Carvalho, from the Federal University of Minas Gerais (UFMG), recorded "cases of epilepsy, seizures, liver and blood poisoning, allergies, irritation and swelling in the eyes, chest pains, respiratory problems and even prostate cancer" in the Saco Barreiro quilombo, in Pompéu (MG), based on reports from numerous residents (GIOVANAZ, 2022, online).

Still immersed in a context of neocolonialism, where nature has become a commodity, agriculture is artificially created and chemically cared for. Notably, we witnessed an alarming Brazilian scenario when we evidenced that our country is the largest consumer of pesticides in the world and the third largest agricultural exporter of commodities. Its share of consumption represents (one fifth) of the world's pesticides and 86% (eighty-six percent) of all Latin America. If these extremely worrying rates were not enough, since the beginning of 2019, in 175 days, the Brazilian government has released the registration of 211 pesticides, being the largest release ever made in Brazil since 2005. One of the government's justifications for this release is a supposed measure of debureaucratization (ALBURQUEQUE, et al., 2019).

It should also be noted that even before the release of pesticide registration, 30% (thirty percent) of the active ingredients used in Brazil are prohibited in the European Union, whose prohibition is based on scientific studies that have already proven the risks and harmfulness of these assets. Thus, it is denoted that the impacts of occupational and environmental origin related to its use have as an immediate target the collective health and especially of the traditional peoples (BOMBARDI, 2017).

As a counterpoint to alarming statistics and the rise of agropesticides, the real need for a technology capable of offering production alternatives that consider the potential of
Brazilian megabiodiversity, its applications to the various productive, vegetable, animal and product processing sectors and be able to curb the evident aggressiveness with the increasingly indiscriminate use of pesticides is evident.

3 ENVIRONMENT AND HUMAN RIGHTS: THE IMPLICATIONS OF PESTICIDE USE ON SOCIAL RIGHTS

The environmental problems resulting from the use of pesticides show that it is more than necessary to change the way of producing, the behavior and the relationship of societies with the environment, bringing effective and less harmful mechanisms. The indiscriminate use of such assets leads to a generalized shake-up of the environment as a whole, both in environmental aspects and in a social panorama (FERREIRA, 2008).

First, it is important to highlight the concept attributed to what is meant by human rights. Bringing a definition to the expression is something of extreme difficulty. The rapporteur of the Commission on Human Rights, Charles Malik, stated in 1947 that:

The expression 'human rights' obviously refers to man, and with 'rights' one can only designate that which belongs to the essence of man, which is not purely accidental, which does not arise and disappear with the change of times, fashion, style or system; it must be something that belongs to man as such. (MALIK, 1947, online, apud MELLO, 1989, online).

Flávia Piovesan (2009, p. 108) also portrays the need to understand aspects of human rights and even more to invoke these rights in all its segments. See:

In any case, human rights are inspired by this twofold vocation: to affirm human dignity and to prevent human suffering. I am reminded here of Hannah Arendt when she affirms that the human being is both a beginning and an initiator and that it is possible to patiently modify the desert with the faculties of passion and action. Human rights ethics works with the language of reciprocity. It is that ethic that sees in the other a being deserving of equal consideration and deep respect, endowed with the right to develop their potentialities freely and fully. In addition, in this historical light it is here that I jump to the Universal Declaration of '48, which was born as a response to the totalitarian barbarism, the atrocities, the horrors committed throughout the totalitarianism of the Hitler era. It greatly innovates the grammar of human rights by answering three questions: who has rights, why rights, and what rights? What rights? The Declaration affirms the indivisibility of human rights. In its 30 articles, some translate civil and political rights, and some translate economic, social and cultural rights. What does the declaration impact on the language of human rights? It comes to say that
red rights are as important as blue rights – civil and political rights. Economic, social and cultural rights are in parity, in degree of importance. Just as important as freedom of expression is access to healthcare, education and work. As serious as dying under torture is starving to death. There is parity with respect to the freedom axis and the equality axis. In addition, the integral vision of human rights, that is, the declaration, composes the catalog of civil and political rights to the catalog of economic, social and cultural rights, thus establishing a relationship of interdependence, interrelation and indivisibility. Not only are they on an equal footing, but one depends on the other. There is no true freedom without equality, whereas there is true equality without freedom.

Bringing the social aspect and the flagrant violation of human rights to the reality of the study, it is noted that this is evidenced by the indiscriminate use of pesticides, reflecting a concern in the international context. The special report on the right to food of the Human Rights Council of the United Nations, distributed on January 23, 2017, consolidates the most modern scientific knowledge, policies and practices related to the management and control of the impacts of pesticides on human rights at the international level (ALBURQUEQUE, et al, 2019).

The aforementioned instrument analyzes the adverse effects of pesticides on human rights, taking into account their impact on human health and the environment and relating them to the rights enshrined in international treaties, especially the human rights to adequate food, health and the full conditions of development of the population as a whole.

Corroborating the aforementioned rights, Article 25 of the Universal Declaration of Human Rights provides that:

Everyone has the right to a standard of living sufficient to ensure health and well-being for himself and his family, especially regarding food, clothing, housing, medical care and the necessary social services, and is entitled to security in the event of unemployment, illness, disability, widowhood, old age or other cases of loss of means of subsistence due to circumstances beyond his control (UDHR, 1948, online).

On an internal level, it is noted that the Brazilian Federal Constitution brings in article 6 the right to food as a social right guaranteed to Brazilians. It is clear, however, that this does not only enshrine the simple right to access food, since in its normative core, we can highlight dimensions such as the adequacy of food available in the market
(the supply of adequate food from the point of view of its quantity, quality and safety and of cultural and informational aspects) (BRASIL, 1988).

The realization of this right is complex and is directly linked to numerous aspects of the organization of the state, from the supervision and promotion of public policies implemented in the area. The nonobservance of the various dimensions of the right to food leads to its noncompliance, either by the supply of contaminated food (inadequate) or by the expansion of negative impacts on health and biodiversity (not sustainable), clear examples in the contemporary era.

The most recent results of the Program for the Analysis of Pesticide Residues in Food (PARA), coordinated by Anvisa, dated December 10, 2019, for the period 2017-2020, report the following:

Pesticide residues were found in 51% of the 4,616 samples. Of the total samples, 23% were considered unsatisfactory because they presented residues with concentrations higher than the maximum residue limit (MRL), which implies potential risks of acute and chronic intoxication arising from dietary exposure. We are talking about samples collected in retail establishments, that is, of the food we acquire to take to our tables. It is undeniable that the result of the analyses is worrisome (HEALTHY EATING, 2020, online).

As envisioned, the right to adequate food guarantees the food necessary to achieve a balanced standard of living, thus relating to the basic guarantee of the dignity of the human person supported by the Universal Declaration of Human Rights as previously presented.

It is also noteworthy that within the framework of the International Convention on Economic, Social and Cultural Rights, the respective committee considered that the right to adequate food "should not be constructed in a shallow or restrictive sense" and that the term "adequate" denotes not only quantity but also quality, emphasizing, further, that the notion of sustainability is intrinsically related to the idea of adequate food that is accessible to present and future generations (ALBURQUEQUE, et al, 2019).

The Human Rights Council report also highlights that pesticides threaten future food production – including in their quantity – to the extent that they are responsible for
the loss of biodiversity, soil and water contamination and for negatively affecting the productivity of arable land (ALBURQUEQUE, et al, 2019).

As described, analyzing pesticides from the perspective of human rights requires recognizing the universality to all people of the rights to adequate food and health, overcoming discrimination against peoples who today still disproportionately bear the burden of pesticides and their dangers.

4 BIOINPUTS: CONCEPTUAL ASPECTS AND THEIR RELATIONSHIP WITH SUSTAINABLE PRODUCTION

The various problems generated by the inadequate management of pesticides have been reflected as one of the great challenges in the current reality. Although Brazil is a megadiverse country, the alternatives for pest control using more sustainable means are still little explored in Brazilian daily life.

Thus, before seeking to understand conceptual and characterizing aspects of the so-called bioinputs and their proposal for a less degrading fight against the environment, it is necessary to portray the issue of sustainability, seeking a greater understanding of its terms and guidelines.

Immediately, it is important to highlight the etymological origin of the word sustainability, which in the second Serra (2015, online), has its origin: "[...] in Latin sustentare: it means to sustain, to support, to conserve." In this way, it is relevant to point out that at a given moment in history, humanity realized that natural resources were finite. Such a perception occurred around the nineteenth century, being accentuated after the Second World War, an opportunity in which inquiries and concerns with the natural environment arose, as well precepted Bernardes and Ferreira (2003 apud OLIVEIRA, 2009, p. 66):

[...] the environmental issue finds its roots in the late nineteenth century and emerged after World War II, promoting significant changes in the worldview. Humanity realized for the first time that natural resources are finite and that their misuse may represent the end of existence itself.
The aforementioned period becomes an initial milestone for discussions and changes regarding environmental issues, although it turns out that until the middle of the twentieth century, the necessary changes took place in a very timid and discreet way. The most significant changes began in the 1960s, as observed in the words of Gonçalves (1996 *apud* OLIVEIRA, 2009, p. 66):

[... ] Until the 1950s, the issues related to the environmental impacts arising from the different human activities were manifested in a very timid way in the scientific community. This situation began to change in the 1960s. As a result of the intense process of industrialization, the use of nuclear energy and the patterns of consumption and population growth adopted in the postwar period, the environmental impacts, both physical, economic and social, assume greater visibility.

Thus, even if in a rather timid way, it is denoted that the first steps toward a change regarding environmental issues were still taken in the nineteenth century, but only in the twentieth century (more precisely from the 1960s) began to gain greater contours due to the use of nuclear energy and the immense process of industrialization, giving greater visibility to the environmental impacts glimpsed at the time (RAMOS, 1996).

It is evident, then, that more precisely in the 1960s, society began to manifest itself in the sense of propagating environmental protection as a reflection of economic advancement. Initially, the most developed countries were those that directed higher levels of concern in environmental conservation, since these because they are more industrialized, presented and consequently present levels of production and environmental degradation of great contours when compared to underdeveloped countries (RAMOS, 1996).

The issue of sustainability assumes in this new century a central role in the reflection on the dimensions of development and the alternatives that are envisioned. The socioenvironmental framework that characterizes today's societies demonstrates that the impact of humans on the environment has had devastating consequences, both in quantitative and qualitative terms. Thus, it should be noted that there are limitations to growth, and the use of less burdensome mechanisms should be cultivated and encouraged in a routine way (JACOBI, 2003).
When portraying the sustainability of an agricultural production system, it should be noted that this is related to the possibility of access of all the most varied social groups to soil, water, and other resources and products (FERREIRA, 2008). The search for sustainability is notorious in all economic sectors and can be implemented in different ways, both in agriculture and livestock. Following a bias of less degradation of the environment, it is highlighted again that the use of bioinputs is an important strategy to boost sustainability without productivity losses, being a viable alternative to the use of pesticides.

In conceptual terms, we can understand bioinput, by the etymology of the word, as "input of biological origin". However, there is no widely used concept in the literature that brings a full understanding of the term. In our country, the term bioinput is used as a synonym for biological products, bioproducts, biobased products or even as an example of a product, such as bioinsecticides, biofertilizers, bioinoculants and others (VIDAL et al., 2020).

Following the conceptual bias and based on the National Bioinputs Program, according to Decree No. 10,375 of May 26, 2020, the following can be established:

Bioinput is any product, process or technology of plant, animal or microbial origin intended for use in the production, storage and processing of agricultural products, in aquatic production systems or planted forests that positively interferes with the growth, development and response mechanism of animals, plants, microorganisms and derived substances and that interact with products and physical-chemical and biological processes (BRAZIL, 2020, online).

It should be noted that the main bioinputs are based on microorganisms (viruses, bacteria and fungi), but there are also several macroorganisms (beneficial insects, predators, parasitoids, predatory mites, etc.), semiochemicals (pheromones) and biochemicals; all beneficial and effective in the search for competitive agricultural production. They are of remarkable importance in helping the production system and cause a decrease in the use of chemical inputs, whose inappropriate or excessive use leads to imbalances that further increase the dependence on synthetic inputs (DALL'AGNOL, 2020).

The benefits caused by the use of bioinputs are varied. Thus, the expected benefit from biological treatment must be compatible with the cost or investment in the method.
It is understood by benefitting not only the direct and evident action of the product on the target but also the fact that these are biodegradable, safe to humans, selective to other organisms and do not cause so many imbalances when compared to chemical inputs (LOPES, 2009).

Thus, bioinputs assume a marked alternative bias in the contemporary era, given the replacement of conventional pesticides that degrade the environment and damage public health, being a new technological promise that opens the possibility of reconciling interests within the agricultural sphere. (VIDAL et al., 2020).

Corroborating the information that the use of bioinputs is constantly growing in Brazil, it is evident that in 2021, 92 products of biological origin were registered, which will contribute significantly to more sustainable agriculture in the country (BRASIL, 2021). The growth shown in Figure 1 demonstrates a change in the behavior of the market over the years regarding the adoption of these practices and the search for sustainability. See:

Figure 1. History of registration of biobased products in Brazil

Source: BRAZIL, 2021.
Although the agricultural market has been showing an increase in the demand for organic, ecological and chemical residue-free products, it is noted that the growth in some regions of these assets is impaired due to the well-established markets for pesticides, lacking a greater awareness of the benefits of bioinputs and uneven efficiency of bioproducts, resulting in the delay of these ecological alternatives for pest control.

It is of paramount importance to make farmers aware of the use, efficacy, and importance of bioinputs (MISHRA et al., 2020), as these differ from pesticides in fundamental ways and often require specific handling and application, which are not well understood by producers, sales representatives, and consumers (GLARE et al., 2012). The need for training on the part of those who will handle the biological product is noted here.

There is a need to introduce certain extension activities, such as the organization of teaching programs and workshops seeking to promote sustainable agriculture using bioinputs. Guidance, explanation and monitoring should be done to propagate and guide the handling of the product used (MISHRA et al., 2015).

Thus, it should be evidenced, however, that aspects inherent to the use, production, legislation, market and importance of bioinputs in Brazilian agriculture have the potential to revolutionize agriculture in Brazil. However, it is necessary that these products are tested to ensure their safety, standardization and effectiveness and are urgently regulated. Thus, the regulation of its use becomes a real and immediate necessity.

Recently, there has been an increase in interest in the production of biological inputs on farms for their own use. This production occurs from the replication of commercial products acquired in the market or through preinoculants prepared and sold by specialized companies, which can also market the infrastructure used in this type of cultivation. The aforementioned preparation is known as on-farm production, which has registered an exponential increase today and lacks regulation in the Brazilian order (CNA, 2022).

On the subject of on-farm production, it is worth understanding its conceptual aspects considering that these bioinputs can bring numerous environmental, economic and even social benefits, but to regulate it, it is also necessary to consider the entire
Brazilian sociopolitical context to establish guidelines consistent with the reality of the country.

*On-farm* bioinputs can be conceptualized as follows:

On-farm production, also known as "home production" or "on-farm production" of biological inputs, consists of the multiplication of bacterial strains within the property for their own use. Today, biological inputs, or bioinputs, are considered essential in Integrated Pest Management (IPM) as a complement to the use of other more traditional tools, such as chemical pesticides. In fact, biological control has been shown to be increasingly effective in the management of pests and diseases, justifying its adoption in constant growth in Brazilian agriculture.

In parallel, there has been growth in the on-farm production of these products, which represents approximately 22% of the total biopesticide market, according to the study "Risks and impacts of on-farm production of biopesticides" conducted by IHS Markit in 2021 (CROPLIFE, 2022, online).

The findings of researchers and technicians who work in agricultural regions affirm that the practice of this production is intense in grain-producing properties in the Midwest region and in Minas Gerais. In the south, this practice is higher in Paraná, expanding more recently to Santa Catarina and Rio Grande do Sul. In the northeast, the advance in fruit orchards of the Petrolina/Juazeiro region stands out, reaching strongly to the region called Matopiba, which also involves the state of Tocantins (EMBRAPA, 2021).

Technical inadequacies and the absence of rigorous quality control steps during the on-farm production of microorganisms can lead to an increasing production of low-quality, unsafe and highly ineffective products for biological control, putting the crop at risk. Additionally, contamination by such biological agents can cause serious pathologies and the proliferation of species that produce toxins harmful to human health, leading to serious consequences, sometimes even more severe than those caused by the incorrect use of chemicals (EMBRAPA, 2021).

The homemade production of biological actives carries a high risk of the occurrence of antibiotic-resistant bacteria, in addition to causing diseases such as endocarditis, meningitis, and urinary tract infections, as already proven in scientific research conducted by Embrapa chemicals (EMBRAPA, 2021). Such evidence demonstrates the need for
urgent regulation that treats bioinputs in a general way and encompasses *on-farm* production in its normative framework.

5 LEGAL FRAMEWORK OF BIOINPUTS IN BRAZIL AND THE LACK OF REGULATORY STANDARDS

The growing search for sustainable development looking for alternatives less harmful to the environment leads to a true expansion of the bioinput production in Brazil, following a worldwide trend of search for less environmental degradation. In this sense, there is a lack of regulatory aspects that regulate the management of bioinputs within legal standards in the national territory, aiming at the correct and adequate management of biological inputs.

In current terms, it is observed that the regulatory regime of biological control belongs to the same legislation as conventional pesticides, that is, Law 7,802 (BRAZIL, 1989) and Decree 4,074, (BRAZIL, 2002). The basic differentiation of the two groups of products, that is, biological and pesticides, occurs through Normative Instructions of the Ministry of Agriculture, Livestock and Supply (MAPA), which dispense with the biological supervision of some specific requirements of those faced by chemists, showing a greater flexibility to the use of bioinputs.

Fromssto form, there is 24796upervis among companies, researchers and members of the government that in view of the exponential growth and aiming at the development of the sector is of 24796upervisi importance the implementation of specific rules and laws for the biological sector in Brazil, lacking its own normative instruments capable of instrumentalizing and regularizing its use in an appropriate way (PEDRAZZOLI; Herrmann, 2016).

In the national territory, MAPA, the National Health Surveillance Agency (ANVISA) and the Brazilian Institute of the Environment and Renewable Natural Resources (IBAMA) are the bodies in charge of issuing the registration of use and commercialization of bioinputs. In a more detailed aspect, it is up to MAPA to perform the analysis of the agronomic efficiency of the product. In turn, ANVISA evaluates the
degree of toxicity of the product and the possible risks to human health. Finally, IBAMA makes an analysis of the danger focused on the environment (VASCONCELOS, 2018).

In procedural terms, it is verified that the veto of any of the three institutions previously mentioned is enough to prevent the approval of a new agricultural pesticide (VASCONCELOS, 2018). Thus, in view of the need to boost the creation of new bioproducts, the National Bioinputs Program (PNB) and its Strategic Council were elaborated, established by Decree No. 10,375 (BRASIL, 2020), which will be duly analyzed following this study.

Therefore, there is still a need for legislative regulation regarding the use and supervision of bioinputs in Brazil. In this aspect, the Projects of Lei 3668/21 and 658/21 are in process aiming at the creation of a legal framework inherent to the theme addressed here.

6 NATIONAL BIOINPUTS PROGRAM: BRIEF ANALYSIS

The need for coordinated actions to offer environmentally friendly inputs and animal and human health is a historical demand for various approaches to sustainable agriculture, which has grown strongly in recent years in the world and, in particular, in Brazil. Thus, the National Biosinumos Program was designed as an instrument capable of "expanding and strengthening the use of biological agents to benefit the agricultural sector" (BRASIL, 2020, p. 105). However, because it is a recent legal mechanism, it needs further studies, as well as adequate parameters and legal provisions.

From a historical and conceptual perspective, it is verified that the National Bioinputs Program was created to meet a growing demand in the national market and to mobilize in the face of international demand. Thus, the Ministry of Agriculture, Livestock and Supply (MAPA) implemented the program, aiming to invest in the potential of Brazilian biodiversity and greater control of the factors that most impact the costs of rural producers today: dependence on inputs for imported fertilizers.

Federal Decree No. 10,375 of May 26, 2020, established the National Bioinputs Program and the Strategic Council of the National Bioinputs Program. The aforementioned program contains 15 articles that address aspects from its institution, the structure
of its governance, and the establishment of technical concepts for the application of the standard, including the establishment of a multisectoral collegiate to formulate the strategic planning of the program coordinated by MAPA (VIDAL, 2021).

The National Bioinputs Program aims to expand and strengthen the use of bioinputs in Brazilian agriculture and livestock, and to this end, it brings in its initial articles its main attributions:

In its initial articles, the aforementioned decree states the following:

Art. 3 The National Bioinputs Program shall be coordinated by the Ministry of Agriculture, Livestock and Supply, which is responsible for the following:

I - establish partnerships with public or private agencies and entities with a view to the implementation, dissemination and development of actions for the use of bioinputs;

II - to foster national and international cooperation projects for the promotion of bioinputs;

III - analyze the legislation related to the theme and indicate the normative conflicts and their impacts on the execution of the program and the elaboration of the regulatory framework;

IV - to issue a manual of good practices for the units producing bioinputs, thus considered biofactories, to be promoted in the different regions of the country, with priority to small and medium production;

V - stimulate innovations in agriculture and national aquaculture production to cover the aspects of the bioeconomy and involve the organizational forms of small and medium-sized producers, including cooperatives and associations, small and medium-sized companies and startups, through the contracting of projects for the development of regional production chains;

VI - establish and consolidate the national catalog of bioinputs;

VII - implement national strategies that inform about the potential use and benefits of bioinputs for agricultural production, with a view to activities to reduce impacts on the environment and health;

VIII - create a favorable environment for the financing of infrastructure and funding through the provision of credit and access to economic instruments that benefit the production and use of bioinputs;

IX - establish the National Observatory of Bioinputs, intended for the collection, systematization and dissemination of annual data on market trends, production and consumption of bioinputs;

X - discuss and propose specific rules to consider the particularity of bioinputs and their respective registration and registration processes;

XI - to foster the development of research that ensures innovation and advancement in the construction of knowledge about the different components of each of the thematic axes of the Program through the edition of specific instruments;

XII - promote good practices of production and use of bioinputs through training, dissemination, promotion of events, among other actions, at the national and international level; and

XIII - monitor and monitor the results achieved and subsidize the stages of review and redirection of the program, according to previously established indicators (BRASIL, 2020, online).
It is noted that the National Program of Biosinsumos is composed of three main thematic axes of action: plant production, animal production and postharvest and processing of products of animal and vegetable origin. The aforementioned axes make up the program and allow other themes to be incorporated throughout the implementation and whenever necessary and agreed upon in the strategic council (BRASIL, 2020).

In this regard, as Vidal (2021, online) prescribes,

In the thematic axis of animal production, there are the following themes: animal health, animal feed, animal management and aquaculture production. The theme of animal health includes biovaccines, herbal medicines, biovermifuges, homeopathy and others. In animal feed are contemplated probiotics, supplements, rations and others. The management of animal breeds in diversified systems comprises the management practices of animal species that present a balance between rusticity and productivity, based on organic and agroecological factors. Aquaculture production seeks to promote food, health, and effluent treatment, among others. In plant production, there are the following themes: plant health; soil fertility, plant nutrition and abiotic stresses; and species management. Health discusses the management and control of pests and diseases involving bioacaricides, biofungicides, pheromones, and bioinsecticides, among others. In soil fertility, plant nutrition and abiotic stresses are inoculants, biofertilizers, biostimulants and others. When considering the theme of management of plant species in diversified systems, the use and promotion of traditional and creole species with organic and agroecological bases is sought. Finally, in the axis of postharvest and processing of products of animal and plant origin, there are themes related to hygiene, conservation and packaging. Postharvest products of plant origin include sanitizers, biopreservatives, packaging and others. For the processing of products of animal and vegetable origin are contemplated the sanitizers, biostabilizers, biofilms, among others.

With its guidelines focused on the use of bioinputs, the program has several social and economic impacts, promoting the strengthening of this sector, such as generating employment and income and improving the quality of life of the characters that integrate the value chains of Brazilian agribusiness. In addition to the benefits mentioned above, the program aims to expand the value capture for agricultural products and their derivatives in the bioinput segment.

Despite the benefits listed with the use of bioinputs and the evolutionary process of their implementation, the promotion of a legislative environment that stimulates the debate on the subject of bioinputs should be established in an emergency way. The National Congress needs to institute the regulatory framework that will discipline the new
technology, as it was with regard to the biosafety of genetically modified organisms, which unfolded in an unprecedented technical-scientific debate, culminating in the edition of Law No. 11,105 of 2005 (VIDAL, 2021).

Thus, it is expected that, in the coming years, the bioinputs segment can expand even more and strengthen, offering its users technological bioinnovations - products, processes, knowledge and information - that expand in a relevant way, the references of Brazilian agro, as more competitive and safe to the environment, notoriously guided by sustainable development.

7 BRAZILIAN LEGISLATION AND BIOINPUTS: THE NEED FOR A REGULATORY FRAMEWORK

The growing expansion of the bioinput market in Brazil follows a worldwide trend of respect for issues related to sustainability. The implementation of the National Bioinputs Program by the Ministry of Agriculture, Livestock and Supply (MAPA) in 2020 has also fostered the use of biological products and other bioinputs in the field, bringing strategies directed to the treatment of biological assets (CNA, 2021).

Faced with this scenario of exponential growth, entities in the sector recognize the need for specific legislation to ensure the safety and standardization of production. Today, the regulatory regime of biological control agents belongs to the same legislation as conventional pesticides: Law 7,802 (BRAZIL, 1989) and Decree 4,074 (BRAZIL, 2002), which demonstrates a legislative lack in the regulation of a sector that is on a remarkable rise.

Currently, two bills are under discussion aimed at regulating the use of bioinputs in Brazil. In the Chamber of Deputies, we find Bill 658/2021, by Deputy Zé Vitor (PL/MG), and in the Senate, Bill 3668/2021, by Senator Jaques Wagner (PT/BA). Such projects aim to regulate the production of bioinputs and derivatives in Brazil, including on-farm production (CNA, 2021).
7.1 OVERVIEW OF THE BRAZILIAN LEGISLATIVE PROCESS

Initially, it is important to highlight how the Brazilian legislative process takes place with regard to the processing of a bill. The legislative process in Brazil consists of the procedural rules, constitutionally foreseen, aiming at the elaboration of the normative species. According to Silva (2013, p. 458), "the legislative process is a set of preordained acts aimed at the creation of norms of law”.

In this sense, article 59 of the Federal Constitution (BRASIL, 1988, online) establishes that:

Art. 59. The legislative process shall comprise the preparation of the following:

I - amendments to the Constitution;
II - complementary laws;
III - ordinary laws;
IV - delegated laws;
V - provisional measures;
VI - legislative decrees;
VII - resolutions.

Single paragraph. Complementary law shall provide for the preparation, drafting, amendment and consolidation of laws.

When we analyze the procedure for the creation of a Charter, Article 61 of the Constitutional Charter highlights the following:

The initiative of complementary and ordinary laws is the responsibility of any member or Commission of the Chamber of Deputies, the Federal Senate or the National Congress, the President of the Republic, the Federal Supreme Court, the Superior Courts, the Attorney General of the Republic and the citizens, in the form and in the cases provided for in this Constitution (BRASIL, 1988, online).

As a general rule, as a result of the so-called federative bicameralism, when faced with a legislative process of federal order, the appreciation of the two Houses of the National Congress should take place: the initiating House and the revising House. Thus, for the bill to be considered by the federal Chief Executive, it must have been previously appreciated and approved by both Houses, namely, the Chamber of Deputies and the Federal Senate (LENZA, 2019).
After the initiative phase of the bill, there will be the moment of conjugation of wills, both of the Legislative (parliamentary deliberation - discussion and voting) and of the Executive (executive deliberation - sanction or veto). Thus, Article 64 of the Federal Constitution states that "The discussion and voting of bills initiated by the President of the Republic, the Federal Supreme Court and the Superior Courts shall begin in the Chamber of Deputies" (BRASIL, 1988, online).

It is important to note that only bills initiated by the Senators or Senate committees are proposed before the Federal Senate, with the Chamber of Deputies functioning as the reviewing house in these cases. Thus, after the parliamentary deliberation with appreciation of the two houses (initiator and reviewer) and of the commissions, the bill follows for sanction or veto of the President of the Republic (LENZA, 2019).

In general, the Federal Constitution provides in its articles 65 and 66 exactly the procedure presented above:

The bill passed by one House shall be reviewed by the other in a single round of discussion and voting and sent for sanction or enactment if the reviewing House approves it or shelved if it rejects it.

Single paragraph. If the bill is amended, it will return to the initiating House. The House in which the vote has been concluded shall send the bill to the President of the Republic, who, acquiescing, shall sanction it.

§ 1 - If the President of the Republic considers the project, in whole or in part, unconstitutional or contrary to the public interest, he shall veto it in whole or in part, within fifteen working days, counted from the date of receipt, and shall communicate, within forty-eight hours, to the President of the Federal Senate the reasons for the veto.

§ 2 - The partial veto shall only cover the full text of an article, paragraph, item or subparagraph.

§ 3 - After the period of fifteen days, the silence of the President of the Republic shall be sanctioned.

§ 4 - The veto shall be considered in a joint session, within thirty days of its receipt, and may only be rejected by the vote of the absolute majority of the Deputies and Senators.

§ 5 - If the veto is not maintained, the bill shall be sent for promulgation to the President of the Republic.

§ 6 - Exhausted without deliberation the period established in § 4, the veto shall be placed on the agenda of the immediate session, superseded the other propositions, until its final vote.

§ 7 If the law is not promulgated within forty-eight hours by the President of the Republic, in the cases of § 3 and § 5, the President of the Senate shall promulgate it, and if he does not do so within the same period, it will be up to the Vice President of the Senate to do so (BRAZIL, 1988, online).
The final or complementary phase of the legislative process takes place with the promulgation, which consists of the attestation of the valid existence of the law and its enforceability. For José Afonso da Silva (2006, p. 219), "the act of promulgation has, thus, as its content the presumption that the law promulgated is valid, enforceable and potentially mandatory."

Once the law has been enacted, it must be published, an act by which it will be brought to the knowledge of all the contents of the legislative innovation. The publication is implemented by the insertion of the text in the Official Gazette and must be determined by who promulgated it (LENZA, 2019).

As mentioned, the Brazilian legislative process comprises the elaboration of several normative instruments, including ordinary laws, provisional measures, amendments to the Constitution, legislative decrees, resolutions, and others. Each type of proposal follows a different procedure.

Based on the bills for the regulation of bioinputs in Brazil, because they are proposals for the creation of an Ordinary Law, the procedure will follow the order established in Figure 2 below and already detailed previously.

See:
Figure 2: Processing of draft laws for the regulation of bioinputs in Brazil.

7.2 REGULATORY FRAMEWORK OF BIOINPUTS IN BRAZIL: ANALYSIS OF BILLS 3668/21 AND 658/21

Having made the initial considerations about the Brazilian legislative panorama, the research proceeds to the analysis of the two bills in progress in the National Congress, aiming at the regulation of the use of bioinputs in the national territory.

Bill 3668/21, an initiative of Senator Jaques Wagner (PT/BA), is being processed in the Federal Senate. The project provides for the production, registration, marketing, use, final destination of waste and packaging, registration, inspection and inspection, research and experimentation, and incentives for the production of bioinputs for agriculture (SENADO FEDERAL, 2021).

Soon in its article 2, the bill established the conceptualization of bioinputs, bringing a broad approach to what would be the biological agents covered by the legislation and other aspects related to them.

See:

For the purposes of this law, the following shall be considered:

I – bioinputs: the product derived from substances of natural plant, animal, microbial and mineral occurrence, isolated or in conjugated formulations or artificial production of substances, provided that identical to those of natural occurrence the process or technology of plant, animal or microbial origin, intended for use in the production, storage or processing of agricultural and forestry products, that positively interfere with the growth, development or response mechanism of plants, microorganisms and derived substances and that interact with physico-chemical and biological products and processes (SENADO FEDERAL, 2021, online).

The article brings in a complete way and without leaving room for doubt, conceptual and necessary aspects to know terms related to biological assets. In its normative body, the bill regulates even the production on farm, bringing even a differentiated form for its registration in its article 3:

Establishments that produce or import bioinputs for commercial purposes and on-farm biofactories are required to register with the Ministry of Agriculture, Livestock and Supply – MAPA.

§ 1 - The regulation of this law shall provide for the procedures for registration of establishment.
§ 2 The on-farm biofactories, defined in item XXIII, article 2 of this law, shall carry out the registration in the form of self-declaration, containing, at least, the production capacity, the identification and origin of the isolate, lineage, strain or strain, quality control mechanisms and procedures for the destination of waste and packaging (SENADO FEDERAL, 2021, online).

It should be noted that on-farm production is characterized by being a "home production" or "production on farms" of biological inputs, consisting of the multiplication of bacterial strains within the property for own use. Often, this multiplication of microorganisms is carried out in a rather precarious and even inconsequential way. There are several cases of inadequate proliferation of bacteria in various properties of the country. These are multiplied in water tanks or other containers in the open, without insulation, without temperature control and without trained and qualified staff with taxonomic knowledge to identify and perform bacterial cell counts (CROPLIFE, 2022).

In addition to the various risk factors presented, there is a huge concern about the problems they may present in export products. Undoubtedly, the presence of excess contaminants in an exported cargo would result in a barrier to the process, which could cause serious inconvenience and damage to the country's economy, thus lacking urgent regulation.

Going into more specific aspects of the registration of bioinputs in general, article 4 of PL 3668/21 (SENADO FEDERAL, 2021, online) determines that "Bioinputs produced and imported for commercial purposes shall be registered with the Ministry of Agriculture, Livestock and Supply – MAPA".

Additionally, with regard to the registration of biological assets, Articles 6 and 7 complement:

Art. 6 The bioinput will have only one registration with MAPA and may have more than one purpose of use provided for in this law.
Art. 7 The application for registration of bioinput that has microorganism as an active ingredient and that is a new product shall be disciplined in regulation by MAPA, ANVISA, IBAMA and instructed with information on I – complete indication of the place of deposit and the reference of the isolate, strain, strain or strain deposited in a public or private germplasm bank accredited by MAPA; II - agronomic efficiency; III – behavior of the microorganism in the environment; and IV – possible toxicity of the microorganism to the human species, animals, plants, other microorganisms and the environment. § 1 - The
provisions of this article do not apply in cases of bioinput that uses colonies of nonisolated microorganisms (SENADO FEDERAL, 2021, online).

The bill also brings aspects inherent to the supervision of the production and import of bioinputs for commercial purposes and for own use, in addition to the registration of establishments and products. Such an inspection measure is attributed to the Ministry of Agriculture, Livestock and Supply, which may apply precautionary measures alone or cumulatively before the evidence or suspicion that an activity or an agricultural product that represents a risk to agricultural defense is in noncompliance with the legal dictates (SENADO FEDERAL, 2021).

In addition to precautionary measures, there is the possibility of imposing definitive punishments, either individually or cumulatively. Thus, penalties such as warning, fine, condemnation of the product, suspension of activity, registration or registration, and cancellation of registration or registration may be applied to offending individuals.

This bill does not consider it necessary to exclude the requirement for prescription bioinputs provided for in Law No. 7,802 of 1989 (Pesticides Law), since such a requirement does not apply to various types of bioinputs covered by the future legal standard. This has as its central objective the ratification of the National Bioinputs Program, understanding that it is important to create mechanisms to promote the production and use of bioinputs by the states, municipalities and the Federal District (SENADO FEDERAL, 2021).

In terms of the legislative procedure, the project was presented to the plenary of the Federal Senate on 10/19/21 and then went to the Environment Commission, where it is until the date of 12/23/22, after going through two public hearings. The hearings marked the defense for sustainable production and the need to use bioinputs in a regularized way. (SENATE, 2022).

Until now, the proposal remains in regular process and must go through all stages of the legislative process until the final sanction of the President of the Republic.

With regard to PL 658/21 authored by the then deputy Zé Vitor (PL-MG), it is noted that this brings numerous points that provide for the classification, treatment and
production of bioinputs through biological management on farms and ratifies the National Program of Bioinputs, in addition to bringing in its core other related measures. In its initial articles, the project established the concept of bioinputs as follows:

Art. 2 For the purposes of this law, the following is considered:

IV – bioinput: product, process or technology of plant, animal or microbial origin, intended for use in the production, storage and processing of agricultural products, in aquatic production systems or planted forests, involving AMC that positively interferes with the growth, development and defense mechanism of animals, plants, microorganisms and derived substances and that interacts with physicochemical and biological products and processes, including in the control of a population or biological activities of another organism considered harmful (CHAMBER OF DEPUTIES, 2021, online).

In the referred Bill, some points deserve attention and analysis, especially when evidenced the fundamentals and the real need to implement the regulation of the use of bioinputs in the national territory.

See:

Art. 3 The production and use of bioinputs in the national territory is based on I – the protection of public health and the balanced environment, through the development of alternatives for agricultural and livestock production that are economically viable and ecologically sustainable, which guarantee healthy products for Brazilian and international society; II – economic, technological and innovation development; III – free enterprise, free competition and consumer protection; IV – the valorization and access to biodiversity; V – the strengthening of production systems, prioritizing family farming whenever possible; and 5 *CD211541083600* Electronic document signed by Zé Vitor (PL/MG), through point SDR_56266, in the form of art. 102, § 1, of the RICD c/c art. 2, of the Bureau Act no. 80 of 2016. VI – the subsidiary and exceptional intervention of the State on the exercise of economic activities (CHAMBER OF DEPUTIES, 2021, online).

The activities included in biological management on farms gained prominence in the drafting of the bill, being mandatory for the accompaniment of qualified professionals who are technically responsible for the development of management activities on farms, which can be hired directly by the rural producer as an employee or third-party service provider.

With regard to the possible penalties imposed on individuals who perform activities contrary to legal determinations, the bill provides for the following
administrative sanctions, without prejudice to those of a civil, criminal nature and those defined in specific rules:

Art. 23. Violations of the rules established in this Law are subject, as the case may be, to the following administrative sanctions, without prejudice to those of a civil and criminal nature and those defined in specific rules: I – fine; II – seizure of the product; III – unusability of the product; IV – cancellation of the notification or registration of the product with the competent body; and V – temporary suspension of activity. Single paragraph. The sanctions provided in this article shall be applied by the map within the scope of its attribution and may be applied cumulatively, including by precautionary measures, antecedents or incidents of administrative procedures, in accordance with Law No. 9,784 of January 29, 1999. Art. 24. The penalty of fine shall be graduated according to the gravity of the offense, the advantage gained and the economic condition of the offender and shall be applied through an administrative procedure, ensuring the right to ample defense. Single paragraph. The fine will be applied in an amount not less than 200 (two hundred) and not more than 100,000 (one hundred thousand) times the value of the Fiscal Reference Unit (UFIR), or an equivalent index that may replace it (CHAMBER OF DEPUTIES, 2021, online).

Additionally, according to the project, it is important to establish a regulation for the production of bioinputs in Brazil since Brazil is one of the world leaders in agricultural production and has one of the most competitive and promising markets, mainly for its biodiversity (CROPLIFE, 2022).

Although there are decades in which the country has agricultural production based on bioinputs, which provide benefits to health and the environment, little is said about this sustainable modality that, although not new, its evolution, propagation and scalability has been the subject of innovation in the Brazilian agriculture and livestock sector. An example is the recent Decree No. 10,375 of May 26, 2020, which, provoked by the national productive sector, gave rise to the institution of the National Bioinputs Program as an advance in the provision regarding the theme (CHAMBER OF DEPUTIES, 2021).

Given these aspects, the project is necessary, bringing to the heart of the legislature a proposal that is viable and effective with regard to the regulation of bioinputs. Thus, at the level of processing, PL 658/21 was approved by the Constitution and Justice and Citizenship Commission of the Chamber of Deputies. The rapporteur of the proposal, Deputy Diego Garcia (Republicans-PR), recommended the approval of the substitute of the Committee on Agriculture, Livestock, Supply and Rural Development to the Bill and,
therefore, may proceed to the analysis of the Senate, unless there is an appeal for the vote, before the Plenary (CHAMBER OF DEPUTIES, 2021).

Given these aspects, it is clear that the path to the approval and consequent presidential sanction of the projects analyzed here is long, and there are several challenges that must be overcome for the effective creation of the standard. There is resistance from sectors linked to the use of pesticides that defend their use, and there will be segments linked to environmental preservation whose flag is linked to sustainability and consequently to the regulation of the management and production of bioinputs.

8 FINAL CONSIDERATIONS

For decades, pesticides have performed pest control to aid in the performance of food production and cultivation. However, its continuous and indiscriminate use results in a severe concern with issues related to the environment and human health, causing intense pollution, environmental degradation and diseases to field workers and final consumers of food.

Thinking of a satisfactory fight against harmful agents and guiding the preservation of the ecosystem, alternatives are raised routinely, bringing the issue of sustainability as a protagonist in the national scenario. The efficiency of production should be evidenced but accumulated to a context of environmental conservation.

Thus, so-called bioinputs emerge, presented as the best alternative to stimulate agriculture that respects sustainable practices and preserves natural resources for the best performance of the agricultural sector itself. Endowed with efficiency and a low degree of harmfulness to the environment, they have become an excellent option for several sectors, including agriculture.

The diversity of existing bioinputs and the ways in which they act are numerous, and each one has characteristic complexity, since each biological asset is specific to the target pathogen that needs to be combated. In this way, actions should be carried out aiming at the acceptability and awareness of farmers for conscious exchange, ensuring the perpetuation and use of bioinputs as a new resource for the control of pests in agriculture, thinking and conserving environmental resources.
It is necessary to invest adequately in training the method of using the purchased product, thinking essentially about the benefits that bioinputs present in comparison to pesticides. Finally, biological agents offer solutions to concerns such as pest resistance to traditional chemical pesticides and public concern about the side effects of pesticides on the surrounding environment and human health, demonstrating a new alternative that is less harmful to the environment and equally effective and combative.

Based on a model of technological innovation, encouraging the reduction of environmental pollution and aiming at a model of sustainability constituting even more sustainable agricultural production with the parsimonious use of the natural resources existing in this megabiodiverse country, biosinsumos emerge. These enter the Brazilian market as a viable alternative to the indiscriminate use of pesticides in the national territory.

In the current context, bioinputs are already innovating, bringing benefits to society and offering alternatives to production systems to solve problems such as heavy dependence on imported chemical inputs, high production costs and notorious environmental degradation caused by pesticides. The growth triggered by this sustainable technology generates great expectations in general terms but causes some concern for a clear absence of legislative regulation.

Thus, with the emergence of the so-called National Program of biosinumos in Brazil, there was a stimulus in the production of a broad debate from the legislative point of view where some initiatives of Bills addressing the theme of bioinputs, their regulation and the ratification of the National Program emerged in the country.

One of the legislative examples that aims to regulate the theme consists of Bill 3668/21, proposed by Senator Jaques Wagner of the Workers' Party/BA, as well as PL 658/21 of Deputy Zé Vitor of PL-MG. These seek to regulate the production, registration, marketing, use, final destination of waste and packaging, registration, inspection and inspection, research and experimentation, and incentives for the production of bioinputs for Brazilian agriculture. The projects are in progress and identify the need to create a regulatory framework regarding the use of bioinputs in Brazil, including on-farm production (SENADO FEDERAL, 2021).
Sustainable technology is a solution for the promotion of productive sectors, promoting bioeconomy, regional development, generating employment, income and new possibilities for Brazilian production chains, with emphasis on the longevity of crop systems. The indiscriminate use of biological agents can cause enormous damage to the environment and even to human health, lacking an evident dispositive norm that guarantees their proper handling.

The valorization of sustainable agricultural models makes regulation even more necessary, being credited to bioinputs a wave of conservation and less environmental degradation, with possibilities of generating positive externalities. Certainly, the frontier presented by the potential use of biodiversity is immense, and our country has technologies, methodologies, processes and the possibility of professional qualification capable of promoting the beginning of a promising process that depends on the appropriate instruments of political support, legislative regulation and prioritized and continued investment so that it occupies the world reference space that belongs to it and preserves its immense environmental diversity.

ACKNOWLEDGMENT

To the Postgraduate Development Program (PDPG) Emergency Strategic Consolidation of Academic Postgraduate Programs stricto sensu. Process nº 88881.710666/2022-01 of the PDPG-CONSOLIDACAO-3-4 Program
REFERENCES


ALIANCE FOR ADEQUATE AND HEALTHY FOOD. To subsidize pesticides is to violate the right to food. Available at: https://alimentacaosaudavel.org.br/. Access in: 09.08.22.


FEDERAL SENATE. *Bill No. 3668/21*. It provides for the production, registration, marketing, use, final destination of waste and packaging, registration, inspection and inspection, research and experimentation, and incentives for the production of bioinputs for agriculture and provides other measures.


