

AGRICULTURE, RIGHT TO FOOD AND BIOECONOMY: A BRAZILIAN AGENDA TO COMBAT FOOD INSECURITY

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ABSTRACT: This work aimed to analyze how the bioeconomy contributes to modify the food system, making it sustainable. Surveys carried out internationally demonstrate the concern of analysts with the map of hunger that will increase due to Covid-19, as well as the megatrends that will increase the demand for food. The challenge will be to implement an economic model that changes the food system. The bioeconomy will allow focusing on sustainable alternatives regarding the use of natural and biotechnological resources and the form of economic organization, so as not to compromise socio-biodiversity. Through bibliographical analysis, it is concluded that the exploitation of biotechnology and biological resources will place Brazil in the focus of the production of products, inputs and food, attracting investors to the domestic market, making it an important player in the production chain. Consequently, it will expand regional markets, contributing to the reduction of food insecurity in the country.

Keywords: Food security; Bioeconomy; Malnutrition.

AGRICULTURA, DIREITO À ALIMENTAÇÃO E BIOECONOMIA: UMA AGENDA BRASILEIRA DE COMBATE À INSEGURANÇA ALIMENTAR

RESUMO: O presente trabalho teve como proposta analisar como a bioeconomia contribui para modificar o sistema alimentar, tornando-o sustentável. Pesquisas realizadas em âmbito internacional demonstram a preocupação dos analistas com o mapa da fome que terá sua crescente em razão da Covid-19, assim como as megatendências que farão com que a demanda de alimentos. O desafio será implementar um modelo econômico que modifique o sistema alimentar. A bioeconomia permitirá focar em alternativas sustentáveis quanto ao uso dos recursos naturais, biotecnológicos e na forma da organização econômica, de modo a não comprometer a sociobiodiversidade. Através de análise bibliográfica, conclui-se que a exploração da biotecnologia e de recursos biológicos colocará o Brasil no foco da produção de produtos, insumos e alimentos, atraindo investidores para o mercado interno, tornando-o um importante player na cadeia produtiva. Por conseguinte, ampliará mercados regionais, contribuindo para a diminuição do quadro de insegurança alimentar no país.

Palavras-chaves: Segurança alimentar; Bioeconomia; Subnutrição.

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INTRODUÇÃO

The Universal Declaration of Human Rights advocates that the right to food is inherent to man, and this right became legally relevant with the advent of the International Covenant on Economic, Social and Cultural Rights (ICESCR) in 1976. In Brazil, the right to food was expressly affirmed at the time of the Amendment to the Constitution (EC) No. 64/2010, being included in the list of social rights.

Food is so important that without it man will not have the strength to seek self-realization. Therefore, if there are obstacles hindering the ability of individuals to produce or obtain food by their own means, soon the economy will not reach this environment, engendering a number of social problems.

Research conducted by international organizations reveals a high rate of food insecurity in Latin America, and the biggest concern will be with the post-pandemic scenario in which the hunger map will expand. On the other hand, another perspective that worries analysts are the megatrends that will cause food demand to rise to stratospheric levels.

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Should one be asked what measures should be implemented? Will the finite resource management model be enough to control the rise of food demand in the future? Will the traditional economy be able to meet large demands by spending the minimum of biological resources considering the possibility of scarcity? What is the role of the bioeconomy on the food security agenda?

Therefore, this article seeks to analyze how the bioeconomy can contribute to modify the food system making it sustainable so that the Government confronts the current challenges and prepares for what is to come, controlling the food insecurity situation in its mild, severe and moderate dimensions.

2. RIGHT TO FOOD: POLITICAL-LEGAL FOUNDATION

Regarding food, it is notorious that food insecurity causes serious social maladjustments. When analyzing the Pyramid of Maslow, it is perceived that the basis of it constitutes the dignity of man and his ability to satisfy its physiological needs, without which it will not achieve self-realization. If in a given³ society obstacles prevent the ability of individuals to produce or obtain nutritious food by their own means, the economy will not reach this environment.

At the end of 2008, the overall average of malnourished people in the world reached the mark of 963 million people, and this number reached about 1.02 billion in 2009. In 2019, the average malnutrition of those in Latin America reached 40.5 million, and projections for the year 2030 estimate an increase to 60.3 million due to the effects of Covid-19 (FAO, 2011; FAO, 2020).

It should be mentioned that the common agenda of countries in combating hunger, expected the achievement of its target by the year 2030. However, the current perspective shows that developing and underdeveloped countries will have difficulties in meeting the Agenda of the Sustainable Development Goals, especially the countries in Latin America and the Caribbean. When analyzing the political history of these continents, we can notice two scenarios, one of neglect and the other of attempts of a pretentious welfarism, in which more poverty is produced instead of extinguishing it.

That said, thinking about measures to solve such problem becomes crucial for the security of the country, because, considering the current pandemic scenario, the unemployment rate tends to increase exponentially, increasing the rate of malnutrition and return of the greatest of problems, who Brazil has long eradicated, hunger.

As we know, the progressive provision of the right to food presupposes the implementation of the necessary measures to ensure the nutritional security of the population. The Universal Declaration of Human Rights (UDHR) ensures that, regardless of the condition of the individual, everyone has the right to a dignified life, with security, work, leisure, education, housing, health and food, rights inherent to man (art. 25, §1, UDHR).

The right to food became legally relevant with the advent of the International Covenant on Economic, Social and Cultural Rights (ICESCR) in 1976, which affirmed the need to implement individual measures and in international cooperation to achieve the right to food.

Developed and developing countries, with the capacity to produce food beyond their internal needs, must cooperate with each other (economic and technical assistance) to progressively achieve peace and social balance. The accession of countries supporting this pact has become the best way to achieve the perspective shared by all humanity (GOLAY, 2009, p. 16).

As provided in the ICESCR, the member states are obliged to comply with this pact, removing the possibility of dodging their commitment on the grounds of funds limitations. In case of non-compliance, the efforts made and the use of the means available to fulfill its responsibility must be demonstrated (GOLAY, 2009, p. 16).

³ Proposed by Abraham Maslow in 1943, the pyramid addresses a psychological theory that is arranged in a hierarchy of human needs or motives. The proposed pyramidal system encompasses five distinct levels, organized in decreasing order of depreence (physiological, safety, affiliation, self-esteem and self-realization). The main idea is that the higher needs – in this case, self-realization – will only occupy the attention of the human person when the most basic needs are met. Therefore, the physiological need to occupy the basis tends to be the strongest and most essential, while self-realization is the weakest in the hierarchy of needs (HESKETH; COSTA, 1989, p. 59). In fact, the human person will only worry about themes related to self-realization when it occupies an environment that favors the development of its potentialities; and is in a job that regumbles him well, so as to acquire food for his livelihood.

In Brazil, the right to food was expressly affirmed at the time of the Amendment to The Constitution (EC) No. 64/2010. It should be mentioned that its effectiveness has never been lowered, given that Article 5, §§2 and 3, encompass the possibility of international conventions and treaties being incorporated into Brazilian legislation with the power of an amendment. Also, before this advent, Brazil was already a signatory to international treaties dealing with the matter. Thus, the inclusion of the right to food to the list of Art. 6 of the CF/988 merely formalized this right, considering that the protected legal interest was safeguarded as a fundamental right arising from the right to life, health, human dignity, and the existential minimum (SARLET *et al.*, 2017; WHITE, WHITE MENDES, 2017)⁴.

At the infraconstitutional level, this right is protected by Law No. 11,346/2006, which established the Food and Nutrition Security System (SISAN), whose objectives cover the formulation, implementation of policies of food and nutrition security plans, the stimulation of cooperation between public administration and civil society, supervision, monitoring and assessing of the country's nutritional security.

Lemos & Moreira (2013, p. 378-379), in this perspective, point out that the feeding of the Brazilian population was consolidated in public policies from the 20th century on, and its development had occurred until it reached the main food security program in Brazil, the Fome Zero Program.

For Suplicy (2003, p. 63) social organization is paramount to overcome poverty. However, the period of the collapse of the government of Washington Luís in 1930, led the country into half a century of political and social chaos due to social movements and the agrarian campaign. After the 1964 coup d'état, in which the government of President João Goulart ended, the Military Dictatorship was established and lasted until mid-1985.

During the Military Dictatorship, expansive monetary policies were adopted based on agricultural export models. Consequently, there was a huge concentration of properties in the possession of few, increasing urban and rural poverty. In the mid-1980s, Brazil moved towards democracy. With the political-administrative reorganization, the Federal Constitution of 1988 put human rights at the fore. Since 1990, food insecurity issues have again gained notoriety because of the financial crisis that has pushed the state to discuss plans related to the matter. Taking this perspective into consideration, the ambitions of the government, businesses and rural producers have been undermined. However, the most affected layer was the working class, because as restrictive policies were implemented, the mass was impoverished and economically weakened.

After intense periods of socio-economic problems that aggravated the scenario of violence in the country and the collapse of the Collor government in 1992, the country was eager for change. In order to reverse the situation, in 1992, Brazil incorporated the ICESCR into Brazilian legislation with the advent of Decree No. 591 of July 6, 1992. In 1997, the Special Secretariat for Human Rights was created to deal with the National Plan for Human Rights, developed in 1999 and 2002. However, regarding the subject of the plan, it should be noted that its effects did not happen as soon as the plan was implemented (FAO, 2011).

The Zero Hunger program was presented for discussion and elaboration in October 2001. The program aimed to eradicate food and nutrition insecurity, being recognized as the most successful in the world, according to the United Nations. The program mobilized a set of ministries, in which it required a well-structured articulation of the government (FRAUNDORFER, 2013, p. 97-98; WE READ; MOREIRA, 2013, p. 378-379; TOMAZINI; LEITE, 2016, p. 15).

It should be highlighted that the program's initiative covered a wide spectrum of actions that covered organization by neighborhood, agrarian settlements and popular restaurants, etc. Given the multiplicity of demands, there was a need to involve several ministries from the federal, state and municipal government spheres. This macrosystem, with diverse actors, dealt with each theme within its sphere of specialization (TOMAZINI; LEITE, 2016, p. 22-23).

As for the purpose of the program, it aimed to combat misery through income transfer, through long-term direct assistance to advance the right to food on many fronts. Among its objectives, we should highlight: the eradication of extreme poverty hunger; promoting economic growth and income distribution; job creation programme (SUPLICY, 2003, p. 62; WE READ; MOREIRA, 2013, p. 379-381).

⁴ It should be recorded that the right to food, in addition to the dignity of the human person, encompasses other constitutional precepts, such as the right to life, health, education, work, assistance to the homeless, housing, guarantee of minimum wage, respectively configured in the arts. 3rd, inc. III; 5th, inc. XXII; 6th; 7, inc. IV; 23, incs. VIII and X; Art. 170, inc. VII; Art. 196; 200, inc. VI, VI. art. 203; Art. 208, inc. VII, and art. 227, of CF/88.

The implementation of public policies on the right to food were marked by experiences and learning, however, its trajectory did not have political force in the federal government's agenda to move forward, because, despite Fome Zero having had a positive impact on its period, some criticized the more than 30 complementary programs implemented (TOMAZINI; LEITE, 2016, p. 15).

In this regard, Santos (2004, p. 62) points out that the program was limited to creating emergency and care policies. For this author, the program was nothing more than a welfare policy that perpetuated the problem that should be solving. In order to solve the impasse, the author points out as a solution the creation of a model of economic development based on income distribution.

About this, Tomazini & Leite (2016, p. 20) highlight that:

One of the fundamental beliefs of the actors of the food security coalition is the right to a regular diet, dignified in adequate quantity and nutritionally balanced. For the actors of this coalition, although the majority of the population in extreme poverty may not starve, it would depend in most cases on favors and philanthropic actions, often feeding unworthily. However this coalition was not alone. Between the 1990s and 2000s, **anti-poverty policies can be analyzed as the product of coalition interaction: a coalition that defended the principles of food security, another that defended the premises of human capital and a third favorable to universal basic income** [my griffin].

With the end of the Zero Hunger Program, other policies in the same segment were implemented to serve those in need. It should be highlighted that the incentive to agriculture, especially to small farmers, were paramount for the State to account for part of the food demand.

However, despite these policies validating compliance with the state's obligation in relation to the millennium goals, the current demand calls for contingency policies to control the damage caused by Covid-19. The economic slowdown, the political-institutional crisis, the extinction of the National Council for Food and Nutrition Security (CONSEA), and the weakening of small-scale family-based farming programs were crucial factors to consolidate an environment of food insecurity in Brazil. The attenuation of policies and actions, once successful and internationally recognized, driving forces aiming to eradicate hunger, made it difficult for vulnerable groups of the Brazilian population to have access to food.

Data collected between August and December 2020, by the research group *Food for Justice: Power, Politics, and Food Inequalities in a Bioeconomy*, reveal that, of the households interviewed, 40.6% are in a food safety situation, while 59.4% are in the context of food insecurity, of which 31.7% are in mild insecurity; 12.7% moderate and 15% severe (GALINDO *et al.*, 2021, p. 2-19).

About this, we cite other studies that demonstrate the degree of food insecurity in Brazilian households:

The National Household Sample Survey 2013 (PNAD - 2013) recorded the best level of food security in the entire historical series - 77.4%. However, four years later, the Family Budget Survey 2017-2018 (POF 2017/2018) (IBGE, 2020) revealed that the food security situation was experienced by 63.3% of the households surveyed. That is, a drop of 14.1 percentage points. As a statement, 36.7% had some degree of Food Insecurity (GALINDO *et al.*, 2021, p. 2).

Sufficient and adequate nutrition are requirements for the promotion of the right to health and human development, given that it is the minimum level of human dignity. This right includes regular, permanent, and unrestricted access, direct or through a consumer relation, quantitative and qualitatively adequate and sufficient, to guarantee a physical and mental wellbeing, individually and collectively, full and dignified.

The human body, for its good performance, operates with the intake of a certain amount of calories and nutrients, without which it weakens and the mind suffers. How will man have the strength to seek employment or develop an activity that pays him, if what gives him energy to do so falls short of his means to obtain it?

It should be considered that part of the population substrate does not even have access to the means of production (land, water, inputs, seeds, technology and agricultural credit). Other adverse factors, such as natural disasters, environmental degradation, and civil conflicts, support this degrading situation to be perpetuated, affecting millions of people.

It should be mentioned again that food security is a basic human right that must be guaranteed and implemented through public policies, with the due participation of public agents in cooperation with civil

society, in areas where the State does not reach. Therefore, "it is up to the State to protect, respect, promote or facilitate and realize this right" (BUZANELLO, 2009, p. 5824).

In order to comply with this goal, progressively, all the legal resources and tools available for compliance must be used. However, if they do not have the necessary resources to do so, international assistance may be requested, as foreseen and expressed in Article 11 of Decree No. 591 of 6 July 1992.

Regarding food security, it must be understood that its concept is not the same as food sovereignty. The first covers physical and economic access to nutritious and sufficient food that meet your dietary needs, as well as your dietary preferences. While the second, in turn, is defined by the Nyeleni Declaration of 2007 as the right of peoples to have access to healthy and culturally appropriate foods, the production of which is done through ecologically sustainable methods, respecting their respective agricultural production systems (FRISON; CLAEYS, 2019).

Therefore, it is perceived that the normative content of food law encompasses the dimension of supply stability, which is tied to the time elements of availability, access and use.

With regard to availability, food is required to be produced directly through the exploitation of land or other natural resources (breeding, fishing, hunting or gathering). Production should be made available in sales channels for the entire population, which encompass internal and external trade (GOLAY, 2009, p. 12; KEPPEL *et al.*, 2014, p. 17; FRISON; CLAEYS, 2019). However, the fact that the food is available does not mean that everyone will have physical access to obtain it.

Physical and economic access to food takes place when everyone can obtain food in a socially acceptable way. An individual or a family must have sufficient economic resources to obtain food without compromising, or restricting other basic needs (health, housing, education, etc.). The dimension of accessibility is quite complex, because it involves food prices and other competing basic needs that affect the resources available to the family, such as home rentals, clothing, school supplies, etc. (GOLAY, 2009, p. 12; KEPPEL *et al.*, 2014, p. 17; FRISON; CLAEYS, 2019).

Regarding the use of food, its dynamics include the adequacy, nutritional and cultural value of food. Therefore, this should be considered in its biological use, influenced by the conditions of basic sanitation and human health, and the microbiological and chemical safety of food. In fact, it must contain micronutrients and be devoid of any pesticide to meet dietary needs, considering the age of the individual, living conditions, health, occupation, sex, etc. (GOLAY, 2009, p. 12; KEPPEL *et al.*, 2014, p. 17; FRISON; CLAEYS, 2019).

The problems related to the highlighted elements can be chronic, seasonal or transitory, which brings important considerations for the definition of actions, both pertinent to the strategies adopted by families and public policies. This perspective provides important perceptions in the definition of actions adopted by families and the State, because the unavailability and lack of access rarely derives from scarcity, but from obstacles related to the lack of opportunity to produce food by their own means and, from insufficient income for nutritional complementation and unemployment.

For the solution of the hunger problem, improvements in availability and access to food that make up the nutritional minimum for the vulnerable are necessary. Mapping areas in which the actions of the Government do not reach is crucial for the planning and execution of appropriate policies, empowering a range of beneficiaries both affirmatively and limitingly.⁵

3. AGENDA FOR FOOD SAFETY

Although the average number of malnourished patients is exponential in Latin America, it is estimated that by 2050, there will be a high demand for food due to greater economic power by the consumer, increased life expectancy, demographic changes, among other megatrends. According to projections, the world's population will reach 9.7 billion people, 40% of which will be concentrated in the urban area. Consequently, production capacity will have to increase by 50% to meet the increase in

⁵ It should be highlighted that the right to food, with regard to its effectiveness, is classified as affirmative and limiting. The affirmative finds in the exercise of freedom contrasts with the geopolitics of malnutrition and poverty. What is desired are individual and social transformations not only in their consumer status, but also the maintenance of constitutional guarantees of the right to citizenship and that they will be executed. As for the limitative, there has been an overcoming of malnutrition, therefore, the individual or a group are already in the condition of food security. However, what is expected is the maintenance of regular access to nutritious foods, free of pesticides and microbiological insecurity (BUZANELLO, 2009, p. 5835).

demand, while meat production will have to double (VIEIRA JÚNIOR *et al.*, 2019, p. 71; UNITED NATIONS, p. 5, 2019; SENAR, 2020).⁶

It should be emphasized that some factors that make up a limiting group (difficulty in food production, scarcity of natural resources and climate fluctuations) worry some analysts who reflect on the possibility of an anticipated food crisis for the year 2030. Modifying the food system by making it sustainable is a necessary measure to face current and future challenges, so that in the next 30 years the food insecurity framework can be controlled in all its dimensions (mild, severe, and moderate).

A sustainable food system recognizes the importance of agriculture as a factor in overcoming food and nutritional insecurity. In its objectives, it seeks to expand the availability of food - not only by volume - accessibility and diversity of agricultural items to be produced, considering nutritional, social and environmental effects.

Faced with this global demand, in the coming decades the bioeconomy will allow to explore a series of opportunities to deal with more assertive policies that focus on sustainable alternatives regarding the use of natural resources, technology and economic organization, so as not to compromise the ecosystem. However, for the bioeconomy to be implemented, a regulatory structure becomes essential that will be innovative and adequate, so that the governments adjust their political agendas to ensure the best practices "of governance, international cooperation and competitiveness" (CNI, 2013, p. 4-8).

About bioeconomics, this concept was coined by the mathematician and heterodox economist Nicholas Georgescu-Roegen, who, to analyze economic theory, applied principles of the natural sciences, "where nature would act as a limiting factor of the economic process". For Georgescu-Roegen, a particular technology would be feasible if it did not impact the "stock of non-renewable resources" (AVELLAR, 2017).

The economists guide themselves on a mechanistic epistemology in which the circular flow represents the evolution of the classical union of the real and monetary flow from the transactions of economic agents. The circular flow chart aims to demonstrate the "accounting identities between Product-Income-Expenses", as well as the inputs and outputs that balance the economy and macroeconomic aggregates. However, when analyzing the circular flow diagram, it is perceived that the economic process does not fully consume material and energy resources, therefore, it is impossible to maintain these dynamics without producing waste as in a kind of perfect sustainability, because, yes, "it would be enough to use the resources parsimoniously to guarantee them to future generations" (DIAS; CARVALHO, 2017, p. 412-414).

For Georgescu-Roegen, one could not follow the principle of complete reversibility as a general rule, given that every energy transformation encompasses dissipation and loss of energy. However, despite part of this resource being recovered, "all the heat generated" will not be taken advantage of. Taking this into account, the economist began to apply and analyze economic theory from the perspective of entropy, a concept used in thermodynamics. Considering that less and less usable energy is available, "high-value natural resources are transformed into worthless waste." Therefore, entropy is consolidated as the core of scarcity, due to the impossibility of cyclical reuse of the same energy. In fact, the bioeconomy acts as a limiting factor in the economic process because technology is unable to find a substitute for a scarce source (DIAS; CARVALHO, 2017, p. 412-413).

Georgescu-Roegen's bioeconomic theory represented, above all, a radical critique of neoclassical theory. It showed the limits, essentially of an entropic nature, to which the process of economic growth/development is subject. If all economic activity involves the irreversible degradation of increasing amounts of raw material and energy, the following two are important conclusions for the economy. The first is of a practical

⁶ According to an analysis of the population projection prepared by the United Nations, the global population is expected to reach 8.5 billion by 2030, 9.7 billion in 2050 and 10.9 billion in 2100. The variant used for this estimate presupposes the decline in fertility in countries where large families prevail, the increase in fertility in countries where there are fewer than two live births per couple and the reduction in mortality at all ages. Logically, as in all projections, the result holds a degree of uncertainty, because the values declared in the variables depend on future trends such as fertility, mortality and migration, which are evaluated through demographic and statistical methods. The study concluded with 95% certainty that the demographic increase will total between 8.5 and 8.6 billion in 2030, between 9.4 and 10.1 billion in 2050 and between 9.4 and 12.7 billion in 2100. Uncertainty about global demographic expansion in 2030 and 2050 is relatively minor, but increases exponentially for projections that spread into the second half of the century. However, despite the scenario being the growth of the world population, there is still a probability of 27% stabilization or even decrease even before 2100 (UNITED NATIONS, p. 5, 2020).

nature: the fundamental objective of the modern economy, unlimited economic growth, which runs contrary to the fundamental laws of nature, must be abandoned or, in any case, radically revised. The second is methodological in nature: the pendular representation of the economic process, presented at the opening of every economics manual, according to which demand stimulates production, and the latter provides the income necessary to feed the new demand, reversibly and apparently able to reproduce indefinitely, will be replaced by a circular and evolutionary representation, in which the economic process is rooted in the biophysical environment that sustains it. In general, this bioeconomic vision reminds us of the inevitable physical and material character of the entire economic process, bringing the economic science of the rarefied environments of mathematics back to the concrete universe of everyday life (Georgescu-Roegen, 2003, p. 9-10).

Because it is multifaceted, considering that biotechnology, biological and bioecological resources underline the bioeconomic potential to create opportunities and improve the management of natural resources that diversifies the market. The bioeconomy will provide the development of the primary and secondary sectors, implementing concrete solutions to social challenges related to megatrends (population growth, economic crisis, climate change, food insecurity, etc.). (AVELLAR, 2017; MARTIN; JACQUINET, 2020, p. 2-3).

Considering the conflict between development and sustainability, bioeconomic and biotechnological advances in the coming decades will be crucial "for the conservation and maintenance of biological diversity and the economy" (BARBA; SANTOS, 2020, p. 29-30). However, one should focus on the arrangement of natural capital and the improvement of the quality of life, targeting to balance the management of common goods, with economic expectations (MARTINHO; JACQUINET, 2020, p. 4-5).

It should be highlighted that in this process the agricultural sector and food will be the biggest beneficiary of biotechnology this will improve vitamin levels in food, and in the field, pests will be controlled through pesticides and/or multidrug-resistant transgenic organisms. Therefore, the benefits in farming and food production coexist to provide social and economic order, fighting poverty, hunger and malnutrition (BARBA; SANTOS, 2020, p. 33-34).

Brazil, due to its extensive fertile land, aptitude for agriculture and good biotechnological adaptation, is one of the main players in this scenario. According to OECD estimates, by 2030, the biotechnological contribution will be US\$ 1 trillion/year, to be distributed among the health, primary and industrial sectors. Furthermore, the same study indicates that "Brazil is in 12th place considering the number of *biotech companies* in the world and 60% of Brazilian agriculture uses the Internet of Things (IoT)" (AVELLAR, 2017).

It is denoted that the bioeconomic scenario is a real opportunity for Brazil from the perspective of social responsibility. The consumer market and investors seek companies that aim at less damaging alternatives to the environment in relation to their activities, which expands academic perspectives aligned with the business sector guided by sustainability and conservation of biological resources, ensuring the competitiveness of national production in the global market. This process requires cooperation between the academic and business environment, establishing a relationship capable of removing the barrier between scientific and technological knowledge and the entrepreneurs (CNI, 2013, p. 10-11).

In Brazil, the implementation of the Brazil Bioeconomy Program – Sociobiodiversity is showing promising signs in this segment. Established by Ordinance No. 121 of June 18, 2019, the program aims to structure productive systems that are based on the rational use of natural resources, extractivism, production and use of energy whose sources are renewable allowing the insertion of these segments in the economic productive arrangements that surround the concept of the bioeconomy. To achieve, it seeks to articulate a partnership between the government, small producers, government subsidized family-based farmers, traditional peoples and communities, and the business sector (Art. 1; Art. 2).

The cooperation between the subjects described above reveals the intention of the legislator to encourage the spirit of participation and interaction between public bodies, including public and private sectors, as well as businesses. Building a space propitious to participation is a fundamental step towards the constitution of environments favorable to innovation and technological transfers. Therefore, this panorama allows the continuity of scientific activities and technological development processes, ensuring competitiveness in the national and international market, mitigating the impacts of regional inequalities.

The Program is structured in thematic axes that covers specific objectives, according to Art. 3 of the respective ministerial decree, namely:

- I - Productive Structuring of the Chains of Extractivism (Pro-Extractivism): to promote the structuring of production chains of extractivism in all Brazilian biomes, with preponderance for the Amazon, and contribute to sustainable development, productive inclusion and income generation;
- II - Medicinal Herbs, Aromatics, Condiments, Special Oils and Teas of Brazil: promoting productive alliances with the food and health sectors as promoters of local development articulated with public policies aimed at expanding access to national and international markets;
- III - Sociobiodiversity Guide: to value Brazilian biological, social and cultural diversity and to support the structuring of productive arrangements and integration guides around sociobiodiversity products and activities in order to contribute to income generation and productive inclusion;
- IV - Potentialities of Brazilian Agrobiodiversity: to promote the conservation of agrobiodiversity through the recognition of traditional agricultural systems and the promotion of actions for the dynamic conservation of these systems with a focus on the sustainable use of their natural resources aiming at generating income, adding value and maintaining the genetic diversity of seeds and cultivated crops;
- V - Renewable Energies for Family-based Agriculture: promoting the generation, economic and productive use of renewable energy sources, especially solar panels, both for self-consumption and distribution, contributing to sustainable development, income generation and productive inclusion in rural areas (BRASIL, 2019).

It should be recorded that article 3 is not adamant, therefore, other thematic subjects can be incorporated when there is a need identified by the Ministry of Agriculture, Livestock and Supply - MAPA. Moreover, it is noted that for the management of the subjects technical resources will be necessary and should be requested from research institutions and civil society entities; as well as financial support to which the Program should seek from international organizations, development funds and banks, the business sector and the government.

With regard to the actions, these will be implemented through "specific public regulations and other legal instruments needed to enable the financing of projects and the implementation of the program's actions". As for existing public policies, these will be integrated into the Program provided that the theme converges with the bioeconomic theme (Art. 4, §2).

The Program will be coordinated by the Secretariat of Family Agriculture and Cooperativism of the Ministry of Agriculture, Livestock and Supply, which will follow the implementation and keep track of the process to be carried out in a strategic partnership articulated among the municipal, state and federal levels, considering the following steps: progress of the results; monitoring and risk management visits; project review; meeting between project managers; and communication of results (art. 4, *caput*; art. 5).

4. FINAL CONSIDERATIONS

From the above, it is unquestionable how much food insecurity causes serious damage to society. It is perceived that when hunger reaches a certain group in a social context, soon the economy will not reach them considering that food is essential to give energy to man so that enables the search for self-realization.

According to data, the moving average of malnourished population in Latin America is too high. Due to Covid-19, projections made by international bodies foresee considerable increases by the year 2030. However, despite food insecurity being an alarming factor, research reveals a scenario of high food demand for the year 2050 due to megatrends.

Faced with a global demand, thinking about a sustainable food system that expands the availability, accessibility and diversity of agricultural items to be produced will be crucial to avoid trade tension and diplomatic incidents in the future. The bioeconomy will allow us to focus on sustainable alternatives with regard to the use of natural resources, biotechnologies and the form of economic organization, so as not to compromise sociobiodiversity.

In Brazil, the Brazil Bioeconomy Program – Sociobiodiversity will allow in an articulated way the Public Power, small producers, government backed family-based farmers, traditional peoples and communities, and the business sector, exploring this perspective in order to make the country an *important player* in the production of products, agricultural supplies and food, attracting investors to the Brazilian market. This will therefore heat up the labour market and broaden the prospects of small producers, government subsidized family-based farmers, peoples and traditional communities, contributing to the reduction of the food insecurity in the country.

The Program is structured in thematic subjects covering specific objectives, the maintenance of which will require technical resources that should be requested from research institutions and civil society

entities; and financial funding to which the Program will seek support from international organizations, development funds and banks, the business sector and the government.

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