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SISTEMINHA – A social technology to alleviate hunger and poverty

SISTEMINHA – Uma tecnologia social para aliviar a fome e a pobreza

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Palavras–chave*— *Sisteminha; vulnerabilidade social; meio ambiente; sustentabilidade; mudanças climáticas.

***Abstract*—** *This article aims to discuss the phenomena of hunger and poverty as social processes resulting from the absence of public policies of the state, which assure Brazilians of food in adequate quantity and quality, as a constitutional right. This is a bibliographical, descriptive and explanatory research, which took as reference the classic and contemporary theorists who study the themes, observing the rules established for this type of investigation, with the main purpose of presenting the efficiency of SISTEMINHA, a social and economic technology as an alternative for the alleviation of hunger, poverty, insufficient income, but also as an important mechanism of environmental sustainability, since all productive routing is organic, minimizing the negative impacts that agriculture and livestock bring to the nature, with interference in climate change.*

***Resumo*—** *Este artigo objetiva discutir os fenômenos da fome e da pobreza como processos sociais resultantes da ausência de políticas públicas de estado, que assegurem aos brasileiros e brasileiras alimentação em quantidade e qualidade adequadas, como direito constitucional. Trata-se de pesquisa bibliográfica, descritiva e explicativa, que tomou por referência os teóricos clássicos e contemporâneos que estudam os temas, observando as regras estabelecidas para esse tipo de investigação, tendo como propósito principal apresentar a eficiência do SISTEMINHA, uma tecnologia social e econômica como alternativa para a mitigação da fome, da pobreza, da insuficiência de renda, mas também, como mecanismo importante de sustentabilidade ambiental, já que, todo encaminhamento produtivo é de natureza orgânica, minimizando os impactos negativos que a agricultura e a pecuária trazem para a natureza, com interferência nas mudanças climáticas.*

I. INTRODUCTION

The Demonstration Unit with SISTEMINHA Technology, located at Espaço Plural / UNIVASF – Federal University of Vale do São Francisco, in the municipality of Juazeiro – Bahia, aims to ensure the production of food in a sustainable way for populations that have little land and few material and financial resources, from the perspective of food security and the

fight against poverty, in line with the SDGs – Sustainable Development Goals of the UN 2030 Agenda – United Nations.

With regard to climate change, although the ABC and ABC+ Plan prepared by MAPA – Ministry of Agriculture, Livestock and Supply created by Law No. Paris Agreement to contain the rise in global average temperature by up to 1.5°C above the pre-industrial period and a maximum of 2.0°C by 2100 – to tackle climate change (UN, 2015), it was found that it was restricted to medium and large producers of commodities for export.

Such limitation is worrying, considering that the movements and social organizations of Family Agriculture played a fundamental role in the definition of Family Agriculture as a model of agricultural production; as a category that aggregates rights and as a political identity that unifies a diversity of family units in the countryside, highlighting the struggles of rural women for access to rights and for the construction of spaces of autonomy (CANO, 1998; FURTADO, 1980; LIMA; HARFUCH; PALAURO, 2020; MAPA, 2020).

With climate change already in the public domain, studies by the IPCC - Intergovernmental Panel on Climate Change (2021) warn about the negative impacts of these transformations on agricultural production and, in this sense, it is necessary to adopt strategies that reconcile production increases with the reduction of greenhouse gas emissions, especially in family production, which is the one that puts food on the table of the world population, generates jobs in the countryside, but it is the one with the least resources to promote such adaptations.

The great challenge, therefore, is to devise strategies capable of inhibiting the effects of climate change that have regional peculiarities, depending on the biome, on this group that represents practically 80% of rural properties in Brazil. To this end, the Federal Government seems to show signs of collaboration in promoting technologies aimed at mitigating these changes, with the allocation of resources to strengthen family farming and in technologies that minimize the negative impacts of agricultural activities on the environment, as stated the allocation of the largest volumes of resources in the Agriculture and Livestock Plan 2021/22 - PAP (FRANCA; FREITAS, 2021).

Despite climate change, it is important to point out that the Caatinga concentrates more than 60% of the areas susceptible to desertification due to inadequate soil management practices and extensive livestock farming, in addition to fires. Currently, the main causes of deforestation are associated with the extraction of native forest for the production of firewood and charcoal to supply the industry, impacting soil fertility, the extinction of species of fauna and flora and, consequently, worsening the quality of life. population (ARAÚJO FILHO, 2013).

Only 7.8% of the territory of the Caatinga is protected by Conservation Units, and only 1.3% of the area is covered by integral protection units, however, the International Convention on Biological Diversity, to which the country is a signatory, determines that the country must maintain at least 10% of conserved areas (BAKONY, 2012).

More recently, experiences by family farmers who live in the Caatinga and invest in differentiated and sustainable soil management have shown that it is possible to live with the characteristics of the region, with varied cultivation and the creation of healthy animals. Fruits, vegetables, roots in natura or processed are produced and used for family consumption and income generation.

The Caatinga area is 844,453 km² (IBGE, 2010), and covers the states of Piauí, Ceará, Rio Grande do Norte, Paraíba, Pernambuco, Alagoas, Sergipe, Bahia, Maranhão and also the northern range of Minas Gerais. It borders three other biomes in the country - Amazon, Atlantic Forest and Cerrado.

The climate that predominates in the Caatinga is semi-arid, with precipitation ranging from 200 mm to 800 mm/year, concentrated in a period of 3 to 5 months, covering January to May. The average annual temperature varies from 25°C to 30°C and is more or less constant throughout the region. Most of its soils are of hard crystalline origin, which does not favor the accumulation of water, shallow and stony, with cactus and bromeliads being the most present native vegetation in the biome. Most of its rivers are intermittent, only having water in the rainy season, which makes farming difficult. However, in the Caatinga there are approximately 5,311 plant species, of which at least 1,547 are endemic (IBGE, 2010).

When analyzing the SDGs - Sustainable Development Goals of the UN 2030 Agenda - United Nations, it is clear that of the seventeen planned, Sisteminha meets at least eight of them, namely:

Goal 1 – Eradication of Poverty – End poverty in all its forms, everywhere.

Goal 2 – Zero Hunger and Sustainable Agriculture – End hunger, achieve food security and improved nutrition and promote sustainable agriculture.

Goal 3 – Health and Well-Being – Ensure a healthy life and promote well-being for all, at all ages.

Goal 8 – Decent Work and Economic Growth – Promote sustained, inclusive and sustainable economic growth, full and productive employment, and decent work for all.

Goal 10 – Reducing Inequality – Reducing inequalities within and between countries.

Goal 12 – Responsible Consumption and Production - Ensure sustainable production and consumption patterns.

Goal 13 – Action Against Global Climate Change - Take urgent action to combat climate change and its impacts.

Goal 17 – Partnerships and Means of Implementation - Strengthen means of implementation and revitalize the global partnership for sustainable development.

The concern with human interference in the environment is old, because from industrialization in the 19th century, the degradation of natural resources was seen as a symptom of progress, but it was only recently that this situation took on greater dimensions, assuming a social position as well. , given that the incentive to unbridled consumption, a practice of a capitalist culture, has left deep marks on Earth and threatening the continuity of the life of animal and plant species.

Like plants, animals have also undergone adaptations to overcome drought. They have adapted to consume seasonally available food, perform seasonal migrations to more humid places such as mountain ranges, accelerate the reproductive cycle during the rains or enter a dormant state during the drought. According to the Ministry of the Environment, the Caatinga has: 178 species of mammals; 591 bird species; 117 species of reptiles; 79 species of amphibians; 241 species of fish; 221 species of bees. Faced with such a rich and diverse scenario, the caatinga needs to be preserved, as it is the cradle of several springs that supply the northeastern sertão (BRASIL, 2012).

This article addresses the themes of poverty, social and economic inequality and environmental sustainability, to explain the Sisteminha as an important social tool to ensure a decent life for vulnerable populations, in the understanding that having access to knowledge, technological innovations, food in quantity and sufficient quality to increase life expectations, does not constitute a privilege, but rights guaranteed in the Federal Constitution. Therefore, it is organized as follows:

In the justification, it addresses the reasons why the theme was chosen for research, pointing out the consequences that hunger and poverty bring to the life and health of those affected by these phenomena and pointing out the Sisteminha as a viable alternative to combat hunger and poverty.

The objectives define where you want to go and the steps to be pursued.

The theoretical framework was the basis for the entire investigation, using classical and modern theorists as a basis, and they have been dedicated to formulating theories that explain social, economic, political, cultural and environmental phenomena.

In the material and methods, the methodology used in the research was described, as well as the way in which the selection of authors and the topics covered was made.

II. JUSTIFICATION

In recent decades Brazil has confirmed a trend of enormous inequality in income distribution and high levels of poverty. An unequal country, exposed to the historic challenge of facing a legacy of social injustice that excludes a significant part of its population from accessing minimum conditions of dignity and citizenship. Inequality is so much a part of Brazilian history that it has become a natural thing. Only South Africa and Malawi have a greater degree of inequality than Brazil (World Bank, 2020).

This inequality manifests itself with greater intensity among the black or brown population, resulting from historical racial discrimination in the structuring of Brazilian society. Over the period between 2012 and 2019, the income of this population was about half of that observed for the white population, which in 2019 was BRL 981.00 for the black and brown population and BRL 1,948.00 for the black and brown population. the white population (IBGE, 2020). The permanence of this situation is characteristic of capitalism, which, by keeping part of the population in a state of poverty, benefits the business class with cheap labor, which, out of necessity for survival, accepts the salary offered to it.

The seriousness of this finding is that the poorest have more difficulty in developing a critical sense, because they have little or no education, peacefully accepting in their work activity to work the maximum number of hours a day, leaving them only enough time to stay alive, consuming the that the media determines and, mistakenly, imagining themselves free (BRANCHER et al., 2020).

According to the 2000 World Bank Report, poverty is characterized by three axes: a) the lack of resources and income to meet basic needs, including education and health; b) lack of voice and power in state institutions and in society; and c) vulnerability to adverse shocks and exposure to risks, combined with an inability to cope with them.

For Aldaísa Sposat (1997), poverty anywhere in the world can be understood as deprivation or absence of basic needs, and may even include the inability to eat. In

agreement with this conception, Adam Smith (1996) argued that the true measure of a nation's wealth is not the size of its king's treasury or the possessions of the rich few, but the wages of the working poor. For the father of Enlightenment economic liberalism, the main role of the market was to produce such wealth, to the point that he who feeds, clothes and produces housing for an entire people, manages to be reasonably well fed, clothed and housed himself. Brazil unfortunately does not even come close to this Smithian dream. The Brazilian labor market is unable to offer half of its workers social protection against market inconsistencies.

The impacts of the Covid-19 pandemic in Brazil have further enhanced the inequalities rooted in society. While a small part of society manages to maintain social isolation by working remotely, the poorest without access to sewerage, drinking water and living in tiny houses that do not allow for a minimum distance that must be maintained to prevent the transmission of the virus, end up contaminating themselves. in greater proportions. In addition, the stoppage of activities to maintain the protocols established by Organs competent bodies, worsened poverty, due to the total lack of income.

Another point affected by the Covid-19 pandemic was the maintenance of school meals in the public education network, which is no longer continuous, putting thousands of students at risk of food insecurity, since, for many of these students, school meals are the main meal of the day. The PNAE – National School Feeding Program serves around 5,570 Brazilian municipalities, around 150,000 schools and more than 40 million students (FNDE, 2019). According to IBGE data, in 2018 more than 13 million people are in a state of extreme poverty (IBGE, 2019), aggravated by the pandemic crisis, because even after two years of staying in the country, it has been compromising years of advancement in poverty reduction and human capital accumulation.

Brazil is among the Latin American and Caribbean countries that have suffered the most from the long periods of public school closures so far, which is expected to increase learning poverty from 48% to 70%, and disproportionately affect the poor, because distance learning benefited less than 50 percent of students in less developed regions, compared to 92 percent in wealthier regions of the country (World Bank, 2020).

Thus, the impact of the Covid-19 pandemic is expected to reverse a period of steady improvement in the Human Capital Index, which had increased from 0.52 to 0.58 between 2007 and 2019, requiring strong accelerating corrective policies.

Studies for Brazil by Machado and Ribas (2010); Ribas, Machado and Golgher (2011); Gonçalves (2015) and Gonçalves and Machado (2015), seek to measure the size of chronic and transitory poverty existing in the country and estimate the chances of entering and exiting poverty, pointing out that facing the health crisis requires that the economy be placed in a state of of induced coma. This translates into three types of shocks that affect households at the same point in time, namely:

i) health shocks directly related to contamination by the virus;

ii) unemployment shocks, which lead individuals to unemployment or informality;

iii) psychological shocks with impacts of varying duration.

These shocks, according to the scholars mentioned above, can determine a temporary drop in total household income and can drive families into poverty. In this process of arrival of a structural shock, families can use strategies to maintain their level of well-being, for example, using additional labor, that is, when a member suffers a shock of health or unemployment. , other members may try to offer labor in the labor market, such as adolescents who could be in a situation of inactivity and with exclusive dedication to studies, or even children.

The second strategy is the use of the set of physical or financial assets belonging to families, in order to smooth consumption over time, for example, selling items such as television, car, motorcycle, computer or some land.

The third family strategy is the use of benefits arising from public or private emergency policies, which make it possible to obtain a permanent or temporary income. The use of this instrument depends on the size, focus, access and adherence of families to policies.

Finally, data from the PNADC - National Household Sample Survey released by the IBGE for the first quarter of 2020, indicate the impacts of social isolation on the labor market, showing that: i) the unemployment rate rose 1.3 percentage points in compared to the last quarter of 2019; ii) there was a reduction of 2.33 million workers in activity vis-à-vis what was observed in the last quarter of 2019; iii) 832 thousand informal workers working in the private sector stopped working while iv) 742 thousand self-employed people stopped working. Thus, the first data on the dynamics of the labor market in the period of social isolation show a deepening of the vulnerabilities of those workers who were already vulnerable before the pandemic. Given these realities, Sisteminha presents itself as a viable alternative for

poverty reduction and food sustainability, which justifies this study.

III. THEORETICAL REFERENCE

Based on an idea that emerged in ancient Egypt, the Integrated System for Food Production was improved for the Brazilian reality by researcher Luiz Carlos Guilherme from EMBRAPA Meio Norte, in 2011, with the aim of mitigating poverty and hunger in families from the states of Piauí and Maranhão, there called "Sisteminha Embrapa" (JÚNIOR et al., 2019).

Sisteminha is a social technology for food production, developed to generate food security and sovereignty for poor families that have little land, having as a central element the creation of fish in tanks, with a recirculation and filtering system, its main advantages being the low initial investment cost, which can be adapted to the needs, experiences, preferences of the producer and soil and climate conditions and the local market. It can be deployed in urban, peri-urban and rural areas, from 100m², constituting a solution dimensioned to meet the nutritional needs of a family of four, in compliance with the recommendations of the World Health Organization - WHO (GUILHERME, 2011)

The technology is founded on four principles:

1) miniaturization;

2) replicability;

3) production scaling;

4) food and nutrition security.

The tank can be handcrafted or built with locally available materials (wood, adobe, cardboard, straw, stone, tire); with masonry; pre-shaped boards or other materials and the water removed is used to irrigate the plants. Currently, at the UNIVASF Demonstration Unit, Sisteminha has 11 modules, namely:

1. Fish production;

2. Production of chicken eggs;

3. Production of broilers;

4. Earthworm production;

5. Vegetable production (vegetables, spices and fruit);

6. Compost production;

7. Production of quail eggs;

8. Guinea pig production;

9. Production of ruminants;

10. Pig production;

11. Biodigester;

By having a staggered production, the families that adhere to the Sisteminha, always have fresh, diversified food that generates income, by selling the surplus, as shown in Table 1.

Table 1 - PLANTING SCHEDULE - 2nd HALF OF 2021

CULTURES	**July**	**August**	**september**	**October**	**November**	**December**
Corn	3/10/17/23/31	7/14/21/28	5/13/21/28	1/8/15/21/28	5/13/21/29	1/8/15/21/29
Green Beans	4/12/19/27	5/13/21/29	1/9/16/24	2/10/17/25/30	8/16/24/30	4/11/21/28
Cassava	3/10/17/23/31	7/14/21/28	5/13/21/28	1/8/15/21/28	5/13/21/29	1/8/15/21/29
Gherkin	4/12/19/27	5/13/21/29	1/9/16/24	2/10/17/25/30	8/16/24/30	4/11/21/28
kra	2/10/18/26	5/13/21/29	1/9/16/24	2/10/17/25/30	8/16/24/30	4/11/21/28
Sweet Potatto	3/10/17/23/31	7/14/21/28	5/13/21/28	1/8/15/21/28	5/13/21/29	1/8/15/21/29
Carrot	6/13/21/28	5/13/21/29	1/9/16/24	2/10/17/25/30	8/16/24/30	4/11/21/28
Beetroot	7/14/21/28	2/10/17/26	1/9/16/24	2/10/17/25/30	8/16/24/30	4/11/21/28
Coriander	3/10/17/23/31	7/14/21/28	5/13/21/28	1/8/15/21/28	5/13/21/29	1/8/15/21/29
Chives	3/10/17/23/31	7/14/21/28	5/13/21/28	1/8/15/21/28	5/13/21/29	1/8/15/21/29
Lettuce	4/11/19/25	5/13/21/29	1/9/16/24	2/10/17/25/30	8/16/24/30	4/11/21/28
Green Cabege	4/11/19/25	5/13/21/29	1/9/16/24	2/10/17/25/30	8/16/24/30	4/11/21/28
Tomato	6/13/21/28	5/13/21/29	1/9/16/24	2/10/17/25/30	8/16/24/30	4/11/21/28
Pepper	6/13/21/28	5/13/21/29	1/9/16/24	2/10/17/25/30	8/16/24/30	4/11/21/28

Arugula	3/10/17/23/31	7/14/21/28	5/13/21/28	1/8/15/21/28	5/13/21/29	1/8/15/21/29
Peppers	3/10/17/23/31	7/14/21/28	5/13/21/28	1/8/15/21/28	5/13/21/29	1/8/15/21/29
Chicory	4/12/19/27	5/13/21/29	1/9/16/24	2/10/17/25/30	8/16/24/30	4/11/21/28
Papaya	04/01/2021					
Guava	05/01/2021					
Acerola	07/01/2021					
Pinecone	09/01/2021					
Cane	10/01/2021					
Banana	03/01/2021					
Mango	10/01/2021					
Passion Fruit	05/01/2021					
Orange	11/01/2021					
Lemon	02/01/2021					

Source: Sisteminha/Espaço Plural

Since the beginning of the 20th century, after the great wars, the UN – United Nations Organization, in order to give convincing answers to populations that were starving as a result of the destruction of fields, equipment and agricultural implements, held the First Hot Springs Food Conference. in the United States, in order to discuss strategies capable of rebuilding productive areas, ensuring the dignity of the population. At this conference, the Food and Agriculture Organization (FAO) was created, with the objective of planning the fight against hunger at a global level (CASTRO, 1992; HIRAI; ANJOS, 2007).

Low food stocks, loss of crops and low productivity of crops, triggered the idea among scholars in the area that it was essential to modernize agriculture, with intensive use of chemical products, a process that became known as the Green Revolution (MALUF; MENEZES, 2000). In this process, not everyone was successful. Family farmers, for example, lacking capital and technical information, did not have the financial capacity to enter this new form of production, nor did they have the favorable conditions to compete with medium and large farmers, which led many of them to migrate to the cities. in search of work opportunities, leaving a big void in the countryside and the certainty that hunger and poverty are the result of social inequalities and poor income distribution.

Defining poverty is not easy, as it is a complex phenomenon that means different things to different people, therefore, its definition cannot be unique and universal (PAES DE BARROS et al., 1992). However, it is possible to say that poverty refers to situations of deprivation in which individuals cannot maintain a minimum standard of living consistent with the socially established references in each historical context.

The satisfied needs of a poor person in the rural area of northeastern Brazil may be absolutely insufficient for a poor person in a large city in the southern region of the country.

For the World Bank (1990), poverty is income deprivation or, in another approach, the inability to achieve a minimum standard of living. Also, it is common to understand poverty as the deprivation of what is necessary for well-being in the material aspect, notably food, clothing, housing and other assets. However, within the psychological aspect of poverty, this social condition makes the poor elements more vulnerable to humiliation and more distant from any kind of participation in society, since they face difficulties in obtaining medical care, treated water, electricity, education. and many others (DALRYMPLE, 2016).

Myrdal (1968), when approaching the subject, talks about the circular causation of poverty. His thinking is based on the fact that those who are born poor will have inadequate food, attend the worst schools, have the worst opportunities, a process that will be repeated with their children and so on, generating a circle that feeds back and does not give rise to or improvement. in the living conditions of individuals.

According to Gonzales (2014), there is a relationship between climate and poverty. For him, places where the climate is warmer and require the least amount

of clothing, allow subjects to sleep in the open, because the night does not require shelter, favoring the appearance of tropical diseases. They can also trigger droughts that decimate crops, causing people to migrate to larger cities. The author reflects that the fact that people do not need to save food to face the winter makes them more carefree about the future, resulting in a state of poverty.

Silva (2009) defines poverty in two aspects: absolute poverty, related to not meeting the minimum needs for biological reproduction, and relative poverty, which concerns the structure and evolution of the average income of a given country, which means that the conception of relative poverty is based on the idea of income inequality and relative deprivation in relation to the dominant way of life in a given context.

In the perspective of relative poverty, Rocha (2003), points out the phenomenon as complex, and can be defined in a generic way as the situation in which the needs to be satisfied in function of the predominant way of life in the society in question, are not met in an adequate way. proper. Relating poverty with income, the IPEA (2010) measures absolute poverty as average household income per capita of up to half a monthly minimum wage and introduces the concept of extreme poverty - average household income per capita of up to a quarter of the monthly minimum wage.

Barros, Camargo and Mendonça (1993), consider the phenomenon of poverty in two aspects: Structural poverty - when over a period poverty still persists and the individual does not obtain sufficient income to meet their basic needs and conjunctural poverty - circumstantial causes such as temporary illness and unemployment that put people temporarily below the poverty line.

Poverty and extreme poverty have terrible effects on people's dignity and, in the case of children and adolescents, have irreparable consequences. The situation irreversibly compromises their development, condemning them to a perpetual state of vulnerability. Children raised in an environment of deprivation and violence are unable to grow, study and work, which makes it difficult for them to become independent adults, perpetuating the cycle of poverty. The lack of pedagogical resources, as well as the scarcity of information for the most needy, are some of the problems that poor people face daily.

One of the most violent impacts of poverty is food insecurity, which can be characterized by the absence of food on a regular and permanent basis, in adequate quantity and quality for people's survival. This is a serious situation that compromises individual and collective health and even the development of the country, in addition to being a violation of rights.

In addition to the lack of food, food insecurity also refers to the quality of what is consumed, often generating hidden hunger, which is when the subject eats ultra-processed products, without nutritional value, which can even satisfy them, however. it does not nourish the basic needs of the organism. On the contrary, food safety can be defined as a group of rules for the production, transport, storage of food, following certain norms already established as microbiological and sensorial issues, determining which foods are suitable for consumption, because food is not safe. may contain biological, chemical or physical hazards.

Biological hazards are represented by pathogenic microorganisms and their toxins that cause foodborne diseases, which can be protozoa, viruses, fungi or bacteria, such as the bacteria Listeria monocytogenes, Salmonella spp., Escherichia coli, which are pathogenic. If the consumer ingests food contaminated by pathogenic bacteria, he may develop diarrhea, vomiting, nausea, abdominal pain and fever. Chemical hazards are residues of pesticides used in agriculture, residues of sanitizers used in food preparation containers, heavy metals. And physical hazards are represented by the presence of foreign elements in food such as pieces of glass, metal, rubber, sand, plastic, screws or others that can come off food processing equipment or packaging, contaminating the food (FAO, 1998).

Thus, food security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs for an active and healthy life. For Tibola and Santi (2017), it deals with the implementation of public policies to guarantee the population's access to food in adequate quantity and quality.

Hanning et al., (2012), emphasizes that food security is affected by climate change, as the stability of food supply can be affected by the increase in the occurrence of floods or droughts. Another factor that affects food security is the loss of biodiversity, as as biodiversity declines, the food supply becomes more vulnerable to climate change and water scarcity. The production of biofuels has been encouraged to alleviate the effects of climate change, reduce concerns about the use of fossil fuels and stimulate rural development, which is what Sisteminha advocates.

As can be seen, health and nutrition are two dependent categories on each other. There can be no health without proper nutrition. And even if nutrition is adequate, the human body needs to enjoy health in order to enjoy it.

These statements become even more relevant when it comes to the relationship between health and nutritional status in childhood, the consequences of which can be devastating, compromising their growth and development potential, undermining their ability to resist diseases and reducing their own chances of developing. survival (MONTEIRO, 1997).

Therefore, the realization of the Human Right to Adequate Food requires the adoption of sustainable policies and strategies for the production, distribution, access, consumption of safe and quality food, health promotion and adequate and healthy food at all federative levels. Ensuring this right becomes increasingly difficult, due to dietary changes over the years. Traditional rice, beans and manioc flour lose space for processed and ready-to-eat foods, such as breads, sausages, cookies, soft drinks and ready meals (IBGE, 2020). With this attitude, in addition to the loss of diversity and cultural identity, the new habits have caused damage to the health of Brazilians. The reduced consumption of in natura foods essential to health, such as fruits and vegetables, associated with the excessive and growing consumption of processed foods (rich in fat, sugar, salt and low in fiber and vitamins) and the sedentary lifestyle of the population, has generated alarming numbers. overweight, obesity and chronic diseases.

Thus, urban populations also need to be awakened to the notion of food sovereignty, so that they are able to reflect daily on their needs, food practices and the origin of food. As Burlandy and Maluf (2010) emphasize, in a context in which land, health, the body and food are configured as commodities, profiles of needs are created and recreated around commercialization and consumption, some of them imposed by the current everyday life. In this context, there is no way to think about food sovereignty treating the production system dissociated from the nutritional dimension and the constraints of contemporary food practices.

Environmental sustainability, the preservation of biodiversity and the commitment to future generations need to be encouraged, because the conventional model of agriculture demands the intensive use of chemical inputs, such as pesticides, which have been causing damage to human health and the environment. Brazil is known to be the largest consumer of pesticides in the world and data from the Oswaldo Cruz Foundation (2019) inform that 20.42% of notifications of human intoxication are caused by pesticides, which in addition to the negative impacts on human health, harm the environment. environment and contaminate surface and underground water resources, depriving future generations of the opportunity to live in a better world.

The advance of the production of transgenic foods has also caused concern, for three reasons:

1. No studies were carried out to indicate the environmental impacts caused by the use of transgenics.

2. It is not yet known what effects, diseases or damage to health the ingestion of genetically modified foods can cause in the medium and long term and this violates the precautionary principle.

3. Products containing genetically modified organisms are sold without specific labeling that indicates their presence, infringing one more consumer's right to know and choose what they consume (LEÃO; RECINE, 2011).

Human Rights here is being considered with those that human beings have, solely and exclusively, by being born and being part of the human species. They are inalienable rights, which means that they cannot be taken away by others, nor can they be voluntarily given up by anyone and are independent of specific national, state or municipal legislation. They must guarantee people basic conditions that allow them to lead a dignified life, that is, with access to freedom, equality, work, land, health, housing, education, quality water and food, among other requirements. essential. The rights to life, liberty, adequate food, health, land, water, work, education, housing, information, participation, liberty and equality can be cited as some examples of human rights (LEÃO; RECINE, 2011).

According to the author, Human Rights:

- They are universal because they apply to all human beings, regardless of sex and sexual orientation, age, ethnic origin, skin color, religion, political opinion, ideology or any other personal or social characteristic;
- They are indivisible because civil, political, economic, social and cultural rights are all equally necessary for a dignified life. Furthermore, the satisfaction of one cannot be used as a justification for the non-fulfillment of others;
- They are interdependent and interrelated because the realization of one requires the guarantee of the exercise of the others. For example: there is no freedom without food; those who do not have the right to work and education do not fully exercise the right to vote; there is no health without adequate food and so on. In this sense, the promotion of the realization of any human right has to be developed in an interdependent and interrelated way with the promotion of all human rights;
- They are inalienable, that is, they are non-transferable, non-negotiable and unavailable rights, which means that

they cannot be taken away by others, cannot be voluntarily assigned by anyone, nor can their realization be subject to conditions (LEÃO; RECINE, 2011).

Based on Amartya Sen's (1992) definition, that poverty is the inability of a person, or group of people, to transform their abilities into opportunities to live life according to their goals and desires, or even the inability to achieve the well-being due to the lack of economic means and the impossibility of converting income and scarce resources into the ability to function, poverty is a category that encompasses many more people than those who are usually classified as poor, given only their location in a structure income distribution system.

In addition to the inability to meet their basic needs due to low income, in this perspective, there is a lack of conditions to live a longer life; lack of access to education and health facilities; the difficulty in escaping a situation of under or chronic malnutrition; lack of access to potable water; electrical energy; decent living conditions and a healthy environment; lack of access to culture and leisure.

Within this vision, the right to adequate food and the right to be free from hunger are far from the reality of many people in Brazil. The incorporation of the concept of the Human Right to Adequate Food and Food and Nutritional Security in the various social development strategies is an effective way to reverse this situation.

IV. GOALS

4.1 GENERAL

Bring relevant information, based on theories formulated by classical and modernist theorists about the causes of hunger and poverty as political decisions with social and environmental impacts, and present Sisteminha as an alternative for reducing these phenomena and improving the quality of life of vulnerable populations from northeast.

4.2. SPECIFIC

4.2.1. To analyze the situation of poverty in Brazil, deepened by COVID-19.

4.2.2. Relate poverty with malnutrition and health.

4.2.3. To characterize the Sisteminha as an integrated production technology aimed at poor populations with little land, capable of ensuring food in adequate quantity and quality for the survival of these populations.

V. METHODOLOGY

This research is qualitative, descriptive and bibliographical and its purpose was to seek qualified information available on the topics of hunger, poverty, sustainability, environment, climate change, food security, organic production and agroecology to support the importance of Sisteminha as a technology for combats all these phenomena mentioned, since the purpose of the research is to find answers or solutions to the existing problems, through scientific procedures that lead the process.

The option for a qualitative approach, used in this bibliographic study, has been frequently used in studies aimed at understanding the life of certain segments of society (DENZIN; LINCOLN, 2000). In the same direction. Severino (2000) states that the methodology must show how the research will be carried out and the design of the method that is intended to be adopted. In this study, the method was descriptive and exploratory and used research in books, texts and articles that addressed the topics relevant to the research.

For a better understanding of the trajectories covered by each of these themes, classical and postmodernist theorists were sought, without making a temporal selection, in the understanding that qualitative research is based on many approaches. In line with exploratory research, Levy (2015) justifies that the use of qualitative methods to investigate phenomena allows rich interpretations that lead to the stimulation of new discoveries; the emphasis on completeness and simplicity of procedures.

Bibliographic research is an exclusively theoretical procedure, understood as the junction or gathering of what exists on a given topic. It is made from the survey of theoretical references already analyzed and published by written and electronic means, consisting mainly of books, magazines, publications in periodicals and scientific articles, newspapers, bulletins, monographs, dissertations, theses, cartographic material, internet, with the objective of putting the researcher in direct contact with all material already written on the subject of the research, taking care to verify the authenticity of the data obtained, observing the possible inconsistencies or contradictions that the works may present (PRODANOV; FREITAS, 2015).

In this proposal, the research followed the following steps:

1. Definition of the topic to be researched.
2. Choice of keywords in order to facilitate the search.
3. Structuring the general and specific objectives.
4. Compliance with official referral rules.

5. Survey of available content.

6. Organization of found materials.

7. Critical analysis of the localized material.

8. Synthesis of the selected material.

The benefits of using bibliographic research are the low cost, considering that in this modality the researcher does not need to go to field activities, because with the internet there are numerous researches already carried out, as long as the search is done in reliable data, both in primary sources, such as articles, theses, annals, dissertations and periodicals, and in secondary sources, such as encyclopedias, dictionaries, bibliographies, databases and books, and in tertiary sources, such as library catalogs, literature reviews and others (SOUSA ; OLIVEIRA; ALVES, 2021).

In qualitative research, the approach is more reflective, reality is verbalized and data receive interpretive treatment, with greater interference from the researcher's subjectivity. In being exploratory, it is characterized by the deepening of the available data, explaining the factors that determine the occurrence of the phenomena, opening spaces for new researches based on experiments.

VI. RESULTS AND DISCUSSIONS

As this is a bibliographic, exploratory and explanatory research, the results presented here are qualitative and are characterized by the conceptual development of the topics addressed, based on the data found. As a methodology for this study, the analysis through literature review was used, pointing out what authors such as Sousa, Oliveira and Alves (2021); Denzin and Lincoln (2000); Sen (1992); Gonzales (2014); Gonçalves and Machado (2015); Bikoni (2012); Ribas, Machado and Golgher (2011); Guilherme (2011); Junior et al., (2019); Leão and Racine (2011); Burlandy and Maluf (2011); Hanning et al., (2012); Tiboli and Santi (2017); Rocha (2003), among others, address the themes of hunger, poverty, food and nutrition insecurity, environmental sustainability and climate change, in addition to research with intergovernmental bodies such as the UN, IPCC, FAO, World Bank and national audiences such as MAPA, IBGE and Oswaldo Cruz Foundation. As a result, the theories formulated by the main authors are discussed in order to explain the social phenomena studied.

The results of qualitative research are intended to explain only the phenomenon or the context in which the research was applied, not being able to generalize the results to a population or to other different contexts, which is perhaps its greatest weakness. However, the qualitative approach encourages the researcher to reflect on the way of researching and analyzing data, since the understanding and interpretation of phenomena is a crucial activity to produce non-measurable knowledge, however, the same rigor and obedience to the stages of research are important. qualitative and ethical commitment.

In this way, it is considered that the qualitative approach in scientific research is promising for the development of academic investigations, especially in the scope of lato sensu postgraduate studies, in order to provide the production of relevant knowledge for the advancement of science itself and of society.

With regard to the themes of hunger and poverty, it was observed that poverty is a state of misery that causes suffering due to insufficient food, which in turn generates health problems, and these two factors influence the quality of life of the population for a long time. these phenomena affected.

In Brazil, poverty has a structural origin, derived from a colonization process guided by the slave society, which remains today, where blacks and browns are the most affected, especially in the COVID-19 pandemic, given that the most vulnerable have lost all the income that was obtained in the informal market, deepening social inequalities.

Poverty is a social phenomenon that is difficult to define, because in each context it has a face, however, it can be said that the deprivation of the minimum conditions of life, such as food, housing, access to health, income, drinking water, information, participation in public life with opinions, are significant indicators of poverty.

On food security, the discussions point to the realization of the right of everyone to regular and permanent access to food, which in the case of Brazil is a reality far from being implemented, given the fragility of public policies. The laws exist and, if practiced, would be able to give legal support to populations in a state of poverty, however, today there are more than 13,000,000 people starving in the country.

According to the Organic Law on Food and Nutrition Security - LOSAN (Law nº 11.346, of September 15, 2006), by Food and Nutrition Security - SAN is understood the realization of the right of everyone to regular and permanent access to quality food, in sufficient quantity, without compromising access to other essential needs, based on health-promoting dietary practices that respect cultural diversity and are environmentally, culturally, economically and socially sustainable.

The commitments assumed by the Federal Government since 2003, in order to combat hunger and

poverty in the country, have guided the construction of the Food and Nutrition Security (FNS) agenda as a State policy, in a broad intersectoral process and with the participation of civil society. , defining the legal and institutional frameworks for this agenda – such as the creation of the National Food and Nutrition Security System (SISAN); the recreation of the National Council for Food and Nutrition Security (CONSEA); the installation of the Intersectoral Chamber for Food and Nutrition Security (CAISAN); and the elaboration of the National Plan for Food and Nutrition Security (PLANSAN 2012/2015).

Starting in the 1940s, specifically in 1945, the government of Getúlio Vargas installed the National Food Commission (CNA), whose function was to study the nutritional status of Brazilians. Going through periods of donations that came from international aid, through the International Childhood Relief Fund (FISI), currently UNICEF, after the elaboration of the National Food and Nutrition Plan that made it possible to structure and adapt the program to reach the entire Brazilian territory (MELO , 2021; FERREIRA; ALVEZ; MELLO, 2019). This initial milestone demonstrates how much school feeding has changed, going through several changes in the name, in the structure, until reaching the current definition of PNAE - National School Feeding Program.

Some considerations about the need to be concerned with clean food production, without the use of pesticides, were made, as this issue is related to food security and environmental preservation.

The execution of the National Food and Nutrition Security Policy (PNSAN) involves the integration of efforts between government and civil society and strategic actions and programs such as:

- Access to Water (Cisternas);
- Rural promotion to the productive activities of family agriculture;
- Food Acquisition Program (PAA);
- Support for Urban and Peri-urban Agriculture;
- Food Distribution;
- Rural Productive Inclusion of Traditional Peoples and Communities and/or Traditional and Specific Groups and Populations;
- Support for the structuring of Public Food and Nutrition Equipment, such as a Network of Food Banks, Popular Restaurants and Community Kitchens;
- Actions to support Food and Nutrition Education, etc. (PNSAN, 2006).

As can be seen, these actions are integrated and range from the field of production promotion, to the marketing, distribution and consumption of healthy foods as a way of guaranteeing the Human Right to Adequate Food and the fight against all forms of malnutrition. However, in the case of Brazil, currently most of these policies are either inactive or do not provide the material conditions for their implementation, hence the Sisteminha has been placed as an option to reduce the levels of hunger and poverty, especially in the Northeast, where the greater number of vulnerable are concentrated.

VII. RESULTS

The literature consulted that served as the basis for this research was satisfactory for the proposed objectives, which were the technical foundations for a better knowledge of the Sisteminha, as a mechanism to combat hunger and poverty, respecting the environment and encouraging the implementation in the Northeast region of agriculture with low carbon emissions, in order to contribute to the reduction of greenhouse gases in the atmosphere; better understanding of the evidence of hunger and poverty in a country like Brazil, which is among the world's largest food producers; Brazil's level of commitment to the responsibilities assumed in international forums with the control of climate change, through the implementation of strategies made available in the ABC Plan of MAPA – Ministry of Agriculture, Livestock and Supply.

From this perspective, this bibliographic work will enable greater socialization of this information for as many as are interested in the subject.

VIII. SOME CONSIDERATIONS

Hunger and food insecurity are products of social inequalities generated by capitalist logic, so since 2016, and more strongly today, public policies aimed at combating hunger in Brazil are threatened, in a regrettable setback, considering the advances made in this area since 2003, during the government of President Luiz Inácio Lula da Silva, where new opportunities arose from the perspective of building references capable of strengthening the food security of poor families, but also, with the concern of empowering them. with training for work and income generation. The Zero Hunger Program was from that time, based on the following diagnosis of the Brazilian reality at the time:

i) the insufficiency of demand resulting from the low purchasing power of the population, associated with the

concentration of income and the situation in the labor market (high unemployment and informality);

ii) the difference between food prices and the purchasing power of the majority of the population;

iii) the precariousness of the social protection network, incapable of serving the contingent of unemployed and other citizens in need of protection by the State, including emergency care (FONSECA; MONTEIRO, 2010).

These governmental initiatives were considered by the World Bank and other development agencies as very important for the reduction of social inequalities, because, although poverty is characterized by a set of needs, the acquisition of income makes it possible to fulfill certain needs.

Studies by Myrdal (1997) already pointed out that poverty causes diseases, which increases early mortality, impacting productivity at work, which makes the State directly responsible for the implementation of policies capable of promoting development.

Therefore, reducing food and nutritional insecurity among the most vulnerable populations is essential to comply with the Federal Constitution, which places access to food in adequate quantity and quality for all Brazilian citizens as a right.

In order to face hunger and food insecurity, among so many alternatives available, emphasis was given in this text to the Integrated Production System for its fundamentals that prioritize those who have little land, few material resources, being able to use family labor to produce the their own healthy food, free of pesticides and still sell the surplus to generate income.

In this process, the central element of the technological solution is the creation of fish in tanks, with a recirculation and filtration system, the main advantages of which are the low initial investment cost, which can be adapted to the needs, experiences, preferences of the producer and soil and climate conditions. and local market. It is suitable for small spaces (from 100 m2), in peri-urban and/or rural areas, constituting a solution dimensioned to meet the nutritional needs of a family, between four and six people, considering the recommendations of the World Health Organization (JÚNIOR et al., 2019).

A large part of the materials for the implantation of the modules in Sisteminha can be adapted to the reality of the families, who use cardboard, recycled wood, straw, plastic and others, easy to be obtained in their surroundings, thus making it possible to start their production. The staggered planting allows families to eat well throughout the year, consuming vegetables, tubers, protein and fruits, as long as they have the necessary training for this, which UNIVASF has done with farmers in the municipalities, providing technical and accompanying production, so that the small initial enterprise can be transformed, in addition to food and nutritional security, into a form of income generation.

The training of those interested by UNIVASF has taken into account, as a methodological principle, the existing knowledge of the populations involved, but emphasizing the importance of making an organic production, which respects nature and integrates people with the environment in a symbiosis where one depends on the other. , resulting in an important balance. With regard to the application of academic concepts, there are opportunities to confront and adapt them to the realities of populations, starting from the following phases:

A. The Diagnosis – Based on the culture of the participants, in order to know their real demands and the possibilities that exist in their communities.

B. Planning - based on the diagnosis developed in a participatory manner, interested parties will choose the modules they wish to implement on their properties, based on their vocations. However, as a suggestion of technical feasibility, it is preferable to start with the construction of the pond for raising the fish;

C. Training and Instrumentation – From there, the participants go to the Demonstration Unit of the Plural Space, in order to verify how the process is carried out, establishing a praxis there, between theory and practice. At the end of the fieldwork, the participants return to the classroom, where they will have their doubts clarified.

D. Consolidation - Upon returning to their location, at the time of implementing the Sisteminha, the UNIVASF professional, if requested, goes to the field in order to assist the farmer in installing the fish tank, as well as, in the implementation of the other modules (JÚNIOR, 2019).

In addition, participants receive guidance on the principles of agroecology, the importance of valuing the environment, the solidarity economy as a mechanism for integration and participation and citizenship as a right.

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