International Journal of Advanced Engineering Research and Science (IJAERS)
Peer-Reviewed Journal
ISSN: 2349-6495(P) | 2456-1908(O)
Vol-9, Issue-4; Apr, 2022
Journal Home Page Available: https://ijaers.com/
Article DOI: https://dx.doi.org/10.22161/ijaers.94.32

Agrobiodiversity and food sovereignty among peasant families in two municipalities in the south of Bahia/Brazil

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Received: 21 Mar 2022,

Received in revised form: 18 Apr 2022,

Accepted: 24 Apr 2022,

Available online: 30 Apr 2022

***Keywords*— Cabruca, Agrofood System, Agroforestry System, Food Security, PANC.**

***Abstract*—** *This article presents a research at a regional level, which includes two municipalities in the South of Bahia/Brazil, in an agroforestry system known as "cabruca". A survey of the main Unconventional Food Plants (PANC) used by the peasant community was carried out. Data were obtained using a quali-quantitative approach, taking into account the quantity and variety of unconventional plants that participants indicated they knew and used, and which had potential for food use. The main species indicated by the community, with food potential, were duly identified. Gastronomic workshops were also held, seeking to encourage the use of Non-Conventional Food Plants (PANC-portuguese) and strengthen the sovereignty and food security of peasant families. The main objective was to investigate the factor(s) that lead some people to not use certain plants in their diet, even though they may be suffering from food deprivation and having with the knowledge the feed potential of these plants.*

I. INTRODUCTION

Brazil has the greatest plant biodiversity on the planet with a total of 40,989 native species of flora (BFG, 2018), and these numbers tend to increase, since on average, more than 250 new species are cataloged per year (Fioravanti, 2016). It is noteworthy that of the total number of species mentioned above, 33,099 are Angiosperms, that is, plants that have seeds protected by fleshy or dry fruits (BFG, 2018).

The Atlantic Forest has a high level of flora diversity, forming a complex system with a high degree of endemism, being considered a priority environment (hot spot) for the conservation of biodiversity. One of these important points for conservation is the South of Bahia, where there is an Agroforestry System known as "*Cabruca*", which has great relevance for the remnants of Atlantic Forest in that region. According to Sambuichi (2003), this agroforestry system is characterized by the thinning of the forest and the cultivation of cocoa (*Theobroma cacao* L.), under the shade of large trees. Within this SAF there is a great diversity of Unconventional Food plants, which are widely known in the region, including among peasant families. However, there is a need for studies that help to measure the real

dimension of the diversity of these species and the ways in which they are consumed.

The term PANC was proposed by Valdely Kinupp to designate species of native, exotic, wild or cultivated spontaneous plants, present in different regions, influencing the food culture of traditional and regional populations (Kinupp & Lorenzi, 2014). They are distributed in all Brazilian biomes, some of which are known and widely used in cooking, but the vast majority are still unknown by Brazilians.

According to Brack (2016), PANC are not restricted to plants considered native, being a broad concept that encompasses all plants that are not conventional in our menu or produced in conventional systems, considered food plants of agrobiodiversity. More broadly, the concept values the specificities of bioregions and forms of production, and may include creole seeds and other plants associated with different traditional and food cultures, rescuing ethnic wealth and strengthening the self-esteem of rural and traditional communities (Kinupp, 2007; Silva, 2015; Brack, 2016).

In recent years, some works related to PANC have been published in Brazil (Kinupp, 2007; Rufino, 2008; Brasil, 2010; Kinupp & Lorenzi, 2014; Filho, 2015; Brack, 2016; Polesi, 2016). However, the number of publications is still low when compared to the species richness and cultural diversity recorded in the country. Many of the species with potential for use in food are not used or only parts are used, due to the lack of knowledge of how they can be consumed and their nutritional content, with a part of the plant not conventionally consumed being discarded.

The concern with quality food has contributed to increasing the population's interest in agro-food systems and the preservation of biological and cultural diversity (Rufino, 2008; Chaves, 2016; Polesi, 2016). In addition to the concern with the production of quality food, agroecology announces proposals for rural development, maintaining a high level of biodiversity and strengthening new mechanisms for food distribution, a condition that favors producers and consumers to reassume their decision-making power over your food (Brasil, 2006, 2010; Burity, 2010; Filho, 2015).

The cultivation and use of PANC associated with agroforestry systems, by peasant and/or traditional populations, can be a way to affirm the autonomy of knowledge accumulated by the communities about these species and to rescue the regional food culture, in addition to enabling the creating new healthy recipes (Brasil, 2010; Kinupp & Lorenzi, 2014; Altieri, 2016; Brack, 2016, Jardim et al.., 2019, 2020).

We know that, associated with the richness of plant species, is the cultural diversity of the peasant population that lives with these plants and that has knowledge associated with their use as a source of food, medicines, fibers, dyes, condiments and so many other features. They are farming families, traditional communities, autonomous collectives that seek to use biodiversity resources in a sustainable way, through ecological production systems, guaranteeing environmental conservation, income generation and the production of food sovereignty (Kinupp, 2007; Köhler & Brack, 2016).

Therefore, food monotony (always eating the same foods) is not due to a lack of options, but a lack of knowledge (or the existence of prejudices) about the existence of species, their characteristics and their potential for use, whether in the form of harvest , planting, handling, processing or simply whether a plant can be consumed, in addition to these barriers, the lack of PANC varieties in open markets and markets, makes consumption difficult (Kinupp, 2007).

The existing studies always approach the quantitative aspects of the species existing in the places, however, due importance is not given to the cultural factors that lead people not to use certain vegetables, even knowing that they could be consumed. As a result, we see a large number of zone rural people experiencing food deprivation, despite the large number of plants that could help meet their food shortages.

Therefore, an approach was used that also contemplates the ethnobotanical aspects that are of fundamental importance to create and support public policies that promote the dissemination of unconventional food plants, as well as practical ways for their recognition, availability of recipes, which can be prepared with these plants, so that they strengthen the agrofood systems and the food sovereignty and security of the population. With the objective of encouraging peasant families to include certain PANC in their food, in order to subsidize actions to strengthen the sovereignty and food security of the peasantry.

II. METHODOLOGY

2.1 Characterization of the study area

The "*Cabruca*" Agroforestry System is of great relevance to the Atlantic Forest remnants of southern Bahia, since endemic, rare and threatened species are still distributed in the existing "*cabrucas*". Many of these species have already been eliminated in remaining areas of forest, remaining only in areas of fertile soils where the "*cabruca*" system was established. These Agroforestry

Systems also function as ecological corridors, linking one forest fragment to another.

The study area is located in the municipalities of Itacaré and Ubaitaba, a region that still has coverage in a good state of conservation of remnants of the Atlantic Forest. The area where the research was developed is inside and around the in the Serra do Vinhático Ecological Complex and its surroundings. This set was created by the Master Plan of the municipality of Itacaré LEI 271/2014, which established Special Zones of Social Interest. Serra do Vinhático still has areas with intact Atlantic Forest coverage. Due to its proximity to Parque do Conduru, which is considered the point with the greatest diversity of woody plants on the planet, it is a potential area of great interest for research involving biodiversity. According to the municipal zoning map of Itacaré (Fig. 01), this region comprises Macrozone F4- Northern Range, located in the northern part of the municipality and separated from the others by the Contas river divider, containing: the villages of Baetés, Cuiúdos, Mata Grande, Matinha, Piracanga, Pontal, Socó, Tijuípe, Vinhático and Volta do Poço.

This Complex is considered an agroforestry conservation zone, composed of the *Cabruca* agrosystem and remnants of the Atlantic Forest. From the point of view of biodiversity conservation, there is a positive relationship between the *cabrucas* and the remaining forest fragments. This reinforces the need to maintain these systems through the dissemination of their importance and the political-financial incentive of governmental entities to favor the maintenance of combined areas of *cabruca* and forest. With this, significant opportunities for food security can be created with the offer of multiple products and services, also favoring the inflow of additional income for peasant families.

2.2 Species collection and identification

The collection of botanical materials was carried out with the social actors, at the time of the workshops. The species that needed to be collected for better identification were herborized according to the techniques described by Mori et al. (1989) and incorporated into the Herbarium. All were photographed for the preparation of identification materials. The identifications were carried out with the help of specific bibliographies, comparison with previously identified specimens, with the support of specialists and botanical knowledge of the author of the research.

For the selection of species, the ethno-directed approach was used, which consists of an indication based on the knowledge expressed by local social actors. To contribute to the enrichment of the number of species, the chemotaxonomic or phylogenetic approach was also used, consisting in the selection of species from a family or genus (Albuquerque & Hanazaki, 2006), for which there is some knowledge of use in food.

2.3 Gastronomic workshops

The workshops were held at partner farms that showed interest. After conversations with the peasant community to identify possible species already used in food, a walk was carried out in the area to harvest the plants previously indicated, as well as edible species that are known to the researcher.

The preparation of the dishes was carried out with the participation of all local members, seeking at times to use ingredients and condiments that the community usually uses in the daily preparation of their food. On other occasions, plants that were already known, but little used in food, gained new forms of preparation that positively surprised the expectations of the participants.

III. RESULTS AND DISCUSSION

The concern with quality food and the price of food has contributed to increasing the population's interest in the search for alternatives linked to more sustainable production, and consequently linked to the preservation of biological and cultural diversity (Rufino, 2008; Chaves, 2016; Polesi, 2016; Jardim et al., 2019). One of the allies in the contribution of this more sustainable alternative is agroecology, which has a proposal for rural development, maintaining a high level of biodiversity and strengthening mechanisms for food distribution, a condition that favors producers and consumers to reassume their decision-making power and control over food (Brasil, 2006, 2010; Burity, 2010; Filho, 2015). In this search for development, be it local, regional or territorial, considering the term sustainable, food assumes a leading role in achieving social, environmental, territorial, cultural and political sustainability.

For Morgan and Soninno (2010) the agri-food sector acquires a unique status in sustainable development for the simple fact that food is essential for everyone and food raises a series of questions, which constitute the center of debates related to sustainability, such as , public health, social inclusion, consumption pattern and environmental implications. In other words, food in the most different ways is a determining factor in the individual and collective commitment to achieving sustainable development.

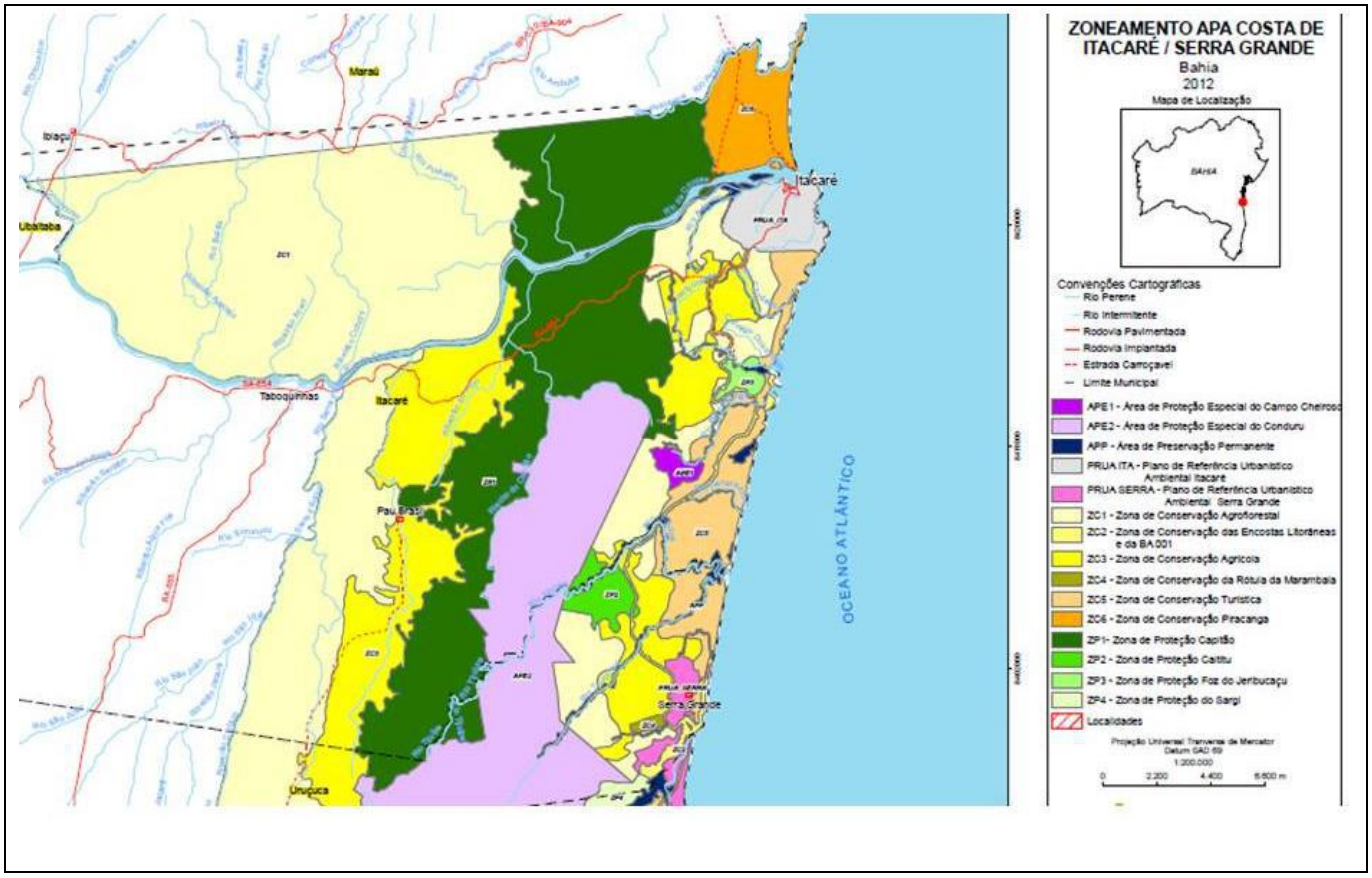

Fig. 01: Map of the ZONEING APA COSTA DE ITACARÉ / SERRA GRANDE Bahia-BR (Master Plan of the municipality of Itacaré LEI 271/2014), where the Serra do Vinhático Ecological Complex is located.

Source: CEPRAM Resolution No. 3503 of September 30, 2005 Municipal Limits

In this perspective, Bezerra and Schneider (2012) emphasize that the dynamics of the hegemonic agri-food system has an impact on the production and consumption model, bringing with it significant risks and losses. Both with regard to the health and quality of food, considering the aspects of reducing nutrients and contamination by pesticides, as well as in the social and cultural dimension of food, causing a profound reduction in the consumption of food, culturally used and produced locally or regionally, thus decharacterizing the traditional consumption of a people (Bezerra; Schneider, 2012). In addition, these processes affect food diversity and the right of each person or group to exercise free choice about what to consume and also to produce (Braga, 2004).

It is necessary to observe the agri-food chain in which we are inserted and the practice of (un)sustainable development. Although we have laws that define what would be ideal when we talk about food as a basis for human dignity and equity, observing the concept of Food and Nutrition Security (FNS), according to Law No. 11.346, of September 15, 2006, it considers that:

> *"Art. 3º ... consiste na realização do direito de todos ao acesso regular e permanente a alimentos de qualidade, em quantidade suficiente, sem comprometer o acesso a outras necessidades essenciais, tendo como base práticas alimentares promotoras de saúde que respeitem a diversidade cultural e que sejam ambiental, cultural, econômica e socialmente sustentáveis"* (Brasil, 2006).

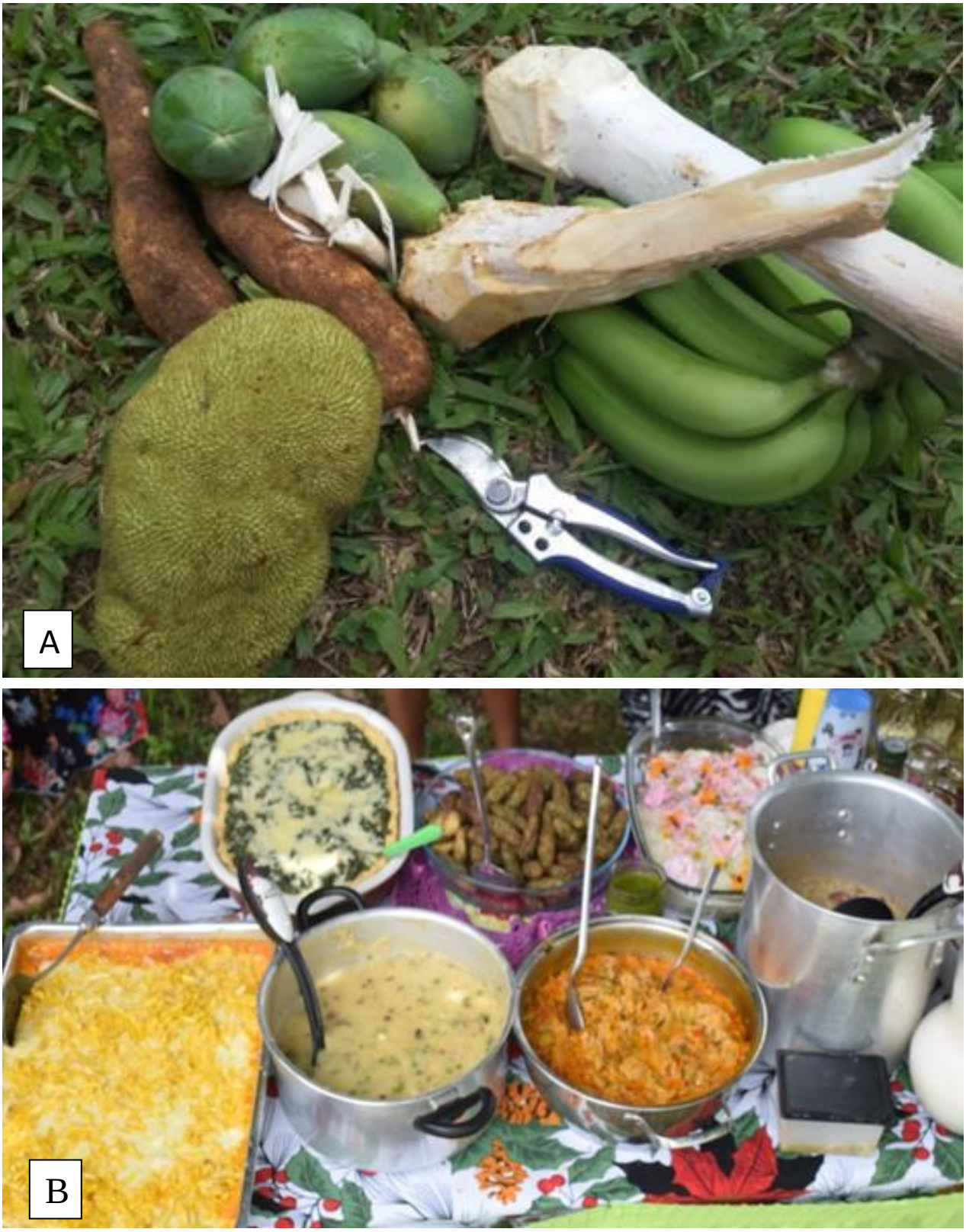

Fig. 02: A-B: A - Some species found in Cabruca (*Carica papaya* L.; *Manihot esculenta* Crantz; *Artocarpus heterophyllus* Lam.; *Elaeis guineensis* Jacq.; *Musa paradisiaco* L.), B - Dishes prepared in a workshop with the plant species in the fig. (A). Photos: A: Jardim, J.; B: Jardim, A.

Fig. 03: A-B: *Taraxacum officinale* F.H. Wigg. (Dandelion); B: Dandelion with guandu bean (*Cajanus cajan* (L.) Huth) and dried meat. C-D: *Piper umbellatum L.* (Capeba); D: Capeba cigar. E-F: (vegetable sponge); F: sponge with cheese sauce. G-H: *Urera baccifera* (L.) Gaudich. ex Wedd. (urtiga); H: Rice cake. I-J: *Eugenia stipitata* McVaugh (Araçá-boi); J: Araçá-boi mousse pie. K-L: *Talinum triangulare* (Jacq.) Willd. (Beldroega); K: Shrimp moqueca with beldroega. M-N *Carica papaya* L. (Papaya); N: Noodles with *Macrocybe titans* mushroom and papaya pith. O-P: *Xanthosoma taioba* E.G.Gonç. (taioba); O: Taioba risotto. Photos: Jardim, A.

Following this FNS approach, we can say that the agri-food chain will still have to undergo major changes to guarantee the Human Right to Adequate Food (HRAF), which will be directly linked to quantity, quality and regularity. As well as changes to meet what we call Food Sovereignty, which seeks to rescue and preserve the food culture of the people and the sustainability of the agri-food system; intersectoriality; equity and social participation (Triches; Gerhart and Schneider, 2014). Faced with the challenges to build the Food Sovereignty of the people, or even the FNS, as HRAF, many realities, even in Brazil, which has food biodiversity and in many other parts of the world, are of Nutritional Food Insecurity. In the search for viable and inexpensive alternatives, related to improving the situation of Food and Nutrition Insecurity (ISAN) of peasant families, the increase in the consumption of local plant diversity in food, such as the PANC, can be an affordable option that would value the inheritances food (Jardim et al., 2020).

The PANC are standing out as a strong ally to ensure Food and Nutrition Security and Sovereignty, as it is an alternative that has low cost, is often linked to food heritage and traditional knowledge, in addition to many having a high nutritional level that can replace plant species. (Fig. 02), we present several plants and dishes that were prepared in workshops in communities that are part of the *cabruca* system (Fig. 03).

In the complex and diverse Agroforestry System that *Cabruca* takes over, different plant species, in addition to cocoa, share the space and fulfill their functions in the system. Among ornamental, arboreal, medicinal, condiment, and various plants that can be used in food, which have their potential little used (Jardim et al., 2019).

In addition to analyzing which plants already had knowledge of their potential for use in food, we observed which were the main foods that served as a basis for this population's diet. One of the results is that in most peasant families in this region the food base is composed of rice, beans, manioc flour and jerked meat (salted and dried beef), with or without vegetables. A fact that had also been observed by Castro (1965), in one of his books called *Geografia da fome* (geography of hunger), where he reports the situation of hunger in Brazil and mentions that there is a similarity in the nutritional deficiency of the population of the semi-arid region of northeastern Brazil and that of the Southern Bahia (humid region), both are based on the same foods.

One of the possible links between the report by Josué de Castro in 1965 and the situation still observed by the authors of this article, may be linked to the origin of the eating habits of the formation of this population, who work on cocoa farms in that region. As the south of Bahia received many people from the semi-arid region of northeastern Brazil, who migrated in search of improvements in the quality of life, as this region was considered very rich due to the status that cocoa plantation gave it, and consequently they brought their eating habits, which is predominantly observed to this day.

IV. CONCLUDING REMARKS

In this sense, it should be noted that the food plant species found in *Cabruca* is a cultural heritage and is configured as a strategy to guarantee the situation of food and nutritional security, having the potential to help families improve their food and nutrition conditions of family income. One of the functions of this Agroforestry System is to be reservoirs of biodiversity in communities. Another relevant aspect that can be incorporated into this production system are agroecological practices, which seek a more sustainable model for the generation of safe food, enriching the food of producing families, in addition to subsidizing actions by the local Government and Public Policies.

In this way, the diversity of food plant species, as well as the preservation of food culture and natural resources, can supply and supplement, even if in part, the daily subsistence needs in most households of the peasant population, collaborating to improve the quality of food for these families. Therefore the search for more alternatives contributing to the guarantee of Food and Nutrition Security through independence in relation to the production and consumption of food, preservation of food and productive culture and maintenance of agrobiodiversity in these spaces.

REFERENCES

[1] Albuquerque, U. P.; Hanazak, N. (2006). As pesquisas etnodirigidas na descoberta de novos fármacos de interesse médico e farmacêutico: fragilidade e perspectivas. *Revista Brasileira de Farmacognosia*. 16(Supl.), p. 678-689.

[2] Altieri, M. A. (2016). Os quelites: Usos, manejo e Efeitos ecológicos na agricultura camponesa. *Agriculturas*. v.13, n.2, p. 30-33.

[3] Bezerra, I. ; Schneider, S. (2012). Produção e consumo de alimentos: o papel das políticas públicas na relação entre o plantar e o comer. *Revista Faz Ciência*, v.14, n.20, pp.35-61.

[4] BFG - The Brazil Flora Group. Brazilian Flora (2020): Innovation and collaboration to meet Target 1 of the Global Strategy for Plant Conservation (GSPC). *Rodriguésia.* 69, n.4, p. 1513–1527, 2018. DOI: 10.1590/2175-7860201869402

[5] Braga, V. (2004). Cultura Alimentar: contribuições da antropologia da alimentação**.** *Saúde em Revista*, Piracicaba, v.6, n.13.

[6] Brasil. Ministério da Agricultura, Pecuária e Abastecimento. (2010). *Hortaliças não convencionais (tradicionais)* MAPA. Secretaria de Desenvolvimento Agropecuário e Cooperativismo. Brasília: MAPA/ACS, p. 52.

[7] Brasil. Lei 11.346/2006 de 15 de setembro (2006). Cria o Sistema Nacional de Segurança Alimentar e Nutricional - SISAN. *Diário Oficial da União*, Seção 1, Brasília, DF, 18 set 2006. Disponível em: <http://www.planalto.gov.br/ccivil_03/_ato2004-2006/2006/lei/l11346.htm>. Acesso em 20/06/2019.

[8] Brack, P. (2016). Plantas alimentícias não convencionais. *Agriculturas.* v. 13, n.2, p. 4-6.

[9] Burity, Váleria *et al*. (2010). .Direito humano à alimentação adequada no contexto da segurança alimentar e nutricional. Brasília. *ABRANDH*, p. 204.

[10] Castro. Josué de. (1965). *Geopolítica da fome*: ensaio sobre os problemas de alimentação e de população. São Paulo: Brasiliense.

[11] Chaves, Mariane Sousa. (2016). *Plantas Alimentícias Não Convencionais em comunidades ribeirinhas na AMAZÔNIA.* Dissertação (Mestrado em Agroecologia) - Universidade Federal de Viçosa, Viçosa.

[12] Filho, G. X. P. (2015) Agroecologia e recursos alimentares não convencionais: contribuições ao fortalecimento da soberania alimentar e nutricional. *Campo-Território*: revista de geografia agrária, v. 10, n. 20 p. 227-245.

[13] Fioravanti, C. (2016). A maior diversidade de plantas do mundo. *Pesquisa FAPESP*. n. 241, p. 42-47.

[14] Jardim, A. Q. B. dos S., Jardim, J. G., Paixão, J. L. da, & Costa, L. C. do B. (2019). Plantas Alimentícias Não Convencionais (PANC) associadas ao agrossistema cacau-cabruca no sul da Bahia. In E. Gross & T. G. Viana (Orgs.), *Guia de Manejo do Agroecossistema Cacau Cabruca* (2ª edição, p. 118–132).

[15] Jardim, A. Q. B. S.; SILVA, J. N. & ALVES, A. G. C. A. (2020). Quintais produtivos e o cultivo de PANC como fonte de alimentação para as famílias da região semiárida em Pernambuco, Brasil. *In: – Agroecologia e Territórios: imersões, sujeitos, experiências e caminhos para o desenvolvimento territorial* / Ana Maria Dubeux Gervais... [et al.], organizadores – Recife: EDUFRPE.2020. 383p. (Série Diálogos interdisciplinares agroecologia e territórios: V.1) 339-356. Disponível: https://ppgadt.univasf.edu.br/wp-content/uploads/2021/05/Dialogo-Interdiciplinar-v1-compactado-1.pdf

[16] Kinupp, V. F. (2007). *Plantas Alimentícias não convencionais da região metropolitana de Porto Alegre, RS.* 2007. Tese (Doutorado em Fitotecnia) - Universidade Federal de Rio Grande do Sul, Porto Alegre, RS.

[17] Kinupp, V. F.; Lorenzi, H. (2014). *Plantas Alimentícias Não Convencionais (PANC) no Brasil:* guia de identificação, aspectos nutricionais e receitas ilustradas. São Paulo. Instituto Plantarum de Estudos da Flora, p. 768.

[18] Köhler, M. & Brack, P. **(**2016**).** Frutas nativas no Rio Grande do Sul: cultivando e valorizando a diversidade. *Agriculturas.* vol. 13, n.2, p. 7-15.

[19] Morgan, K; Soninno, R. (2010). Repensando a Alimentação Escolar: O Poder do Prato Público. In: The Worldwatch Iinstiitute. *Estado do Mundo*: Transformando culturas do consumismo a sustentabilidade. Washington: WWI/UMA, p. 298.

[20] Mori, S. A. *et al*. (1989). *Manual de Manejo do Herbário fanerogâmico.* 2ª ed. Itabuna. Centro de Pesquisas do Cacau. CEPLAC.

[21] Polesi, R. G. (2016). *Agrobiodiversidade e Segurança Alimentar no Vale do Taquari: plantas alimentícias não convencionais e frutas nativas.* Monografia (Especialização em Gestão da Qualidade no Processamento de Alimentos) - Unidade de Encantado, Universidade Estadual do Rio Grande do Sul, Encantado.

[22] Rufino, M. S. M. (2008). *Propriedades funcionais de frutas tropicais brasileiras não tradicionais*.. Tese (Doutorado em Agronomia) - Universidade Federal do Semiárido. Mossoró,

[23] Sambuichi, R. H. R. (2003). *Ecologia da vegetação arbórea de cabruca - Mata Atlântica raleada utilizada para cultivo de cacau - na região sul da Bahia*. Tese de Doutorado - Universidade de Brasília.

[24] Silva, A. T. R. (2015). A conservação da biodiversidade entre os saberes da tradição e a ciência. *Estudos avançados*, v.29, n.83, p. 233-259.

[25] Triches, R. M.; Gerhardt, T. E.; Schneider, S. (2014).. Políticas alimentares: interações entre saúde, consumo e produção de alimentos. *Interações*, Campo Grande, v. 15, n. 1, jan./jun. p. 109- 120.