

## PRODUCTIVE DIAGNOSIS FOR PEPPERS IN THE MID- NORTE CAPIXABA TERRITORY - ESPÍRITO SANTO STATE

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**Abstract:** This work established a logical structure for a Cooperative and its members to strengthen the agricultural activity of the region's producers. A SWOT analysis was carried out to assess the internal and external environment of a Cooperative, surveying the main weaknesses and threats, as well as the strengths and opportunities present in the pepper production chain: black pepper (*Piper nigrum* L.) and pink pepper (*Schinus terebinthifolius* Raddi), in the Mid-North Territory Capixaba. The state of Espírito Santo stands out as the main national producer and exporter of black pepper and pink pepper, but it faces several problems, mainly related to contamination by *Salmonella spp.*, which impacts commercialization, especially for the foreign market. With the results obtained, it was possible to outline strategic actions in all links of the production chain to be implemented by the Cooperative to support family farmers, in view of the increase in the post-harvest quality of this spice.

**Keywords:** Contamination, *Salmonella spp.*, family farming, agricultural diagnosis, productive development.

## CONTEXT

The black pepper (*Piper nigrum* L.) and the pink pepper (*Schinus terebinthifolius* Raddi) are known in the internal and external market as spices used in cooking and as raw material for the production of cosmetics and drugs, given the antioxidant and anti-inflammatory properties of the compounds present in the fruits and also in other parts of the plant such as stems, roots and sheets. Therefore, the quality of the grains for processing is important, especially when it is intended for "in natura" consumption.

Competitiveness in the international market is directly related to the quality and safety of pepper; therefore, changes in sensory properties and contamination directly impact

its market value. The main causes of rejection or detention of batches of spices are related to the presence of residues in the final dry product, such as pathogenic microorganisms (among which *Salmonella spp.* is the main aggravating factor), and even the smell of smoke in the dried pepper, as a result failures in the drying process (BRASIL, 2021). In Brazil, the National Health Surveillance Agency establishes a maximum contamination limit for aflatoxins (20 µg/Kg) and ochratoxin A (30 µg/Kg) in black pepper (BRASIL, 2011). The presence of dirt in peppers reflects the precariousness of hygienic-sanitary conditions and shows negligence in the implementation of good practices throughout its production chain. The result is a low quality product with lower added value.

The state of Espírito Santo is the main national producer of black pepper, whose production represented about 60% (62,633 tons) of Brazilian production, with a significant participation in the export market. About 88.7% of all production is exported (IBGE - Brazilian Institute of Geography and Statistics - 2019). The activity plays an important role in generating income for rural families in the north of the state. It is estimated that around 90% of the black pepper planting area is located on family-based rural properties, and the high yield per area favors the adoption of the crop on small properties. The market value makes pepper an excellent source of income and an option for diversifying activities on these properties. The pepper is processed and later marketed by cooperatives and associations.

For the pink pepper production chain, the Capixaba Association of Pepper and Spice Exporters reported that 500 t of pink pepper were exported in 2018, with the Municipality of São Mateus/ES being the largest producer and exporter of pink pepper in the world. However, the extractive base of the pink pepper production chain makes production

and productivity very susceptible to several factors that could be controlled, following technical recommendations for management, and dissemination of information to extract, maintain, innovate and expand the subsistence agriculture in its entirety, generating benefits for the community involved.

This diagnosis plays a strategic role in improving the quality of peppers (black pepper and pink pepper) by dealing with aspects related to the problem faced by Cooperatives, with regard to the contamination of peppers by microorganisms, especially *Salmonella spp.* Which impacts the pepper market, especially abroad.

## DEVELOPMENT

The present work involved a bibliographic survey, data collection, qualitative research and interviews with the main actors of the productive chain in question for the composition of the diagnosis of the productive chain of black peppers and pink pepper in the Mid-North Territory Capixaba/ES. The Meio Norte Capixaba Territory is made up of 16 municipalities previously selected by the Program to Support Agricultural Development in the Northeast (AgroNortheast) of the Ministry of Agriculture, Livestock and Supply (MAPA), whose purpose was to identify and promote the development of existing production chains in the semi-arid region by increasing competitiveness and improving production and marketing activities (Figure 1).

The Cooperative used in this study is a recognized Cooperative of family farming and currently has 406 members in its membership. It is estimated that the total number of members owns an amount of 4 million black pepper plants cultivated in about 2,400 ha, totaling a production of 12 million kg of dry pepper, for which around 4,000 workers are employed. people.

It is worth mentioning that 80% of this production is concentrated in the municipalities that make up the Mid-North Territory Capixaba, where 45% of the total rural establishments in the region grow peppers, with São Mateus, Jaguaré and Vila Valério, the three largest producing municipalities in the state and Territory. Despite the recognized participation of the Cooperative in the productive capacity and insertion in the market, there are problems that permeate institutional aspects, productive aspects, processing, storage and commercialization.

For a comprehensive analysis of the pepper production chain, a SWOT analysis was performed (Learned et al., 1965). The term SWOT originates in English and is an acronym for strengths (S–strengths) and weaknesses (W–weaknesses), threats (T–threats) and opportunities (O–opportunities), also known as F.O.F.A. which is an acronym of the same words in the Portuguese language, although reordered differently.

With the SWOT matrix elaborated, actions can be outlined within a logical structure that includes components of the productive base and processing in the field, components of logistics in the warehouse and commercialization in the markets to obtain the improvement in the entire productive chain (Figure 2). Thus, to ensure pepper quality control throughout the production process, harvesting, drying, certification and product storage, the cooperative members will receive technical assistance from the Cooperative during production, harvesting and post-harvest.

After drying the production on the farm itself (On Farm Processing Unit), the associates will deliver the production to the warehouse, which will sort it, store it and properly control the stock, forwarding samples to the Quality Control Center, where will undergo physical-

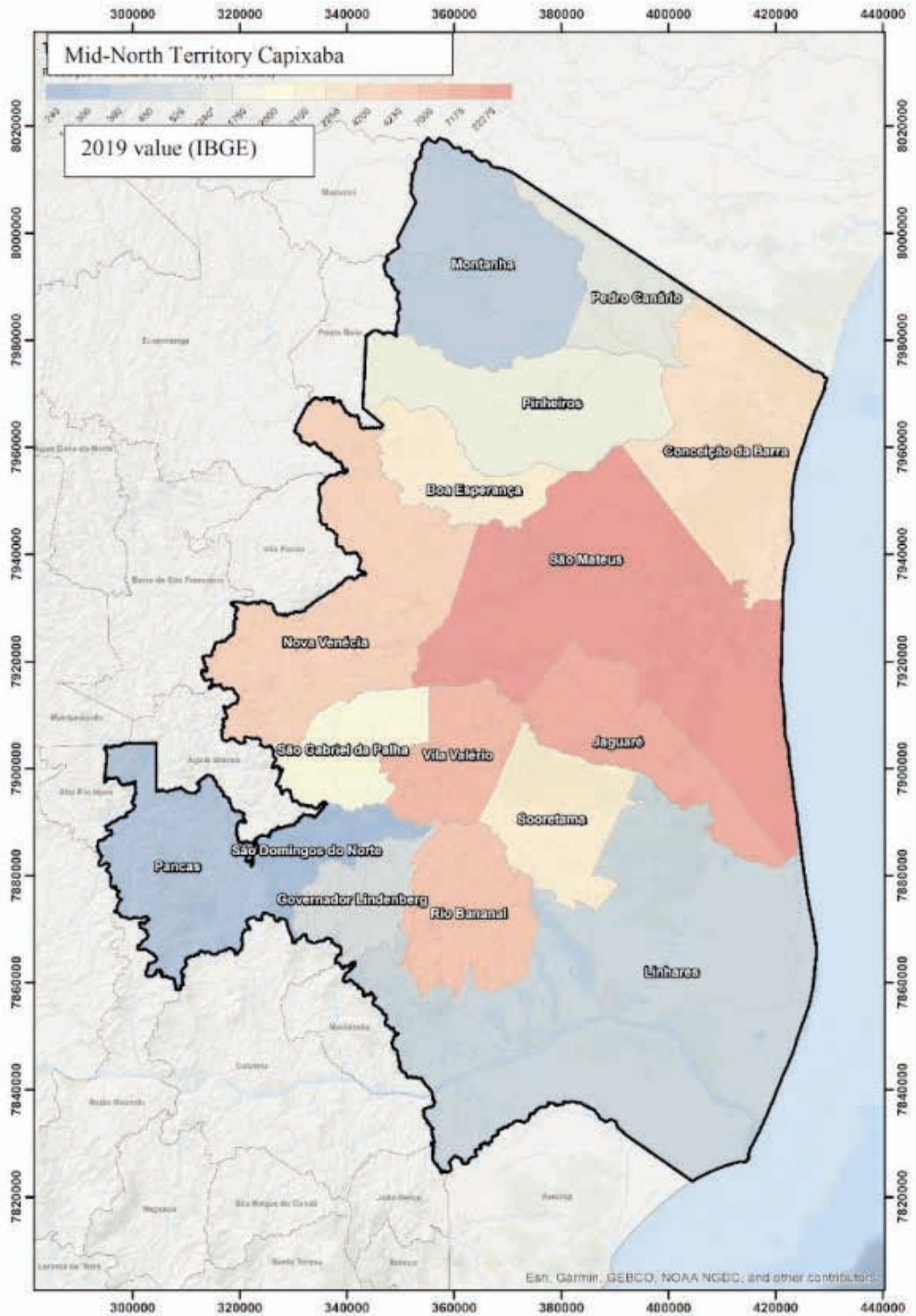


Figure 1 – Municipalities belonging to the Território Meio-Norte Capixaba/ES. Source: Nucleus of AgroNortheast FEST/UFES. Data: IBGE (Brazilian Institute of Geography and Statistics, 2020)

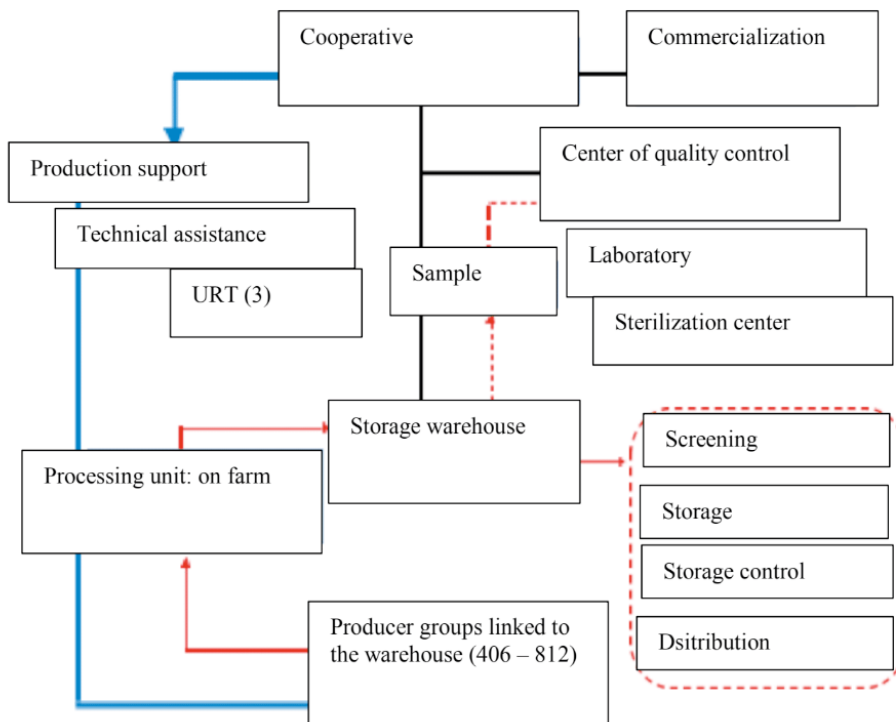


Figure 2 – Scheme of the logical structure of the project.

Source: Nucleus of AgroNortheast FEST/UFES.

Strengths/Opportunities	Weaknesses/Threats
<ul style="list-style-type: none"> <li>-Cooperative present in more than 30 importing countries;</li> <li>- Cooperatives with family-based property and high productivity;</li> <li>-Cooperative makes use of the classification of density of peppers (Asta, B1, B2);</li> <li>- Cooperative with the potential to influence the requirements of good agricultural practices recommended for the cultivation of peppers</li> </ul>	<ul style="list-style-type: none"> <li>- Lack of preventive measures in fertilization and harvesting to avoid contamination by <i>Salmonella spp.</i>;</li> <li>- Hygiene of harvesters and equipment used in harvesting;</li> <li>- Free access for animals in the drying areas;</li> <li>- Packing of dried grains in unsanitized bags;</li> <li>- “Direct” drying process with traces of smoke;</li> <li>- Drying in uncovered yard;</li> <li>- Lack of maintenance in mechanical dryers;</li> <li>- Little personal training and technical training</li> </ul>

Table 1 – Results of the SWOT analysis for the productive diagnosis of peppers in the Mid-North Territory Capixaba/ES.

Source: Prepared by the authors (2022)



chemical and microbiological analyses. Contaminated samples will be sent to the sterilization center before being sold by the Cooperative.

Although the SWOT technique has a relatively simple application, it proved to be effective in the formulation of strategic planning with the identification of strengths, weaknesses, opportunities and threats during the productive diagnosis of the Mid-North Territory Capixaba, ES.

Despite noting, among others, weakness related to the absence of machines that can better meet the demands of processing peppers, the excellent quality products and the potential influencer of the Cooperative in the requirements of good agricultural practices recommended for the cultivation stand out as strengths. of the peppers. The greatest opportunity identified is the possible implementation of new techniques capable of mitigating the effects of contamination by *Salmonella* spp. And improve the drying process, enabling the transformation of threats into opportunities.

## CONCLUSION

This work provides subsidies for the promotion and implementation of a Local Productive Arrangement in the Mid-North Territory Capixaba, developed in a participatory way by multisectoral teams, with effective participation of the various groups involved with the productive chain of peppers. Associations and Cooperatives of family producers with technical assistance for an organized and sustainable production chain make it possible not only to increase the production area, but also to expand the market with a product of higher quality and added value.

## THANKS

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