

## *Black pepper global market: insertion and participation of Brazil in global circuits*

*Mercado global de pimenta-do-reino: inserção e  
participação do Brasil em circuitos globais*

*Mercado global de pimienta negra: inserción y  
participación de Brasil en circuitos globales*

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### **Abstract**

The current period of capitalism is marked by the globalization of commodity flows and the insertion of countries in increasingly globalized circuits. In this sense, the concept of the spatial circuit of production has emphasized the role of fixed and flows in the ordering of the sub-stages of production, making it possible to understand the part of these spaces in the overall production process. This article analyses the spatial circuit of black pepper production in the country and its interrelation with the global market. To do so, we resorted to bibliographic review and statistical data available in IBGE, COMEX STAT, and International Trade Centre databases, which reveal that Brazil is one of the main producers and exporters of this commodity in the world and that its production is concentrated in the states of Espírito Santo and Pará, while the exportation of the grain is commanded by companies located in the states of Pará, Espírito Santo and São Paulo, although the outflow and circulation, interconnecting Brazil to the global scale, is done through the ports of Santos, Belém and Rio de Janeiro, which monopolize 99% of the flow of this product.

**Keywords:** Spatial circuit of production; Agricultural commodities; Black pepper.

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### **Resumo**

O período atual do capitalismo é marcado pela globalização dos fluxos de mercadorias e pela inserção de países em circuitos cada vez mais globalizados. Nesse sentido, o conceito de circuito espacial de produção tem enfatizado o papel dos fixos e dos fluxos no ordenamento das subetapas da produção, possibilitando compreender o papel destes

espaços no processo produtivo geral. Esse artigo analisa o circuito espacial da produção de pimenta-do-reino no Brasil e a inter-relação deste com o mercado global. Para tanto, recorreu-se à revisão bibliográfica e à consulta de dados estatísticos disponíveis em bancos de dados do IBGE, do COMEX STAT e do *International Trade Centre*, os quais revelam que o Brasil é um dos principais produtores e exportadores desta mercadoria no mundo e que sua produção se concentra nos estados do Espírito Santo e do Pará, ao passo que a exportação do grão é comandada por empresas situadas nos estados do Pará, do Espírito Santo e de São Paulo, enquanto o escoamento e a circulação, interligando o Brasil à escala global, são feitos pelos portos de Santos, de Belém e do Rio de Janeiro, que monopolizam 99% do fluxo deste produto.

**Palavras-chave:** Circuito espacial de produção; Mercadorias agrícolas; Pimenta-do-reino.

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### Resumen

El periodo actual del capitalismo está marcado por la mundialización de los flujos de bienes y la inserción de los países en circuitos cada vez más globalizados. En este sentido, el concepto de circuito espacial de producción ha puesto de relieve el papel de los fijos y los flujos en la ordenación de las subetapas de la producción, permitiendo comprender el papel de estos espacios en el proceso productivo global. Este artículo examina el circuito espacial de la producción de pimienta negra en Brasil y su interrelación con el mercado global. Para ello, recurrimos a la revisión bibliográfica y a los datos estadísticos disponibles en las bases de datos de IBGE, de COMEX STAT y de *International Trade Centre*, que revelan que Brasil es uno de los principales productores y exportadores de esta mercadería en el mundo y que su producción se concentra en los estados de Espírito Santo y Pará, mientras la exportación del grano es comandada por empresas localizadas en los estados de Pará, Espírito Santo y São Paulo, aunque la salida y circulación, interconectando Brasil a escala mundial, se realiza a través de los puertos de Santos, Belém y Río de Janeiro, que acaparan el 99% del flujo de este producto.

**Palabras clave:** Circuito espacial de producción; Productos agrícolas; Pimienta negra.

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## Introduction

The growing worldwide demand for specific products and the territorial segmentation of the production-distribution-exchange-consumption relationship has expanded and intensified the flows of goods in space, because, according to Santos (1986) and Arroyo (2008), each place has a particular role in the labor division, that is, the technical-productive capacities to concentrate certain types of activities and to centralize different flows. These territorial divisions of production-distribution-trade-consumption have contributed to these subspaces being inserted in increasingly globalized productive logics.

Therefore, the theory of productive spatial circuits, productive sub-stages through which the product passes until it reaches the final stage of consumption (ARROYO, 2008; CASTILLO & FREDERICO, 2010; DANTAS, 2016; MORAES, 1985; SANTOS, 1986), has been fundamental to the understanding of the spatial dimension of production-distribution-exchange-consumption, insofar as it allows to identify the territorial division of labor, the direction of flows and the successive exchanges that originate from them, which led Milton Santos and María Laura Silveira to consider productive circuits as an

important method for understanding the movement in space, that is, such logic leads geographers to "[...] a dynamic vision, pointing out the way flows permeate the territory" (SANTOS & SILVEIRA, 2020, p. 143).

But, to build this type of analysis, it is necessary to start from the locations (fixed) and interactions (flows) in and between the subspaces, which conform to the very spatial organization of the activity (MORAES, 1985). The objective of this article is to analyze Brazil's insertion in the global productive dynamics, based on the diagnosis of the spatial circuit of black pepper production in the country. The fact that Brazil is among the largest producers and exporters of this commodity, with production concentrated in specific points of the national territory, has become the object of analysis in previous studies, and the method of analysis proposed here represents a refinement of the treatment of the data presented before.

To achieve this objective, we started with a literature review of works that focus on the concept of productive circuits, especially the works of Barrios (1980; 2016), Rofman (1980; 2014), Moraes (1985), Arroyo (2008), Santos (1986; 2014a; 2014b; 2020), Castillo and Frederico (2010), and Dantas (2016). Added to this, information surveys were conducted on official Brazilian websites, such as those of the Brazilian Institute of Geography and Statistics - Municipal Agricultural Production 2020 (Produção Agrícola Municipal 2020) and Agricultural Census 2017 (Censo Agropecuário 2017) -, from which we retained data on the production *stricto sensu* in Brazil, and the Brazilian Chamber of Foreign Trade (COMEX STAT) (2021), with access to information on product imports, dispatch units (URF), destinations (importing countries) and routes (displacement), having, as a reference, the year 2021. Besides, international databases such as the Food and Agriculture Organization of the United Nations (FAOSTAT) and the International Trade Centre (ITC) (Trade Map) were consulted to extract documents about production, exports, and imports of the product at a global level.

Given the fact that black pepper is commercialized in ground, grain, or powder formats, in the present discussion we used the values for black pepper of the Piper genus (grain) (NCM-09041100)<sup>1</sup> because this pattern has larger commercialization volumes in the world market and Brazil. After collection, the data were grouped and tabulated in Excel spreadsheets (version 2013), for the composition of tables and graphs, and the QGIS program (version 3.16.14) was used in the construction of the cartographic products.

The first part of the article includes a theoretical discussion of the concept of the spatial circuit of production; then, it is performed the analysis of the dynamics of the functioning of the spatial circuit of black pepper in the Brazilian territory; and, then, it is discussed the insertion and role of the country in the global market of the commodity.

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<sup>1</sup> Fiscal classification of the goods (consultation code), according to the Mercosur Common Nomenclature (Nomenclatura Comum do Mercosul - NCM), the product categorization system adopted by the countries belonging to the Southern Common Market (Mercado Comum do Sul - MERCOSUL)

## **Productive spatial circuit: theoretical elements to understand the insertion of spaces in global dynamics**

The theme of spatial circuits of production has become, for geographic science, an important category of analysis in economic-productive studies, which is proposed as a geographic investigation that is not purely positivist/quantitative, as occurs in the analysis of production chains in general.

Originally, this concept dates back to the MORVEN project<sup>2</sup>, which was initially limited to analyzing some types of urban industrial activities, taking into account the regional scalar unit of research, focusing on regional accumulation circuits (BARRIOS, 1980; 2016; CASTILLO & FREDERICO, 2010; MORAES, 1985; ROFMAN, 1980; 2014; SANTOS, 1986; SILVA, 2019). This formulation is also attributed to Karl Marx - specifically, his work *Contribution to the Critique of Political Economy*, published in 1859 (CASTILLO & FREDERICO, 2010; MORAES, 1985). From this work, geographers rescue the idea that the production process is composed of stages - production, distribution, exchange, and consumption -, constituting the basis for the understanding of the concept, the materialization of these stages, and the flows that originate from them, that is, the spatiality and circulation of goods (MORAES, 1989), synonymous with the fact that space is a support and a condition of production.

Its central idea is based on the spatial identification of the constitutive sub-stages of a general productive process, starting from production *stricto sensu* and reaching consumers, which would be the economic-productive organization itself of the circuits (SANTOS, 1986; 2014a; 1994; SANTOS & SILVEIRA, 2020). In this category of analysis, the terms spatiality and circulation become fundamental theoretical elements of understanding (MORAES, 1985), giving the basis for the existence of a theory, which seeks to understand the dynamics (functioning), the extent (spatial dimension) and the intensity of flows (exchanges), therefore:

[...] to discuss the spatial circuits of production is to discuss **the spatiality of production-distribution-exchange-consumption as a constant circular movement**. To capture its determining elements is to account for the essence of its movement. (MORAES, 1985, p. 4, our emphasis)<sup>3</sup>

Considered as spatial divisions of labor, by Antônio Carlos Robert de Moraes (1985), it is understood that, in a productive circuit, each fraction of space performs a specific function, typical of the territorial distribution of fixed and circulating capital; not only the regional scale, as the creators of MORVEN did, because the productive circuits present different dynamics of operation when analyzed at different scalar levels (local,

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<sup>2</sup> Methodology of regional diagnosis, developed by Venezuela's Center for Development Studies (Centro de Estudios del Desarrollo - CENDES) in the 1980s.

<sup>3</sup> In the original: “[...] discutir os circuitos espaciais da produção é discutir a **espacialidade da produção-distribuição-troca-consumo como movimento circular constante**. Captar seus elementos determinantes é dar conta da essência de seu movimento.”

micro-regional, mesoregional, state, national and global). Therefore, the theory intends to "[...] clarify conceptual instruments to understand the spatial division of labor at multiple scales" (MORAES, 1985, p. 3), that is, the production process is not necessarily restricted to a single region or a limited number of subspaces, an idea considered insufficient to contemplate the complex spatial organization of current productive processes, thus we are no longer facing regional circuits of accumulation, but spatial circuits of production (SANTOS, 1986).

For Santos (1986), productive spatial circuits are spatialized in their places of realization and in the exchanges to be established between the different subspaces, because the importance of each of these levels in the division of labor of certain socio-spatial and international formations flows directly from the ability to concentrate the greatest number of activities, that is, the flows that originate from them.

The analyses carried out by Santos (1986) and by Moraes (1985) explain the existence of what Mónica Arroyo (2008, our insertion) considered as "[...] concentrated [and] geographically dispersed spatial circuits. That is, the short dimension/extension productive circuits (in the material sense), which are completed in a reduced number of subspaces (spatial concentration of activities), and the geographically extensive and discontinuous productive circuits, for some reason, end up incorporating different fractions of space and generating spatial deconcentration of activities (ARROYO, 2008).

This spatial discontinuity, typical of the capitalist mode of production, at the same time that it pretends a utopian homogenization of space, creates particular forms of production. Here is the central idea of the concept: the geographical deconcentration of production-distribution-exchange-consumption results in successive and increasingly intense exchanges, which is why we understand the subspaces according to their functions in the overall production process: the more globalized the production process becomes, the greater the chances of this circuit being, to use Arroyo's (2008) expression, geographically dispersed, so the greater the tendency for successive and overlapping divisions of labor.

For Castillo & Frederico (2010, p. 464), productive circuits "[...] presuppose the circulation of matter (material flows) in the chaining of geographically separated instances of production, distribution, exchange, and consumption of a given product in a permanent movement [...]" . Dantas (2016) is objective, when stating that what moves the understanding of the concept is the circulation of goods and institutes the circulation of the term to the circuit itself (material dimension) and communication to the circles of cooperation (symbolic dimension), thus circulation and communication would be summarized in mobility, this being the central unit of the theory. The term flow, synonymous with movement and continuity, was incorporated into Geography to explain the displacement of goods, people, and commodities (material flows), as well as information, capital, and orders (immaterial flows) (SANTOS & SILVEIRA, 2020).

In any case, for Santos (1986), the spatial circuits of production:

[...] give us the relative situation of places, that is, the definition, at a given moment, of the respective fraction of space according to the division of labor on the total space of a country. There the relations of social production, which the circuits of branches typify, are conjugated with the relations of production of the past, maintained or rejuvenated by current relations represented by relics or legacies, both in the landscape and in the social structuring itself. (SANTOS, 1986, p. 130)<sup>4</sup>

The division between work that is still to be done and work that has already been done, the presence of fixed and circulating capital, the technical level, the formation of circles of cooperation, and the natural and technical-productive conditions partially reveal the importance, centrality, and hierarchization of spaces in both internal and external divisions of labor. Milton Santos (1986) talks about "[...] the relative situation of places", which, in other words, consists in saying that places can be understood from their positions concerning others that participate in the same production process. Therefore, each place has particular ways of producing, because each one acts according to the availability of resources there and the productive arrangements that are established there.

From studies on spatial productive circuits, it is possible to highlight the specific productive branches (CASTILLO & FREDERICO, 2010) and how they demand labor forces, raw materials, etc., from other regions, to make production *stricto sensu* feasible. Regarding distribution, there is the need for the use of physical structures for the outflow of the final product, until it reaches its main objective, which is consumption, whether the final or the reuse in the formation of a new production process, because a production whose objective is not the consumptive or productive consumption is a waste of time, labor, raw materials, etc., i.e., it has no purpose (MARX, 2008).

By assuming that the production process is a totality that brings together different sub-stages (CASTILLO & FREDERICO, 2010), it is understood that all its operations are subsidized by the spatial dimension, i.e., that have the space as a joint force acting and resulting from the same process, because "[...] we consider space as an instance of society [... ] means that, as an instance, it contains and is contained by the others [...]" (SANTOS, 2014a, p. 12) and, when it comes to an economic-spatial analysis, there is no way to avoid seeing space as part of the economic formation of a society and the local-global productive dynamics, because, as Milton Santos complements, "[...] the economy is in the space, as well as the space is in the economy" (SANTOS, 2014a, p. 12).

Given the above, it is understood that a productive spatial circuit is formed by different flows and that its spatial organization is specified by the institution of the relation production-distribution-exchange-consumption, whose instances, although implicitly attributed to the concept, should be identified to not prevent the understanding of the

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<sup>4</sup> In the original: "[...] nos dão a situação relativa dos lugares, isto é, a definição, num dado momento, da respectiva fração do espaço em função da divisão do trabalho sobre o espaço total de um país. Aí se conjugam as relações de produção social, que os circuitos de ramos tipificam, as relações de produção do passado, mantidas ou rejuvenescidas pelas relações atuais representadas por relíquias ou heranças, tanto na paisagem quanto na própria estruturação social."

dynamics of flows. Since they are the results of divisions of labor, these operation stages tend to suffer alterations, when the geographic scales (local, regional, meso-regional, state, national and global) are reduced and/or expanded, hence the need for studies on productive circuits to take into consideration the place where the sub-stages take place since this reveals the particularities (of the sub-stages), which, at first sight, tend to be covered up by the generality (of the total productive process). This is the reality that this article seeks to reveal by analyzing the insertion of Brazil in the global circuits of commodities such as black pepper.

### **Black pepper production and the dynamics of the spatial circuit in Brazil**

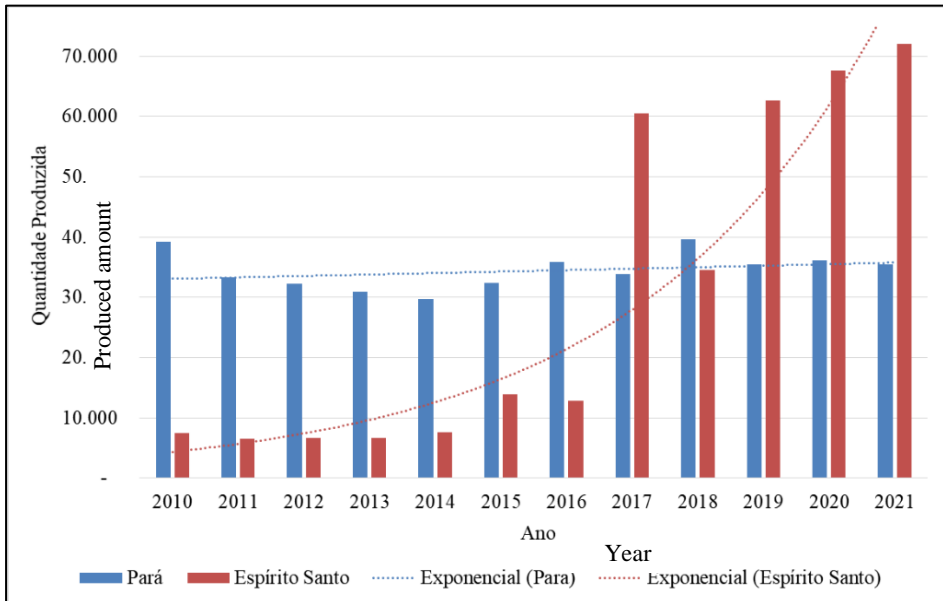
Currently, Brazil has stood out as one of the main producers of grains in the world. In the case of black pepper, the insertion of the country in this market occurred in 1950, when the first exports of the product were registered, from immigrants, pioneers, and protagonists in the cultivation of the plantation areas in the state of Pará, in 1930 (HOMMA, 2016)<sup>5</sup>. Since then, the country has entered the International Division of Labor as a producer and exporter of this grain, supplying approximately 17.5% of world demand (ICT, 2020) and constituting itself as one of the main suppliers of this product globally.

In 2021, the country harvested the equivalent of 118,057 tons of grain, from the 37,994 hectares cultivated throughout the territory. If this indicator persists, it can be stated that the productivity of Brazilian peppers is not conditioned exclusively by the land factor, but accompanies the technical-productive development, through which the Brazilian agricultural sector has been going through. However, the increase in Brazilian production in recent years has occurred, due to the expansion of the black pepper agroecosystem in the Southeast Region, mainly in the state of Espírito Santo, which, since 2017, has been reaching consecutive production records, surpassing even the state of Pará, traditional grower of this grain (Figure 1).

By cross-referencing data on the harvests in the two states, it can be seen that, in the last 11 years, the production in Pará is rectilinear, with few oscillations upwards and/or downwards, not exceeding 40,000 tons, conforming a kind of productive inertia. On the other hand, the production of Espírito Santo is increasing and, starting in 2017, has significant growth, reaching 72,084 tons in 2021 (IBGE, 2021; PAES & CRUZ, 2022).

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<sup>5</sup> The state of Pará was a pioneer in black pepper production in Brazil, with crops brought by Japanese immigrants who lived in Tomé-Açu, since the 1930's, after the settlement of the municipality (HOMMA, 2016).



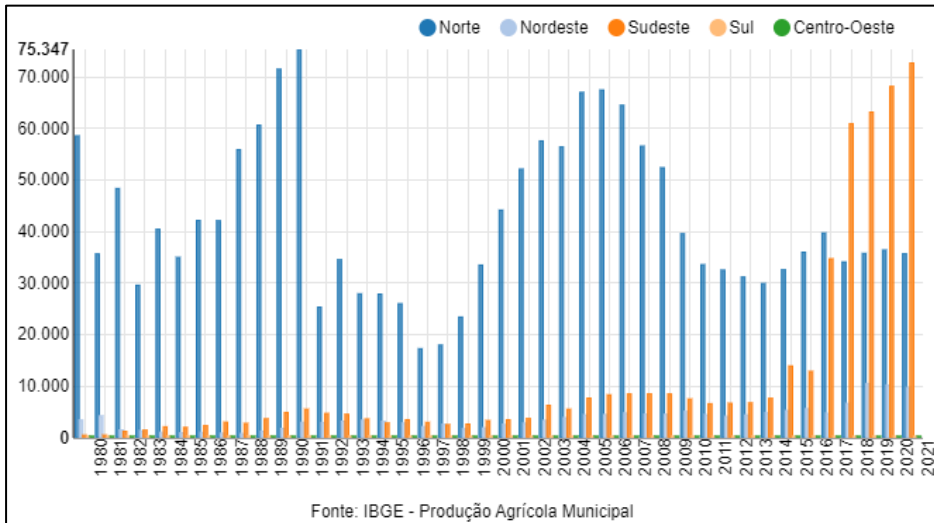
**Figure 1:** Amounts of black pepper produced in the states of Pará and Espírito Santo from 2010 to 2021.

**Source:** organized by the authors (2022), based on IBGE (2021) and Paes & Cruz (2021; 2022).

According to Vidal (2020), the ascension of Espírito Santo as the main production center is due to the loss of competitiveness of the Pará crops, as a result of the constant and recurring diseases, such as fusariosis, which impacts the longevity of chilis and entails their low productivity; the different technical levels of production in these two states; and, mainly, the expansion of the "do/plant" areas in the Espírito Santo state, which went from 6,836 hectares in 2016, to 15,208 ha in 2018, and 17,921 ha in 2021 (IBGE, 2021). Besides, the states have different periods of maturation and harvest of the grains: in Espírito Santo, there are at least two harvests per year, while in Pará there is only one intense harvest period (EMBRAPA, 2004). Such factors mark and accentuate the different levels of productivity of the states in question and are decisive in the current geographical situation of production in Brazil (PAES; CRUZ, 2022).

This new territorial division of pepper production in Brazil evidences the spatial deconcentration of the production process in the country, which, until 2016, was focused in the North Region (Figure 2).





**Figure 2:** Chart of annual black pepper production in Brazil by region, from 1980 to 2021 (in tons).  
**Source:** IBGE (2021).

These changes make the Southeast region the main producer of black pepper in Brazil, currently accounting for 62% of the national crop, followed by the North region, with 30%, and the Northeast region, with 8% (IBGE, 2021). A set of technical-productive and edaphoclimatic factors explains partially the exponential increase in production in Espírito Santo, to the detriment of other regions/states. For Paes & Cruz (2022), there are two distinct geographical situations in the cultivation of these grains in Brazil, which are present in the two largest producing states and give rise to two large flows of grains, which are dispersed in the territory and are "attracted" to places/fixtures, which allow the interconnection between the sub-stages of the production process in the country and in the global market: the reordering of the productive spatial arrangement, which consolidates both states of Espírito Santo and Pará as centers of production and commercialization of grains in the country; and the issue of grain circulation, which is directed to the Southeast region, especially to the Port of Santos, which is responsible for 50.3% of national exports (COMEX STAT, 2021).

The circulation of goods in space depends directly on the spatial distribution of companies and agents involved in production processes and their respective circles of cooperation, the presence of fixed and circulating capital, the technical-informational level, the infrastructure systems, and other elements that the subspaces offer, subsidizing their participation in the overall production process. Therefore, we are facing processes marked by unequal and combined development expressed in the dynamics of production and circulation in space, in which it is possible to observe the differentiation between production and distribution centers, thus formatting the territorial division of labor, as well as the participation of Brazil in the international division of labor.

The geographical (de)concentration of the productive process and the unequal and combined distribution of fixed capitals in the space tension the circulation of production, which is based on the use of different modal systems (road, maritime, air, among others) for its outflow. The groups of physical-natural and built elements (systems of objects), the distance between the areas of production *stricto sensu* and the final consumer, and the destinations of this product explain in part the fact that the transport of the good is done by a certain modal system (maritime, road, air, rail, etc.), the time of displacement of production and the spaces it travels through. This means that the circulation can be direct (continuous, without interruptions) or indirect (discontinuous, with interruptions and/or stops), as is the case of black pepper.

Regarding this, Castillo & Frederico (2010) prefer to call this transport logistics, which refers to the use of different physical structures in the outflow of goods and the establishment of exchanges between spaces. Hence comes the importance of understanding the linkages of the sub-stages of the productive process, because: "[...] the infrastructural dimension of logistics (technical networks and other equipment) deserves special attention, since, through them, the connection between the various separate instances of production is established" (CASTILLO & FREDERICO, 2010, p. 465).

By analyzing the exchanges established in the commercialization of black pepper, it is possible to map the distribution and use of fixed objects in the territory, to explain the concentration and direction of the piper flows in Brazil (internal dynamics) and from Brazil, concerning other countries (external dynamics). For this, it is essential to analyze the places of origin of the product (State of origin of the product), the places, from which the product is dispatched (IRS Dispatch/Shipment Unit), and the destinations of production (importing countries). Based on this information, we can understand the importance of ports in the dynamics of the black pepper production circuit, because it is through these means that approximately 99% of Brazilian black pepper is exported to the main consumer countries (COMEX STAT, 2021) (Table 1).

The participation of these spaces in the productive circuit of black pepper, as "nodes" in the distribution network of the product, results from the concentration of physical structures (ports) used for the product's dispatch. Based on this, Moraes (1985) emphasizes the importance of considering both circulating and fixed capitals in the analysis of productive spatial circuits.

Added to this, it is important to highlight the formation of circles of cooperation in space that agents and exporting companies establish among themselves for the full functioning of this circuit, since the spatial deconcentration of agents and companies also clarifies the functioning dynamics of the spatial circuit of black pepper production in Brazil. In this regard, it was verified that exporting companies are the main ones responsible for executing the commercialization of the grains. Their locations, together with the examination of the presence of export points (ports), provide subsidies to the understanding of the planning and direction of the production of this good in the Brazilian territory.

**Table 1:** Main places, from which the black pepper produced in Brazil was exported in 2021<sup>6</sup>.

Cód.	URF	Valor FOB (US\$)	Quilograma Líquido
817800	PORTO DE SANTOS	117.370.840	38.341.363
217800	ALF - BELÉM	90.472.287	25.462.624
717600	PORTO DO RIO DE JANEIRO	84.934.793	24.057.599
717800	PORTO DE ITAGUAI	5.695.545	1.720.110
727600	PORTO DE VITORIA	3.307.694	1.054.734
927700	PORTO DE SAO FRANCISCO DO SUL	1.458.421	425.022
517800	ALF - SALVADOR	1.432.147	471.634
417902	IRF - PORTO DE SUAPE	384.981	133.001
917500	ALF - FOZ DO IGUAÇU	270.409	64.750
1017701	IRF - CHUÍ	235.070	53.250
1010252	JAGUARAO	156.338	35.000
1017500	ALF - URUGUAIANA	153.395	37.000
817600	AEROPORTO INTERNACIONAL DE SAO PAULO/GUARULHOS	80.527	6.220
1010351	IRF SANTANA DO LIVRAMENTO	51.955	9.000
817700	AEROPORTO INTERNACIONAL DE VIRACOPOS	28.771	3.088
260152	BONFIM	17.196	20.082
317903	IRF SAO LUIS	2.411	506
1017700	PORTO DE RIO GRANDE	1.935	230
917800	PORTO DE PARANAGUA	986	132
812051	SAO SEBASTIAO	296	45
710251	IRF CAMPOS DOS GOYTACAZES	279	46
147600	ALF - CORUMBÁ	190	38
927502	IRF - IMBITUBA	174	21
927800	ITAJAI	167	13
317900	ALF - FORTALEZA	81	8
1017800	ALF - PORTO ALEGRE	79	9
520100	ARACAJU	62	18
210200	SANTAREM	60	1
240151	OIAPOQUE	13	2
430151	CABEDELLO	12	6

Source: organized by the authors (2022), based on COMEX STAT (2021).

Exporting companies buy the product from several regions of Brazil, especially from the Southeast and North regions, to re-commercialize it with global companies, usually located in countries with developed economies. Paes & Cruz (2022) reveal that most of the companies trading this pepper in Brazil are located in the states of Pará (38%), Espírito Santo (17%), São Paulo (15%), and Bahia (10%)<sup>7</sup>, besides Minas Gerais, Alagoas, Paraná, and Pernambuco, which host approximately 6% of the identified companies. Nevertheless, the North, Southeast, and Northeast regions appear again as propitious places for the implantation of these agents, that is, they are close to the "doing/planting" areas, cooperating with the articulation of the product distribution. Regarding the state of São Paulo, its participation in this circuit reveals its privileged position in the country, considering that it does not belong to the group of states with piper plantations, but is located in one of the most developed regions in Brazil, which centralizes different flows and concentrates fixed capitals of much of the Brazilian production.

<sup>6</sup> Available at: <http://comexstat.mdic.gov.br/pt/geral/72222>. Access on: Dec 3, 2022.

<sup>7</sup> Percentage equivalent to the total number of companies identified during the research, which was conducted on the official websites of International Pepper Community (IPC), Exporter's Showcase (Vitrine do Exportador), and B2Brazil, in 2021.

The structure of the black pepper trade gathers different types of agents and companies specialized in black pepper exports in the states of Pará, Espírito Santo, São Paulo, and Bahia, as already mentioned. The companies operating in Brazil are interconnected, on one hand, with small companies and/or intermediate buyers and, on the other hand, with global companies located in different subspaces of the international market, forming large circles of cooperation in the global productive sphere, with the establishment of exchanges of capital, messages, orders, which is configured as a unification strategy of the productive process that is geographically multifragmented (PAES, 2022). In this way, the circles of cooperation are, to use the expression of Moraes (1985), the pillars of the spatial division of the productive process. Thus, a geographically dispersed network of buyers is formed, which "unite" through successive exchanges of capital and raw materials; these exchanges extend throughout the Brazilian territory and go beyond its borders. These exchanges follow a linear scalar dynamic, starting from the local instance and reaching the global one, but with particular arrangements when analyzing the spatial circuit of pepper in the state of Pará, as observed by Paes & Cruz (2022).

When examining the dynamics of this circuit in the municipality of Cametá, and how it is articulated with the other substages of the production process, Paes & Cruz (2022) identified several spatial arrangements, in which production is not necessarily conditioned to follow rigid patterns of distribution and ordering of flows. In the case of Cametá, the circulation of production occurs on the following scales: local (in the municipality of Cametá itself); local-micro-regional (within the microregion of insertion of the municipality - Cametá and Mocajuba); local-mesoregional (between the local and mesoregional areas of production of the state of Pará - Cametá and Castanhal); micro-regional-mesoregional (between the municipalities of the micro-region of Cametá and the mesoregion of the state - Mocajuba-Castanhal); and micro-regional-national (between the municipalities of the micro-region of Cametá and the state of São Paulo - Mocajuba-São Paulo).

These dynamics are explained by the territorial fluidity (opening of roads and highways), which has provided the production areas *stricto sensu* with greater autonomy, regarding the commercialization *per se*; the commercialization system (the performance of intermediate-buyers in the circuit); the outflow of production and the formation of cooperation circles, which are established among different groups of buyers (exporting companies and intermediate-buyers outside the municipality of Cametá; affiliated exporting companies and local buyers-intermediaries; local buyers-intermediaries and buyers-intermediaries outside the municipality; local buyers-intermediaries and buyers-intermediaries located in the city of Cametá itself)<sup>8</sup>; and the producers themselves (PAES, 2022).

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<sup>8</sup> Paes & Cruz (2022), by analyzing the commercialization structure of black pepper in the municipality of Cametá, identify four groups of buyers: group 1 - local buyers-intermediaries (affiliated and informal), fixed in the production areas (rural space); group 2 - buyers-intermediaries, located in the city (urban area of Cametá); group 3 - buyers-intermediaries, located outside the municipality of Cametá; and group 4 - exporting companies.

Studies like this one show that the more the circuits extend over the territory, that is, the more divided the general production process is, the greater the tendency for the exchanges to become more complex and more difficult to be identified and analyzed, and, consequently, the greater the number of agents involved, both in the production process itself and in the commercialization, distribution, and circulation of the goods.

Therefore, each place presents a specific dynamic, resulting from a set of variables of its own and precipitated in the place, as well as particular forms of production, distribution, and commercialization; forms that the capitalist production system does not disarticulate, because capitalism appropriates the old commercialization structures as a mechanism to retain surplus value, which tends to be realized outside the place of production itself.

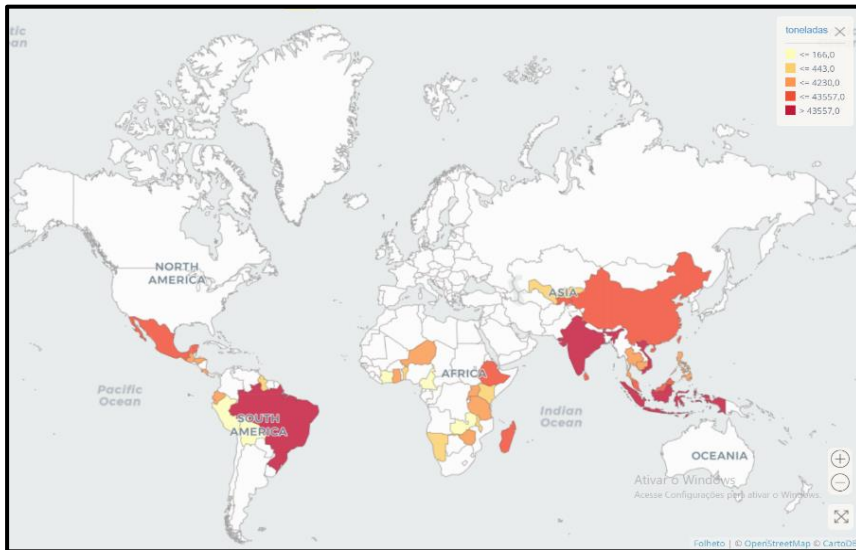
### **Brazilian participation in the global black pepper market**

Brazil's insertion in the global black pepper market has its origins in the production crisis triggered among the main producers of piper, during World War II (HOMMA, 2016), leading to a vertiginous drop in production and an increase in demand for this product in Brazil. The country remains in the market, despite the production and pricing instabilities, considering that black pepper is considered an agricultural commodity and obeys external market logic, which makes it more vulnerable to sudden changes in value.

By analyzing the global black pepper market, one can see that, among the countries that cultivate the Piperaceae, Brazil is the only South American nation to occupy the top position as a producer of the grain, since most of the producing countries are located in the Asian continent. The territorialization of production in specific points of the globe results from a set of variables, which are not limited only to edaphoclimatic conditions (climate and soil), but express an international division of labor, in which countries considered peripheral remain as suppliers of raw materials and countries with developed economies, as the main recipients and re-exporters of products (PAES, 2022) (Figure 3)<sup>9</sup>.

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<sup>9</sup> Available at: <http://www.fao.org/faostat/>. Access on: Jan. 5 2022.



**Figure 3:** Territorial division of black pepper production in the world in 2020.  
**Source:** FAOSTAT (2020).

In 2021, Brazil exported 91,895,552 net kilograms of the spice (17.5% of world exports) to 94 countries, including Germany, the United Arab Emirates, and the United States, the largest importers of Brazilian pepper (COMEX STAT, 2021; ICT, 2021) (Figure 4).



**Figure 4:** Main importers of black pepper produced in Brazil in 2021.  
**Source:** ICT (2021).

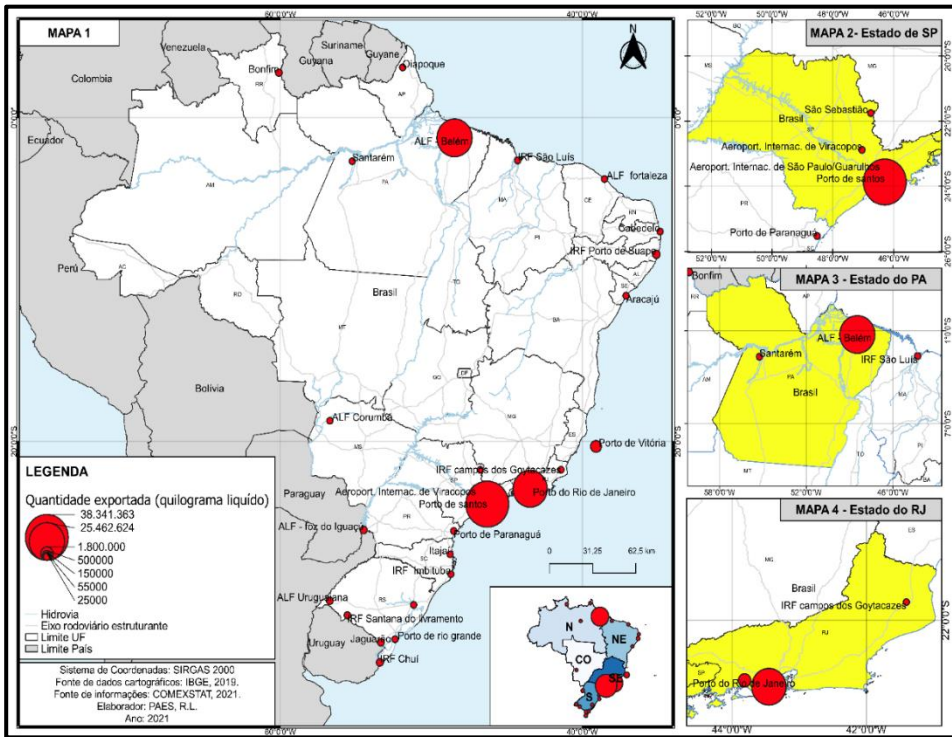
The destinations of Brazilian production reveal that the demand for the product is global. The spatial configuration of the commercialization of this good results directly from the International Division of Labor, that is, producing countries, such as Brazil, are inserted, in the division, as centers of primary production, while countries with developed economies carry out different sub-stages of the production process and re-export to other countries (PAES, 2022) (Figure 4). These are the driving forces of the capitalist mode of production: both territorial and international divisions of labor configure and reveal the specializations of the subspaces in the productive processes in general. Roughly speaking, such logic consists in fractioning the productive process and in deliberating functions to the spaces, and, as divisions are added, exchanges are intensified, extending beyond the socio-spatial formation, increasing the dependence of the spaces of primary production concerning extra-local economies. Hence, the studies of productive spatial circuits emphasize the interlocution between local economies and the global economy.

In today's capitalism, there are world products (cosmopolitan production), world markets, and world flows, and the spatial division of production manifests itself basically as a process of internationalization of capital. Thus, in the globalized space of monopolist capitalism, the optics for apprehending the spatial circuits of production must be discussed on the scale of the international division of labor. The circuit of capital and merchandise is directly or indirectly involved in a world circularity. (MORAES, 1985, p. 11)<sup>10</sup>

The logistics of the Brazilian piper production outflow can be understood from the country's geographical positioning concerning its trading partners, considering where the country exports its products and the infrastructure system used for this purpose. This is why production in a strict sense is directly linked to the distribution of manufacturing, labor, raw materials, and capital, among others (MARX, 2008). In this regard, 99% of Brazilian production is currently exported by sea, while a small part of the grain is exported by road, mainly to countries that border Brazil (such as Uruguay, Paraguay, Chile, Guyana, and Bolivia). The largest port in Latin America, the Port of Santos (in the state of São Paulo), is the main outflow point the production (as already mentioned, about 50.3% of the production is dispatched by this IRS Dispatch/Shipment Unit, followed by the units of Belém (in the state of Pará) and Rio de Janeiro (in the state of the same name) (COMEX STAT, 2021) (Figure 5).

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<sup>10</sup> In the original: “No capitalismo atual existem produtos mundiais (uma produção cosmopolita), mercados mundiais, fluxos mundiais, e que a divisão espacial da produção se manifesta, basicamente, como um processo de internacionalização do capital. Assim, no espaço mundializado do capitalismo monopolista a ótica para se apreender os circuitos espaciais da produção deverá ser discutidas na escala da divisão internacional do trabalho. O circuito do capital e das mercadorias se vê, diretamente ou indiretamente, envolvido numa circularidade mundial.”



**Figure 5:** Main distribution points of black pepper exported by Brazil in 2021.  
**Source:** organized by the authors (2021), based on COMEX STAT (2021).

Thus, São Paulo, Belém, and Rio de Janeiro polarize the circulation of black pepper in Brazil, turning these cities into hubs, or nodes, of the circuit between the national and global scales. The presence of these fixed capitals (physical structures) explains, in part, the fact that these places are the main nodal points in the circulation of products in the Brazilian territory. Added to this, it is necessary to understand the process of formation of circles of cooperation in space, an idea implicitly attributed to the productive circuit concept. Such circles are formed by information flows (and not necessarily of goods, as occurs with productive circuits) (SANTOS; SILVEIRA, 2020). The cooperation circles of the Brazilian black pepper spatial circuit are formed by a network of exporting companies of different sizes, which are dispersed in the national territory. The connection of these companies to global companies, which also have affiliates in specific points of the national territory, explains the "drainage" of production at different scales.

The topology of the spatial circuit of black pepper in Brazil, which originates in rural areas (of cultivation), gathers different subspaces in a single bundle, which contains the source of raw materials used in the production process (inputs/fertilizers), the subspaces of its commercialization (exporting companies), its distribution subspaces



(concentration of fixed capitals) and its reuse and transformation subspaces, for final consumption (importing countries) (PAES, 2022).

Finally, by analyzing the production *stricto sensu* (local scale) and consumption (global scale), it was possible to identify that the black pepper produced in Brazil is drained in local, micro-regional, meso-regional, state, national and global scales, however, this scalar flow is not closed, and there are producers with entrepreneurial profiles or organized in cooperatives, who can commercialize their productions directly with national companies (PAES & CRUZ, 2022). In general, the spatial circuit of black pepper in Brazil has its production concentrated in the states of Espírito Santo and Pará and its main export center (and interconnection of Brazil with the world) in the state of São Paulo. According to Santos (2004), this reality tends to create spatial productivity more favorable to producers located in the Southeast region (in Espírito Santo) and to increase the difficulties of permanence of growers from Pará in the circuit, which points to structural changes in the black pepper culture in Brazil and the profile of its producers.

## Conclusion

Through the study of the productive spatial circuit of black pepper, it was possible to understand Brazil's role as a major producer and exporter of the product in the International Division of Labor, i.e., as a center of global production of the good in question, given the fact that the country supplies a considerable part of the world demand for it. However, in the last four years, Brazil has undergone changes in its spatial organization of production *stricto sensu*, which resulted in productive restructuring. From them, the Southeast region became the main producing and exporting region of this commodity in the country. Until 2016, production was concentrated in the North region, specifically in the state of Pará, but, as of 2017, with the rise of Espírito Santo, the Southeast region took the lead, a direct consequence of what Santos (2004) called spatial productivity, i.e., the subspaces with better geographic arrangements tend to stand out concerning the others.

The circulation of black pepper production in Brazil is centralized in the Southeast region, from where almost the totality of the product is shipped to foreign markets, because this region is technically more developed and presents concentrations of fixed capitals, of engineering systems used in the distribution of the product and of the circles of cooperation between exporting companies with headquarters in the national territory and those dispersed around the globe. As for the logistics of the Brazilian production's outflow, one can see the use of the sea modal system, which reinforces the importance of port terminals in the dynamics of flows, which are "attracted" by the presence of these fixed capitals.

The research demonstrates that the spatial dimension of the productive process of black pepper is substantially dissipated and multifragmented. The new data is the change in the territorial division of labor, with the establishment of the Southeast Region as the main producer, while, in the international division of labor, the country remains a mere raw material supplier. The more globalized a productive process becomes, the more

vulnerable are the subjects that participate in it, since the fact that they have no control over what they produce, nor over the prices of what they manufacture, makes the activity economically risky and, in certain circumstances, unviable for the producers involved in it, especially family producers. For those who make their living from this activity, there is an urgent need to promote productive diversification and create new commercialization circuits.

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