

Food environment and access to fruits and vegetables: “A metropolis into perspective”¹

O ambiente alimentar e o acesso a frutas e hortaliças:
“Uma metrópole em perspectiva”

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Abstract

This study aimed to explore the food environment, according to the access to fruits and vegetables (FV), from the perspective of a great Brazilian metropolis, which is an international reference for public policies on food and nutritional security (SAN). We reviewed the literature and the official website that showed SAN and urban planning policies of Belo Horizonte-MG; we also built maps. In this city, SAN programs serve more than 1 million people a day, including initiatives to encourage food production, protection and promotion of food consumption, subsidized marketing of foods and meals, and food training. We found a concentration of shops selling FV - including those with public subsidies (open air markets and public farmers' markets) - in the richest region of the city, limiting the access of those living in the outskirts of the city. We also found territories with health promotion services (Health Academy Program). However, the increase in public and private farmers' markets, open air markets and supermarkets would be able to promote the access to healthy foods in the disadvantaged territories. These data show that civil society and government representatives must watch public policies, aiming to reduce inequities, and contribute to improve the quality of life and social well-being of the population, in addition to collaborate for sustainable food systems. We suggest that SAN public policies should dialogue with other policies, such as those of health,

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urban planning, social welfare, and agriculture, to promote fairness and intersectorally meet the needs of more vulnerable communities.

Keywords: Food Environment. Food and Nutritional Security. Fruits. Vegetables. Public Policy. Nutrition in Public Health.

Resumo

Este trabalho objetivou explorar o ambiente alimentar de acordo com o acesso a frutas e hortaliças (FH), a partir da perspectiva de uma grande metrópole brasileira, referência internacional para políticas públicas de segurança alimentar e nutricional (SAN). Procedeu-se à revisão da literatura e de site oficial de divulgação das políticas de SAN e de planejamento urbano de Belo Horizonte (MG), além da construção de mapas. Os programas de SAN no município atendem a mais de um milhão de pessoas por dia, incluindo iniciativas de incentivo à produção de alimentos, defesa e promoção do consumo alimentar, comercialização subsidiada de alimentos e refeições, e capacitação em alimentação. Verificou-se no município a concentração de estabelecimentos comerciais de FH, incluindo aqueles com subsídios públicos (feiras-livres e sacolões públicos), na região mais rica da cidade, com acesso limitado na periferia e territórios de serviços de promoção da saúde (Programa Academia da Saúde). Entretanto, o aumento de unidades de sacolões públicos e privados, feiras-livres e supermercados poderia favorecer o acesso a alimentos saudáveis nos territórios mais vulneráveis. Estes dados revelam a importância do monitoramento das políticas públicas, pela sociedade civil e representantes do governo, visando reduzir as iniquidades e contribuir para melhoria da qualidade de vida e o bem-estar social da população, além de colaborar para sistemas alimentares sustentáveis. Sugere-se que políticas públicas de SAN dialoguem com outras políticas, como as de saúde, planejamento urbano, assistência social, agricultura, dentre outras, de forma a promover a equidade e atender intersectoralmente às necessidades de comunidades mais vulneráveis. **Palavras-chave:** Ambiente alimentar; Segurança Alimentar e Nutricional; Frutas; Verduras; Políticas públicas; Nutrição em Saúde Pública.

Introduction

Brazilian urbanization and urban concentration are a recent reality that resulted in several demographic and lifestyle changes (Santos, 2009). The environment where one lives or works can ease or impede distinct aspects, such as the access to food, affecting the quality of one's eating habits (Morland et al., 2002; Diez Roux; Mair, 2010). This is studied in the literature as food environment. A proper and healthy nutrition is only possible from food environments that ensure access to food and support minimum conditions in which people can prosper (WHO, 2008).

The food environment includes different dimensions, but we will explore only the built environment, because it is directly linked to food access. The built environment is the result of an action conducted by different subjects and that somehow encourages healthy or unhealthy behaviors. They include the buildings available in the environment, such as residential and commercial properties, parks, recreational areas, as well as the lighting and public transportation available in the region. Specifically, food shops, restaurants, snack bars, *fast-food* networks are examples of food environments (Morland et al., 2002; Diez Roux; Mair, 2010). It is believed that this built environment can offer opportunities or barriers to adequate and healthy eating habits.

The consumption of fruits and vegetables (FV) is an important marker of a proper and healthy nutrition. Given the power of this food group to promote health, different studies seek to know how the built environment affects the access to FV, mainly because the easy access is possibly associated with the higher consumption of these foods (Robinson et al., 2013).

Inadequate consumption of FV is linked to different and complex factors. Socio-demographic, biological, cultural, economic, and environmental aspects are important determinants in choosing these foods or not. Socioeconomic conditions, income, and access to FV are intrinsically related to their consumption, negatively affecting the food and nutritional security (SAN) of families and the guarantee of the human right to adequate food

(DHAA). Socioeconomically disadvantaged areas are usually inhabited by individuals who consume less FV. This is believed to happen due to less access to healthy food in these areas (they are usually less available and, when available, present low quality and higher prices), as well as to greater exposure to unhealthy food, which are sold in smaller establishments, convenience stores and fast-food networks (Moore; Diez Roux, 2006; Filomena; Scanlin; Morland, 2013; Mook et al., 2016).

The influence of food access on consumption seems to vary according to the type of establishment available in the territory. Supermarkets, farmer's markets, and open-air markets have been singled out as inductors for the consumption of healthy food, such as FV, for presenting greater variety, better quality, and lower cost. Small shops and convenience shops, on the other hand, have products with inferior quality and higher prices, selling mainly ultra-processed products - high in fat, salt, sugar, and chemical additives (Larson; Story; Nelson, 2009; Franco, 2008).

This environmental influence on eating habits reflects the need for actions, guidelines and inter-sectoral public policies that can reverberate in the dynamics of social use of soil, production, distribution, marketing, and healthy food supply. Some examples of such are the stimulus to urban agriculture and the implementation of public and/or private establishments in deprived and low-income areas, to ensure DHAA and SAN. According to the World Health Organization (WHO) actions that promote health equity, such as those that ensure the universal access to healthy foods, should be the top priority and central heart of urban planning and public policies (WHO, 2008).

Given these aspects, this study aimed to explore the food environment, according to access to FV, from the perspective of a great Brazilian metropolis, which is an international reference for public policies on SAN.

Food environment and nutritional security in the metropolis perspective

The National System of Health and Nutritional Security (SISAN) was created in 2006 with the aim

of guaranteeing the DHAA. It enabled Brazil to better organize public policies and actions for the promotion of SAN. A milestone in this process was the implementation of the National Policy on Food and Nutritional Security (PNSAN) in 2010, with a focus on multiple dimensions of several areas of knowledge. Such action allowed the creation of guidelines for elaboration of the first National Plan of Food and Nutritional Security (PLANSAN, 2012/2015), which is already in its second version (PLANSAN, 2016/2019). Among the guidelines of this plan, we highlight the "Supply Promotion and Decentralized Systems Structure, from Agroecological and Sustainable Basis of Production, Extraction, Processing, and Distribution of Food," which aims to promote food supply and to consolidate local and regional circuits of production, supply and consumption to guarantee the regular and permanent access to food, in sufficient quantity, quality, and diversity; considering healthy food practices, and cultural and environmental aspects of the region (Brasil, 2010; 2011; 2016a).

In this manuscript, we will explore the metropolis of Belo Horizonte, capital of the Minas Gerais state. This municipality is found in the southeastern region of Brazil, being the sixth most populous in the Country and the eighth in South America. The population consists of 2.375.151 inhabitants, with a demographic density of 7,167 inhabitants/km² (IBGE, 2013), Municipal Human Development Index (IDHM) of 0.810, and 0.6106 GINI (BRASIL, 2016b).

The municipality was chosen due to its successful SAN public policies, with world visibility (Rocha, 2001; Gopel, 2010). Regarding the rest of the country, SAN policies were implemented in the municipality early in the 90s, which is evidence of its pioneering spirit. In 1993, the creation of the Municipal Secretariat of Supply, now Municipal Deputy Secretariat for Food and Nutritional Security (SMASAN) leveraged the SAN actions, especially those related to food consumption, production, and supply (Rocha, 2001). In addition, the Integrated Metropolitan Policy for SAN, described in the proposal of the Integrated Development Master Plan of Belo Horizonte's Metropolitan Region (PDDI-RMBH), presents interesting aspects

for building healthy environments from sustainable food systems, such as the use of metropolitan soil to food production, with less impact in food distribution and consumption; encouraging the practices of urban agriculture, peri-urban areas and agroecology; and the promotion of population health through proper and healthy nutrition (Belo Horizonte, 2011).

The SAN programs, developed by SMASAN in the municipality, attend more than 1 million people daily (42% of Belo Horizonte's population). They focus on encouraging production; self-sufficiency; school and community gardens; orchards; the defense and promotion of food consumption through feeding workshops, nutritional guidance, and distribution of school lunches; subsidized food marketing; and training in professional schools (Belo Horizonte, 2016). From partnerships between public authorities, private sector and civil society, the municipality has also open-air markets of organic products, which carry out direct selling from producer to consumer. Quality products at regulated prices are offered, contributing to income generation for producers. However, this program is still restricted to noble areas of the city and there are few points of sale, not contributing significantly to improve access to healthy foods.

An important action is the subsidized offer of meals by popular restaurants. They seek to improve the offer of healthy ready meals at affordable prices, especially for families and individuals in nutritional and food insecurity. In Belo Horizonte, this action is managed by SMASAN, which subsidizes a part of prices and handles the logistics in groceries purchasing, manufacturing, and nutritional quality of the meals, offering approximately 14,000 meals/day. Street individuals registered by the Social Assistance Secretariat receive three free meals a day, and to beneficiaries of Bolsa Família program a 50% discount is granted (Braga et al., 2014).

From this successful experience in Belo Horizonte and in other Brazilian municipalities, now the Popular Restaurants Program from the Ministry of Social and Agrarian Development (MDSA) is an integral part of the SAN actions developed by the Federal Government, intending to create a food protection network in areas of great

circulation of people who eat out, by serving the most vulnerable segments of population (Brasil, 2004).

Two other important programs related to food supply are the public open-air markets and farmer's markets. These act in diverse axes of the food system, some in partnership with other institutions. They are market regulatory actions, carried out by the municipality and recognized as essential to promote health food environments.

The open-air markets work on streets and squares in the nine municipality regions, being currently 60 points of sale. In these spaces is commercialized food, which is proven to be hand-crafted, from familiar and industrial farms, such as fruits and vegetables, dairy products, meat, fish, candy, and cookies (Belo Horizonte, 2016).

The municipal farmer's market, named Low-cost Food markets (ABC) and known as ABasteCer, commercialize, on average, 70 items. From these, 20 are fruits and vegetables, sold to the maximum price of R\$1.19 per kilo. These establishments are also distributed through the city and there are, currently, 21 units inspected by SMASAN on price, quality and type of products offered to the population. About 4.4 million people were assisted between January and December 2013. In the same period were commercialized approximately 44.1 million kilos of food in these establishments (Belo Horizonte, 2016).

Such actions and public policies promote access and direct acquisition of healthy food for the population, especially for those in vulnerable situations, and can contribute to reduce the impact of food and nutritional insecurity on families. However, they present limitations that will be further discussed.

Knowing the food environment: private and public equipment

The access to food can be effected by public and/or private network. Regarding private establishments, there are diverse types, such as hypermarkets, supermarkets, wholesales, local markets, farmer's markets, among others. Although of uncommon practice and limited credibility, the private sector can contribute to the public and social well-being. To this end, the participation

of the civil society and empowered consumers is important to the greater social responsibility of the private sector in offering fair prices and superior quality products (WHO, 2008).

In Belo Horizonte's case, the public network presents a differentiated role, especially for presenting a specific City Department to deal with SAN matters. The SAN public policies of the municipality are internationally recognized and numerous awarded. Such policies include a municipal food supply network that covers several actions and equipment, including open-air markets and ABasteCer farmer's markets, as previously mentioned.

A study aimed to audit the food environment of the health services territories under the Basic Attention to Health, named Health Academy Program (PAS), which, according to the Ministry of Health, should contemplate actions of healthy food promotion and SAN. The study showed that, despite the innovative initiatives in the municipality about food distribution, the concentration of FV shops was in the central-southern region of the city - the richest area of the city, with limited access to suburbs and PAS territories (Costa; Oliveira; Lopes, 2015). This raises the question of how is the access to FV shops for populations in more peripheral areas of the city, and whether this is enough to guarantee DHAA and SAN.

In Figure 1 all FV business premises existent in the municipality are presented, including public and private locations. Observing the map, it is possible to verify that the establishments are not randomly distributed, showing a tendency of spatial agglomeration in certain areas and regions, as singled out by other studies held in the municipality (Pessoa, 2013; Costa; Oliveira; Lopes, 2015).

As for the public facilities named open-air markets, from the 64 existent units in the municipality, 35 (54.7%) were in the central and richest area of the city. In contrast to this, the more peripheral regions, such as Barreiro and the North, were attended by only one unit (Figure 2) (Costa; Oliveira; Lopes, 2015).

We found 13 open-air markets when analyzing the 18 Poles of the municipality's PAS territories, and one of them, located in a peripheral region, was not working any longer (Costa; Oliveira; Lopes,

2015). These open-air markets presented unfavorable access characteristics when audited directly in the field, being small, with an average of only four tents (ranging from two to nine), and the offer of only one kind of product, whether fruits, vegetables, meats, fish, or cookies. Furthermore, despite being encouraged by public policies, they traded ultra-processed food, rich in sugar, fat, and salt; which directly compete with healthy food such as the FV (Costa; Oliveira; Lopes, 2015).

Corroborating the importance of this information, Araújo (2016) showed in the PAS territories levels of food insecurity above the national mean. This reinforces the need to implement SAN programs in these territories, aiming to offer food at more accessible prices.

The municipal farmer's markets were also not randomly scattered through the city, but concentrated in central-southern and eastern regions, which are the regions with the highest IDHM in the municipality. The northern region, however, which has the lowest IDHM, have not presented any equipment (Figure 2).

The smaller distribution of open-air markets and farmer's markets in the more peripheral areas of the city, with lower IDHM, demonstrates the importance of social control and monitoring of public policies to reduce inequities and to contribute to the building of healthy territories. It should be noted that positive changes in food can be difficult to achieve and maintain in environments unfavorable to health.

Costa et al. (2015) showed that the increase of commercial establishments, such as farmer's markets, open-air markets, and supermarkets, might favor the access to healthy food in disadvantaged territories. In addition, the implementation of public equipment can contribute to preserve the local cuisine and economy, increase the tax base, attract other trades, reduction of food prices and increase in the community's purchasing power, among other aspects.

Public policies, when well planned, implemented, and, above all, when intersectoral, can positively impact on social determinants, on food environment, and on community life, reducing inequities and promoting health.

Figure 1 – Commercial establishments of fruits and vegetables, Belo Horizonte, Minas Gerais, Brazil

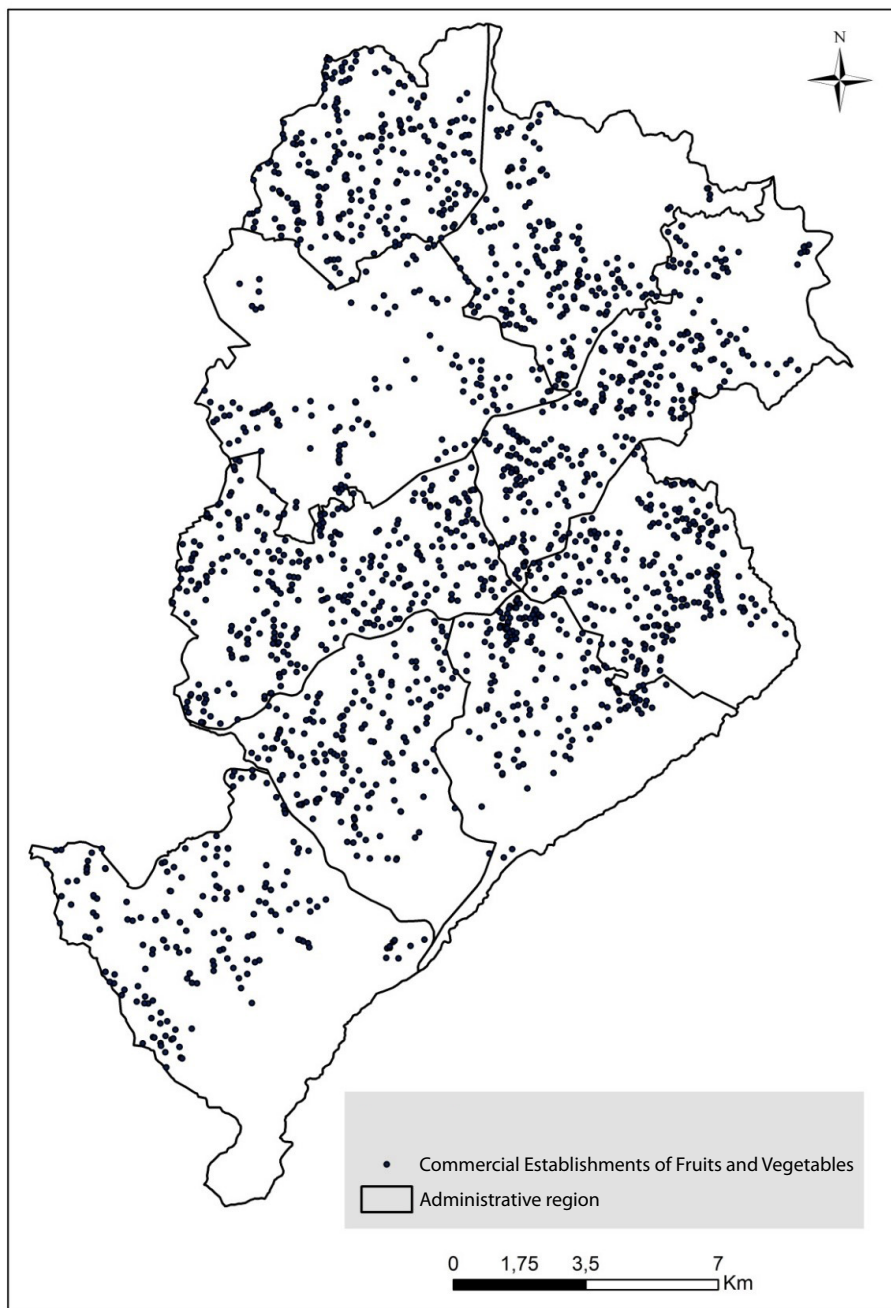
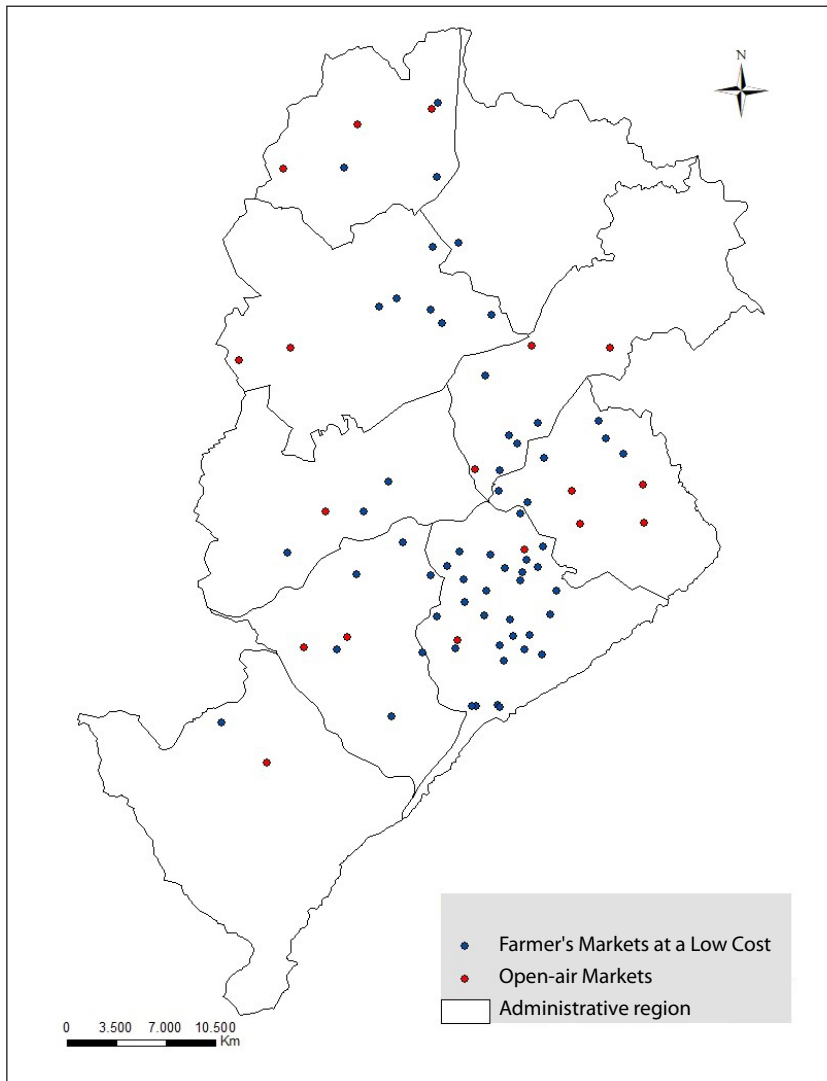


Figure 2 – Municipal Open-air markets and Farmer’s markets distribution, Belo Horizonte, Minas Gerais, Brazil



Final remarks

The distribution of commercial establishments in central areas has been described in other cities, such as São Paulo, for example. However, public policies should, by its own potential and vocation to overcome injustice, be distributed in a fair manner, meeting the need of peripheral and disadvantaged areas.

The violence and the inexpressive number of individuals interested and/or informed of the public calling process to use public facilities of the food supply have been singled out as the main

difficulties for a better distribution of this equipment in the city. Health services and other public equipment, though, are distributed more homogeneously such as the health centers and PAS poles.

Because this is an eminently intersectoral theme, it is suggested that public policies of food marketing or supply are coupled to other policies such as health, urban planning, public security, geography, commerce, agriculture, and education. Several movements have proposed this integration to achieve greater effectiveness in reducing the iniquities.

An interesting path in this sense can associate this food supply equipment to the PAS poles,

which usually have open spaces and visitors' eager to consume health. Besides, the program is in expansion in Brazil. The Ministry of Health transferred resources to the construction of 3,790 poles in more than 2,700 Brazilian municipalities. Until June 2015, 1,244 of this works were completed (Malta; Silva, 2016). These services are located near or inside health centers and rely on local population's support, thus becoming a feasible alternative to overcome violence.

The PAS, for being a health promotion service, recommends the intersectoral approach, the completeness of care, and the popular participation in coping of social determinants and health construction. In addition, it forecast the performance of promotion activities in healthy and proper nutrition and SAN. Its actions aim to develop individual competences, reinforce collective actions, and create favorable environments. Aligned, therefore, with SAN policies in the quest for a food environment that is diverse and healthy (Costa; Oliveira; Lopes, 2015).

In Belo Horizonte, the PAS was implemented in 2006, mainly in vulnerable areas of the city (Health Vulnerability Index = high/very high and medium²) (Dias, 2010). Currently, there are 63 poles distributed through nine regions, with estimate capacity to attend in average 25,000 people (Belo Horizonte, 2016)

To supply this contingent of people with healthy food, such as FV, dairy products, fish, and meat, in the most vulnerable territories, can contribute to overcome the uneven distribution of SAN programs. Besides, it can broaden its spectrum of action, as well as favor the reduction in families' food insecurity.

Henceforth, the encouragement of SAN promotion through the stimulus to healthy and sustainable food systems, such as urban agriculture, peri-urban and agroecology practices, can be an alternative in metropolitan regions. These actions are taken in various places around the world, including Brazil and Belo Horizonte, although it is

still in an inexpressive manner. They forecast the use of available spaces in residences, urban voids, and in public and private areas that are unbuilt and present productive potential. Such areas should be used for agricultural production and creation of small animals, destined for home consumption or for sale in local markets. Such practices follow the City Statute, which defines standards of public character and social interest that regulate the use of urban property to the collective good, and to environmental security and balance.

Another issue raised here and that needs attention is the rupture of the open-air markets culture. In the past, this was a space not only for the purchase of food at lower prices but also of coexistence and prices' bargain. However, the change in buying habits of Belo Horizonte citizens, from open-air markets to large commercial establishments, has hindered the survival of this cultural practice. In addition, the current model of bidding open-air markets makes it difficult to compete in prices and food quality, since each marketer can sell only one product type (e.g., only vegetables or fruits, among others). Nevertheless, open-air markets remain a tradition in diverse cities of the country, including in the interior of Minas Gerais state. This proves that this culture is present and can be recovered. But to achieve that, the participation and social control in the design, planning, and distribution of public equipment are essential. This involvement and empowerment of citizens can contribute to better ways of dissemination and convocation of bidding processes, extending its reach to the population.

The population support in the formation of common interests' networks has been singled out as one of the main levers of successful programs, ensuring its maintenance, regardless of political and administrative changes. Public policies and actions, aiming to a participatory management, are tools to empower its participants in the representation of their rights and needs. Thus, the empowerment and the autonomy of the community

² Health Vulnerability Index (IVS) consists of socioeconomic and environmental variables. It attributes different weights to sanitation items, education, income, and health, aiming to highlight epidemiological inequalities in distinctive groups. The IVS varies from 0 to 1. The closer to 1 the index gets, the greater the vulnerability (BELO HORIZONTE CITY HALL, 2012)

in building healthy and sustainable environments are essential for SAN programs, such as open-air markets and farmer's markets, to meet the less favored regions and the population, thus fulfilling its social function of promoting equity in the metropolis.

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Authors' Contribution

Lopes led the conception, design, and idealization of the study. Menezes contributed in data analysis. All authors contributed in data interpretation and manuscript writing, and approved the definitive version to be published.

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