Determinants of the commercialization of urban agricultural products in Bogotá: A case study of the Mhuysqa indigenous cabildo of Bosa

Determinantes de la comercialización de productos de la agricultura urbana en Bogotá: estudio de caso del cabildo indígena Mhuysqa de Bosa

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ABSTRACT

Since the beginning of the 21st century, the Botanical Garden of Bogotá (Colombia) has been promoting urban agriculture in urban and peri-urban areas. The Mhuysqa (Muisca) indigenous cabildo of Bosa, among other communities, has been practicing this activity for more than a decade. Although their production is mainly for self-consumption, there are some surpluses that are sold. Because the commercialization of urban agriculture products has certain limitations, this research aims to identify and analyze its determinants, taking the Mhuysqa indigenous community as a case study. The data collection methodology is based on documentary research, observation of gardens, surveys of 33 gardeners and interviews with four experts. The analysis is based on descriptive statistics, content analysis and the use of non-formal logic. The results show that urban agriculture in the cabildo is multifunctional, and the surplus for sale is low (< 30%). The determinants of commercialization are: the establishment and fulfillment of objectives and goals; volumes, quality and frequency of supply; knowledge and specialized technical production capacities; quality of presentation and freshness of the product; costs of collection and transport; forms and means of payment; and fixed buyers for market development. A key determinant is the explicit and clear intention of the cabildo, as an organization, to market its surplus products from urban agriculture.

Key words: planning, production, product preparation, transportation, sale.

RESUMEN

Desde inicios del siglo XXI, el Jardín Botánico de Bogotá (Colombia) ha venido promoviendo la agricultura urbana en la ciudad y zonas periurbanas. El cabildo indígena Mhuysqa (Muisca) de Bosa, entre otras comunidades, practica esta actividad desde hace más de una década. Si bien su producción se destina principalmente para autoconsumo, hay unos excedentes que se venden. Debido a que la comercialización de los productos de la agricultura urbana presenta ciertas limitantes, esta investigación se propone identificar y analizar sus determinantes tomando como caso de estudio a la comunidad indígena Mhuysqa. La metodología de recolección de información se fundamenta en la investigación documental, observación de huertas, encuesta a 33 huerteros y entrevista a 4 expertos. El análisis es de estadística descriptiva, análisis de contenido y uso de lógica no formal. Los resultados muestran que la agricultura urbana del cabildo es multifuncional y el excedente para venta es bajo (< 30%). Por su parte, los determinantes de comercialización son: el establecimiento y cumplimiento de objetivos y metas; volúmenes, calidades y frecuencias de oferta; conocimiento y capacidades técnicas especializadas de producción; calidad de presentación y frescura del producto; costos de acopio y transporte; formas y medios de pago; y compradores fijos para desarrollo de mercados. Un determinante clave es la intención explícita y clara del cabildo, como organización, de comercializar sus productos excedentes de la agricultura urbana.

Palabras clave: planeación, producción, alistamiento de producto, transporte, venta.

Introduction

Urban agriculture in Bogotá

Currently, 56% of the world's population lives in urban areas, and by 2050, this figure is expected to reach 70% (Banco Mundial, 2024). At the same time, agricultural land per capita is decreasing drastically; in 1961, there was 0.36 arable ha per person, a figure that fell to 0.18 ha in 2021. In Colombia, the situation is even more worrying, with agricultural land per capita falling from 0.22 to 0.04 ha per person between 1961 and 2021 (Banco Mundial, 2024). This reduction affects sustainable food production and both urban and rural food security. In this context, urban agriculture (UA) emerges as a viable solution to

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grow vegetables, fruits and medicinal plants in small spaces (Centrone Stefani *et al*., 2018; Genovese *et al*., 2018). UA not only seeks to ensure local food security but also contributes to employment generation, environmental education and urban regeneration (Abegunde, 2012; Bojacá & Schrevens, 2010; Leandro, 2013; Orsini *et al*., 2014). Furthermore, by decreasing the number of intermediaries and optimizing the relationship between producers and consumers, it improves social inclusion, involving vulnerable communities (Jansma & Wertheim-Heck, 2021). UA also enhances resilience to climate change and promotes health and well-being through healthy habits and social cohesion, strengthening the local economy through commercial partnerships. However, it faces significant challenges, such as lack of urban planning, population growth, and extreme weather events, which require more effective marketing strategies for success (Abegunde, 2012; Agyeman & McEntee, 2014; Orsini *et al*., 2013; Weidner *et al*., 2019).

Urban agriculture in Bogotá, institutionally, has evolved since its beginnings in 1992 with the creation of the Botanical Garden of Bogotá "José Celestino Mutis", initially focused on ornamental plants in the urban environment. Over time, various policies have been implemented to promote food security and agricultural practices (Acuerdo 39 of 1992; Acuerdo 040 of 1993; Decreto 984 of 1998; Núñez & Cuesta, 2007). In 2004, the plan "Bogotá without indifference" promoted these initiatives, and subsequent development plans (2008-2012, 2012-2016, 2016-2020, and 2020-2024) have reinforced this approach, prioritizing food sovereignty, farmer networks, environmental sustainability, and economic reactivation. Strategies include the implementation of organic gardens and agroecological practices in urban spaces, seeking to mitigate climate change and foster social inclusion (Acuerdo 119 of 2004; Acuerdo 308 of 2008; Acuerdo 489 of 2012; Acuerdo 605 of 2015; Acuerdo 645 of 2016; Acuerdo 761 of 2020).

Urban agriculture in Bogotá is led by the District Secretariat of Environment and the Botanical Garden of Bogotá "José Celestino Mutis", which is responsible for technical advice and research (Horticultora60, 2016). Since 2004, the Botanical Garden has trained more than 60,000 people and supported more than 20,000 vegetable gardens, including community and home gardens. However, despite the institutionalization of this form of agriculture through District Agreement 605 in 2015, the city has seen a decrease of more than 20% in the number of urban and peri-urban farmers. In response, Project 7681 has been approved, which seeks to strengthen agriculture in Bogotá through the creation of planting spaces, orchard parks and agricultural parks, and improve productivity with technical assistance. It also proposes recovering ancestral species, implementing sustainable techniques, associating farmers and establishing agroecological routes, as well as connecting gardeners with peasant markets (Jardín Botánico de Bogotá, 2020).

Problem and research objective

Urban vegetable gardens generate food, medicines, aromatic herbs and condiments for self-consumption, as well as surpluses for commercialization. According to the Botanical Garden of Bogota, these vegetable gardens are classified as home, community, school, and institutional (Lara *et al*., 2022). The sale of surplus products is usually carried out in "peasant markets" and other agri-food markets (Parrado-Barbosa & Molina, 2014), which helps generate jobs and additional income for the families involved, promoting the development of urban agriculture in Bogotá and its social, economic and environmental benefits. However, marketing is a complex process, especially for urban agricultural products (Cattaneo & Lipshitz, 2008). Project 7681 (Strengthening Urban and Peri-Urban Agriculture in Urban Localities of Bogot**á**) has addressed this problem, establishing the goal of designing a promotion and marketing strategy for these products in conjunction with peasant markets. Within the framework of this project, and in order to meet Goal 11, among others, between December 2020 and September 2021, the "Specific cooperation agreement was signed between the Faculty of Agricultural Sciences of the Universidad Nacional de Colombia, Bogotá campus, and the Botanical Garden of Bogotá "José Celestino Mutis", whose objectives, among others, focused on strategies for the promotion and commercialization of urban agriculture products from the Cerros Orientales, Altos de la Estancia Polygon (Ciudad Bolivar), and the Mhuysqa indigenous cabildo (a self-governing authority) of the town of Bosa. This is where the contact with the cabildo originated.

The Mhuysqa indigenous community of Bosa has eight community gardens and 39 home (family) gardens. The production of these 47 gardens is mainly oriented toward self-consumption, although about five family gardens have been commercializing their surpluses. Based on this experience and considering the challenge of improving the commercialization of urban agriculture products, this research aims to identify and analyze the determinants of the commercialization of urban agriculture products, taking the Mhuysqa indigenous community as a case study.

Materials and methods

Geographical location of the study

Bogotá City District has 20 localities, one of which is Bosa. Bosa is the seventh (7th) locality, located in the southwest of Bogotá, with 823,041 inhabitants and an area of 2,466 ha. The indigenous cabildo Mhuysqa is the self-governing authority for Mhuysga community located there (Bogotá, 2024). The urban orchards are distributed throughout Bosa, although three of them lie outside its boundaries (Fig. 1). The locality's geographic characteristics are as follows: average altitude of 2,544 m a.s.l., flat topography with a very low slope, average annual rainfall 594 mm, moderately cold climate, average temperature 15°C, alluvial soils, and colluvial river deposits. The area is bordered to the north and west by the Bogotá and Tunjuelo rivers, respectively (Bogotá, 2024).

Information required

The information required relates to the following subtopics:

- General determinants of urban agriculture;
- Characteristics of urban agriculture in the indigenous cabildo Mhuysqa;
- Determinants of the commercialization of agricultural products;
- Determinants of the commercialization of the products of urban agriculture in the cabildo.

Sources of information

The sources of information are both primary and secondary. The primary sources include the representatives of 33 home gardens (of the 47 in the cabildo). Additionally, input was gathered from four experts in urban agriculture, three from the Botanical Garden of Bogotá and one authority from the Mhuysqa indigenous cabildo. The secondary sources consist of bibliographic documents and reports related to the research topic.

Methods of data collection

Literature review

A systematic search of specialized literature was carried out in the databases of the Universidad Nacional de Colombia and search engines such as Google, Google Scholar, and Semantic Scholar. The search terms included: "agricultura urbana", "urban agriculture", "mercadeo de productos agrarios", "marketing of agricultural products",

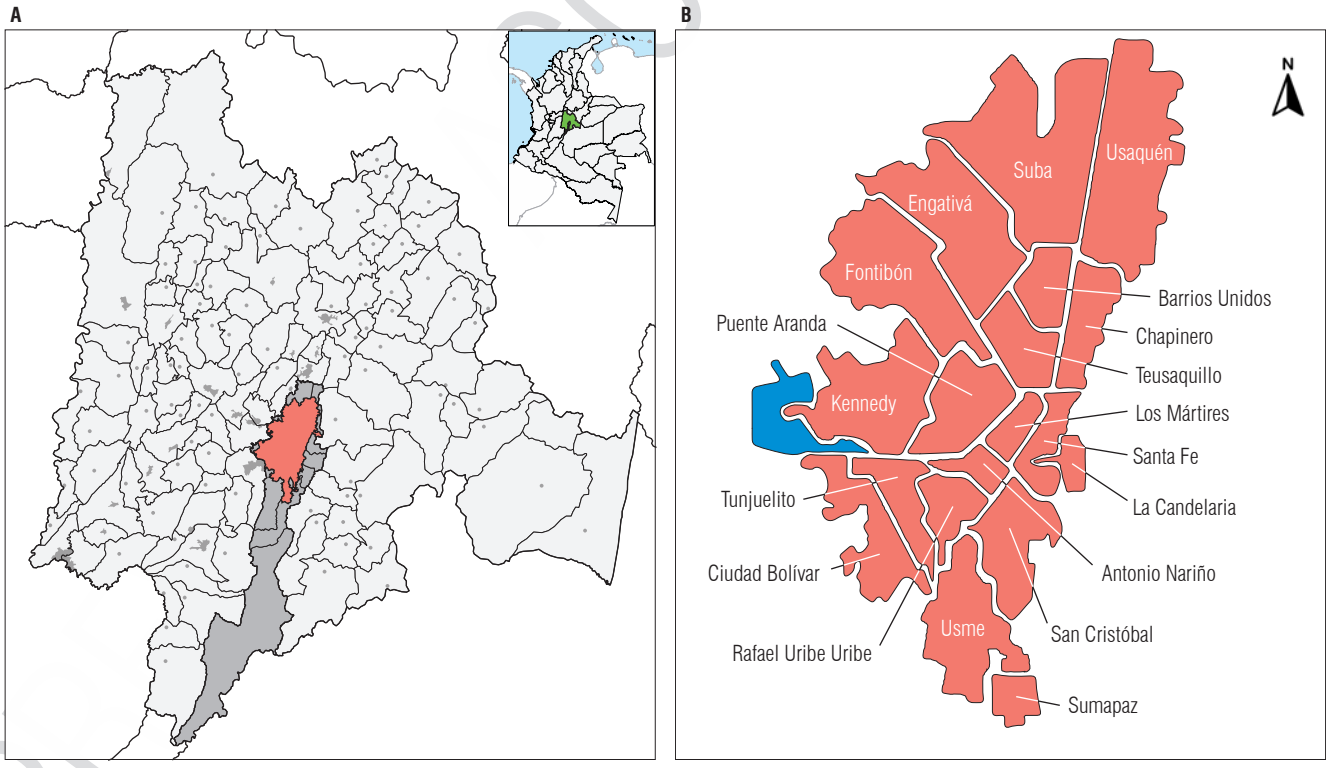

FIGURE 1. Department of Cundinamarca (green) (A), location of Bogota (red) (A), and location of the study area of the Mhuysqa indigenous cabildo of Bosa (blue) (B). Source: Wikipedia, 2024; Bogota, 2024; own elaboration.

"determinantes de mercadeo agropecuario", "determinants of agricultural marketing", "mercadeo y agricultura urbana", "marketing and urban agriculture", and variants of these keywords. In addition, books on the marketing of agricultural products and two (2) reports from the project "Urban and peri-urban agriculture with a differential approach in communities of Bosa, Ciudad Bolivar, and Cerros Orientales de Bogotá" were consulted.

Survey

Within the framework of the project "Urban and peri-urban agriculture with a differential approach in communities of Bosa, Ciudad Bolivar, and Cerros Orientales de Bogotá", 33 surveys were conducted among vegetable gardeners (four from community vegetable gardens and 29 from family vegetable gardens). The sample was selected by convenience from 47 vegetable gardeners participating in the project, including those who showed willingness to take the survey. The survey was conducted between May and August 2021 through a questionnaire that addressed the following topics: information about the vegetable gardeners, information about the vegetable garden, distribution of production, consumption of vegetable garden products, organization of the vegetable gardeners and constraints of urban agriculture.

Observation of vegetable gardens

At the time of conducting the surveys, observations of the vegetable gardens were made to obtain a complete picture of the vegetable garden. This method was used to corroborate and clarify the information provided by the vegetable gardeners.

Interviews

Interviews were conducted on topics similar to those of the survey, with a semi-structured questionnaire, with four experts in urban agriculture, three from the Botanical Garden of Bogotá (financiers of the project) and one authority of the Mhuysqa indigenous cabildo.

Methods of information analysis

The information from specialized documents (academic articles, books, reports) was organized into Tables 1 and 5 to support the topics: General determinants of urban agriculture and Determinants of the commercialization of agricultural products. The results of the surveys were systematized in Tables 2, 3 and 4, and the quantitative information was analyzed using descriptive statistics in Microsoft Excel. The information from the interviews was used to complement the results of the surveys, while the remaining analysis was conducted using logic tools.

Results and discussion

General determinants of urban agriculture

According to Indraprahasta (2013), in many countries, the development of urban agriculture has been institutionally promoted by the state. Cantor (2010) suggests that urban agriculture was primarily intended to provide food and income; however, he also recognizes that urban agriculture serves other purposes. Follmann *et al.* (2021), Kuusaana and Eledi (2015), and Marçal *et al.* (2021) also state that urban agriculture, like conventional agriculture, is multifunctional. Mackay (2018), Moustier and Renting (2015), and Thebo *et al.* (2014) clarify that the growth of the city has been displacing urban agriculture with other activities with higher returns. Finally, Follman *et al.* (2021) argue that the access of urban agriculture products to the market depends on several factors including technical, economic, social and political aspects. The following is a systematization of the most relevant factors of urban agriculture identified by these authors.

For urban agriculture to develop, certain conditions must be met across various areas, such as technical, economic, social, political and even environmental aspects. In general terms, Table 1 shows that the technical scope deals with

TABLE 1. Determinants of urban agriculture.

Scope	Determining factors	Sources
Technical	Size and location of the vegetable garden	Follman *et al.* (2021)
	Knowledge and access to technology	Odame *et al.* (2020)
	Access to and dependence on external inputs	Schmidt *et al.* (2015)
	Technical management of the vegetable gardens	Follman *et al.* (2021)
Economic	Volume and diversity of production	Cantor (2010), Degenhart (2016)
	Level of self-consumption	Cantor (2010), Chica Gómez (2022)
	Marketing channels	Ferrer *et al.* (2020)
	Types of transactions	Ferrer *et al.* (2020)
Social	Social profile of the vegetable gardeners and their families	Follman *et al.* (2021)
	Organization and governance	Cantor (2010), Chica Gomez (2022)
	Social networks	Ferrer *et al.* (2020)
Political	Public policies for social development	Cantor (2010)
	Public policies for urban agriculture	Rodríguez Pava & León Sicard (2018), Conpes (2019)
	Institutional programs for urban agriculture	Rodríguez Pava & León Sicard (2018)
	Development of marketing channels	Indraprahasta (2013)

Source: Authors based on the sources in the Table.

production, the economic scope with the market and the distribution (marketing) of production, the social scope with the vegetable gardeners and their organization, and the political scope with the intervention of the Colombian state in the promotion and development of urban agriculture. These determinants of urban agriculture will serve as a frame of reference for analyzing the determinants of urban agriculture in the case study, especially those related to the commercialization of its products.

Characteristics of urban agriculture in the Mhuysqa indigenous community

The following are the technical, economic, social, environmental and legal characteristics of urban agriculture in the Mhuysqa indigenous cabildo.

Technical aspects

The vegetable gardens stand out for their multifunctionality; beyond producing food and medicines, they serve as spaces for the education of children and young people, environmental care, recreation, and tourism. Another characteristic is the destination of production: urban vegetable gardens primarily produce for self-consumption, although part of the harvest is later dedicated to other purposes such as education, sales, environment, etc. It is worth mentioning that the vegetable gardeners possess accumulated knowledge and experience in agricultural production (Tab. 2).

Economic aspects

There are three relevant economic aspects in this case. First, there is an acceptable capacity for production based on the availability of production factors. Second, there is already a supply, although still small, that is marketable. Third, there are functional markets (peasant markets) and potential markets (La Canasta Program, neighborhood stores, etc.) for the products of urban agriculture in the cabildo (Tab. 3).

Social aspects

The characteristics of the cabildo vegetable gardeners are as follows: they are mostly women, adults, and older adults, mainly engaged in household chores and belonging to a low socioeconomic status. In general, vegetable gardeners have time and dedication to urban agriculture, which they also see as a source of income generation. The profile of vegetable gardeners is expected to change in the medium and long term, which implies a generational change that must be addressed.

TABLE 2. Technical aspects of urban agriculture in the Mhuysqa indigenous cabildo.

Variable	Characteristics
Type of vegetable garden	88% family and 12% community
Ownership of the vegetable garden	91% owned, 3% leased, 3% community property, 3% public
Age of the vegetable garden	18% is older than 30 years, 3% between 21 and 30 years, 9% between 11 and 20 years, 3% between 6 and 10 years, and 67% less than 5 years old
Size of the vegetable garden	70% has 23 m^2 on average, 12% has 85 m^2 on average, 6% has 147 m^2 on average, 6% has 180 m^2 on average, 3% has 250 m^2 on average, and 3% has 450 m^2 on average
Place of production	82% is produced in soil, 52% in pots, 45% in crates, 12% in used tires, and 12% in other (baskets, buckets). 61% of the vegetable gardens have 2 or more production sites
Protection of the vegetable garden	85% is in free exposure, 21% is surrounded by a fence, 6% has poly-shade (community vegetable garden), 3% has a plastic cover (community vegetable garden), and 3% has a greenhouse (community vegetable garden)
Source of water for production	76% is rainwater, 70% comes from the aqueduct, and 39% is harvested water. 70% of the vegetable gardens use 2 or more water sources
Source of plant material	73% is owned and 64% is purchased. 36% have both sources
Function of the vegetable gardens	100% production for self-consumption (food, medicines, ornamental crops), 45% as a means of training for children and youth, 42% production for sale, 36% for production of medicines, 15% for environmental practice, 12% as a point of agrotourism, and 9% as a place for recreation. 76% of them fulfill 2 or more functions
Production	97% edible (leafy vegetables, cold climate fruit trees, and tubers), 91% medicinal, 82% aromatic, 42% ornamental (flowers and succulents). 94% produce 2 or more product groups
Type of farming	It is mainly biological and/or agroecological (94% in nutrition, 52% in pest control, 90% in disease control, and 70% in weed control)
Agronomic knowledge and technical assistance	The cabildo has knowledge and technical production skills and, in addition, eventually receives technical assistance from the Botanical Garden of Bogotá and the Secretariat of Economic Development of Bogotá
Needs to improve the practice of urban agriculture	94% technical assistance, 76% containers, 73% seedlings, 67% tools, 64% biofertilizers, 61% seeds, 33% bio-controllers, 24% labor, 21% land, and 21% marketing

Source: Authors based on survey of 2021.

TABLE 3. Economic aspects of urban agriculture in the Mhuysqa indigenous cabildo.

Variable	Characteristics
Factors of production	Factors of production such as land, labor, inputs, services and capital goods are available to an acceptable extent (quantity and quality)
Supply of urban agriculture products	Less than 30% (low) of production is available for sale or distribution other than to the market gardener
Distribution and commercialization of UA products	73% for self-consumption, 33% for neighbors who belong to the community (barter and sale), 27% for the community vegetable garden (delivery), 24% for neighbors who do not belong to the community (sale), 12% for neighborhood stores, and 12% for the "canasta" program. A low percentage (5 out of 47 families) sell through "peasant markets" and one family has implemented electronic sales
Aspects to improve in marketing	33% increase the quantity of products for sale, 24% increase the frequency of production for sale, 15% aim to improve product presentation, 15% to improve packaging, 15% to increase the selling price to encourage supply, 3% to add value to products, 3% to improve logistics

Source: Authors based on survey of 2021.

TABLE 4. Social aspects of urban agriculture in the Mhuysqa indigenous cabildo.

Variable	Characteristics
Population of the cabildo	The cabildo is made up of 13 clans, 1,080 family groups for a total of 4,300 Indigenous "cabildantes", which include mestizos. According to the 2018 Census, 56% are women and 44% are men
Sex	61% women, 39% men
Age	42% adults over 60 years old, 55% adults between 27 and 59 years old, and 3% youth between 14 and 26 years old
Social class	82% social stratum 2 and 18% social stratum 1
Occupation	61% housework, 15% employed, 12% agriculture, and 12% self-employed
Sources of family income	Mainly construction work, recycling, and handicraft production
Housing	Mostly made of brick and cement, with a few of mud and straw. Most are owned, the rest are rented

Source: Authors based on survey of 2021.

Environmental aspects

The main sources of water for urban agriculture are rainfall and aqueducts, with the latter used as the main source for irrigation due to the limited amount of stored rainwater. The soils in the vegetable gardens are classified as good (Class II) and acceptable (Class III). Regarding pollution, agricultural production generates some waste, such as leaves and plant and crop residues, and polluting materials such as plastics and agglomerates.

Legal aspects

Approximately half of the land where the vegetable gardens are located is owned and the other half is leased. The community gardens are located on district land, operating under a permit.

Determinants of the commercialization of agricultural products

Defining the commercialization of agricultural products

Based on various authors, the marketing of agricultural products is defined as a series of processes and activities that move agricultural goods from the place of production to the place of consumption. The sequence of processes includes planning based on market information (market research), market-driven production, product preparation, transportation and sale (Kohls & Uhl, 2002; Lohosha & Semchuk, 2021; Ramkishen, 2005). This definition serves as a starting point in the section on the determinants of commercialization of urban agriculture products.

Determinants of the marketing of agricultural products: rural and urban

The bibliographic reference sample (Tab. 5) provides an approximate picture of supply and distribution at the level of small rural and urban agricultural producers. Due to their socioeconomic condition, the limitations in production factors are evident, especially in terms of land, water and financing. With regard to distribution, distance to market and access to transportation are the limitations, although for urban agriculture these are less significant. The most striking determinants in both cases are social, *i.e.*, human resources, including age, the number of people in the family unit (available labor), education (related to the ability to continue learning) and agricultural training (knowledge of agricultural production). The authors in Table 5 assume that producers, especially rural producers, have the plan and the intention to market their products; however, this is not always the case in urban agriculture. This fact is crucial for the analysis of the commercialization of urban agriculture products.

TABLE 5. Determinants of the commercialization of urban and rural agricultural products.

Authors	Supply	Commercialization	Other
Nigus *et al.* (2024)	Land	Market information, market access	Age, education, occupation, household size, farming experience
Grebitus (2021)			Confidence, attitude, knowledge, household size, age, sex, income
Ater *et al.* (2021)	Land, irrigation		Age, farming background, associativity, earnings
Tafesse *et al.* (2020)	Size of production unit	Access to transport service	Education, age
Hagos Belay *et al.* (2020)	Quantity of production, size of production unit, quantity destined for sale	Distance to market	Educational level, family size, extensionist visits
Musitini *et al.* (2019)	Quantity of production	Transport availability	Associativity
Melese *et al.* (2018)	Productivity, productive unit size, financial capital, volume of production	Access and distance to market	Age, education, access to extension service
Muricho (2015)	Size of production unit, access to credit, access to cell phone	Access to transportation, transportation costs	
Akinlade & Balogun (2013)	Size of production unit, input costs		Age, associativity, social capital
Tufa *et al.* (2013)	Access to irrigation and land, size of production unit	Distance to market	Education, size of household

Source: Authors based on the sources in the Table.

Determinants of the commercialization of cabildo urban agriculture products

Based on the definition of commercialization of agricultural products, which includes planning, production, product preparation, storage and transportation, sale and market development; and on the information on urban agriculture in the cabildo, the analysis of marketing is proposed in six stages: planning, production, product preparation, storage and transportation, sale and market development.

Planning

Planning is very important for the successful execution of any activity. It does not necessarily have to be formal, but the following elements must be clearly established: an objective, strategies, resources, and time. Although there is an intention to commercialize urban agriculture products in the cabildo, it is not a clearly established and mandatory objective. During the project, five out of 47 families (11%) have been identified with the intention and action to sell their surpluses (Tab. 3). Since there is no established marketing plan, there is no clarity about the organization of the product to be sold or the human resources to carry it out. Commercialization has taken place in peasant markets more on the initiative of some members of the cabildo and the District. In addition, the cabildo does not have a determined financial resource for the commercialization process, evidencing individual rather than organizational initiative.

Production

For this research, the small amount of agricultural production destined for sale is considered a determinant, which in the case of the cabildo is approximately 25% of the total. This production comes mainly from five of the 47 vegetable gardens (11%). The agricultural production of the cabildo at the time of the survey has the necessary production factors (land, water, inputs, and labor). It also has the knowledge and experience for agricultural production, although there is a need for more specialized knowledge for a more efficient and commercial urban agriculture (Tab. 2). Technical advice can eventually be provided by the Bogotá District or the Botanical Garden of Bogotá. Since there is no established supply information, it is necessary to plan production in terms of quantity and frequency of supply according to the target market.

Product preparation

There are two situations in this process: when the producer supplies an intermediary, and when the producer sells directly, for example, at peasant markets. The first case is more complicated for the producer, because the volume, quality and presentation, and the specific time of delivery must be arranged. The cabildo does not have enough experience as a supplier and, therefore, needs some preparation (discipline and commitment) if it decides to take on this role. In the second case, the cabildo does have experience, having already sold its products to neighbors who do not belong to the cabildo and in peasant markets organized by

the District and the Botanical Garden of Bogotá (5 out of 47 families). In this case, the preparation involves smaller volume, quality considerations and flexible presentation.

Collection and transport

During participation in peasant markets organized by the Botanical Garden of Bogotá, the cabildo has been observed requesting assistance with the collection and transportation of their merchandise from the production sites to the point of sale. This indicates that the costs of collection and transportation are not included in the sale price of the products. In the future, the goal is for the cabildo to self-finance the collection and transportation while maintaining the level of profits (profitability) generated by the production and commercialization of UA products.

Sales

Sales were conducted on a cash-on-delivery basis. The most common form of payment was cash, although there was discussion about the use of low-cost mobile deposit applications such as "Daviplata" and "Nequi", but these had not yet been adopted by 2021. Electronic sales are a potential channel that has yet to be explored or exploited. Moreover, due to the small volumes of supply handled by the cabildo, the vegetable gardeners are not currently interested in post-delivery payments (more than two weeks).

Market development

Although potential markets are known (Tab. 3), such as the cabildo itself, the "Canasta" program (subsidized by the district), non-indigenous neighborhoods, neighborhood stores and peasant markets (organized by the district), there are no fixed markets with a clear development objective. Without a production and marketing plan, it becomes difficult to secure fixed buyers. In the commercialization and development of markets, individual efforts again outweigh community efforts.

Conclusions

Urban agriculture in the Mhuysqa indigenous cabildo is multifunctional, mainly oriented to agricultural production for self-consumption and the generation of social services. The surplus of agricultural supply destined for commercialization is relatively low, approximately 25% of the total. From a process perspective, the determinants of the commercialization of urban agricultural products are: strengthening the cooperative work in the cabildo, setting and meeting commercialization objectives and goals (in planning); achieving adequate volumes, quality and frequency of supply, as well as knowledge and specialized technical skills (in production); ensuring the quality of presentation and freshness of the product (in product preparation); managing storage and transportation costs (in storage and transportation); defining forms and means of payment as well as exploring electronic sales (in sales); and securing regular buyers (in market development). Finally, it is important to acknowledge the limitations of the research in terms of the vegetable gardener own vision about the commercialization of urban agriculture products. Likewise, an information gap is identified in the detail (sub-factors) of the determinants of the commercialization of urban agriculture products.

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Conflict of interest statement

The authors declare that there are no conflicts of interests regarding the publication of this article.

Author´s contributions

DCMQ contributed significantly to data collection, systematization and draft writing of the manuscript; JCBF structured the article, provided and systematized information and collaborated in the draft writing and translating the manuscript; CFCM collaborated with the revision and correction of the final version of the manuscript. All authors have read and approved the final version of the manuscript.

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