



Original article

Cultivating communities in Mendoza, Argentina: Exploring social aspects of urban agriculture

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ABSTRACT

Global food production and security are current challenges. This is reflected, among other things, in the fact that more than 690 million people suffer from hunger or food shortages. The availability of nutritious food is critical for disease control and immune function. In this context, urban agriculture is promoted as a way to ensure access to food, which has developed due to rising prices, food shortages and urban growth. However, there is a lack of in-depth knowledge on the impacts as well as barriers to implementation. Therefore, this study investigates vegetable consumption patterns in the metropolitan city of Mendoza in Argentina, as well as interest in vegetable production, opinions on urban agriculture and barriers. Quantitative research methods were used, and a citizen survey was conducted. The data was analysed using SPSS software and correlations were determined using chi-square. The results show strong interest from citizen in urban agriculture, but also barriers such as lack of time and resources. Successful implementation requires initiative, political will, and acceptance. The results are consistent with other studies and could be further explored in longitudinal studies to assess effectiveness. This is helpful given the importance of urban agriculture and vegetable consumption for sustainable food production and supply.

KEY WORDS: citizen survey, food security, urban agriculture, social factors, public policy

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1. Introduction

Goal 11 of the United Nations' Sustainable Development Goals stresses the imperative of establishing inclusive, safe, resilient, and sustainable cities and human settlements (UNITED NATIONS, 2018). This objective has garnered increasing prominence due to pressing issues like urban food security, sustainability, and the need to mitigate the effects of climate change and urbanization (FOLLMANN ET AL., 2021). Contemporary cities heavily rely on resource imports, including food, for daily necessities. This spatial mismatch has adverse implications for the environment, such as greenhouse gas emissions,

social equity, and the detachment from nature (BENIS ET AL., 2018; BURBANO-CRIOLLO ET AL., 2022; CORCELLI ET AL., 2019; GUPTA & MEHTA, 2017; KIRBY ET AL., 2021; RAO ET AL., 2022).

Global food production and security present a multifaceted and pressing challenge, influenced by climate change, socio-economic factors, and health crises. Despite global efforts, the statistics are alarming, 690 million people suffer from hunger (FAO, 2020). In Latin America and the Caribbean over 34.3 million people still grapple with hunger (ZELEDÓN ET AL., 2016). The COVID-19 pandemic has emphasized the importance of accessible, nutritious food, highlighting local food initiatives (APPOLLONI ET AL., 2021;

GOODFELLOW & PRAHALAD, 2022; O'HARA & TOUSSAINT, 2021). The availability of nutritious food is crucial for fighting disease and boosting immunity, while malnutrition and poor diet can lead to health problems such as obesity and diabetes. Against this backdrop, local food initiatives such as Urban Food Hubs are becoming increasingly important. These initiatives pool resources to promote local food businesses and reduce costs, while providing training and employment opportunities and driving green innovation to empower marginalised communities (O'HARA & TOUSSAINT, 2021).

Food security goes beyond the mere availability of food. It means that people have access at all times to sufficient, safe and nutritious food to lead active and healthy lives, at affordable prices. It also requires a food supply that is resilient to shocks and crises and respects the environment in a sustainable manner (EDWARDS-JONES, 2010). These hidden costs of food not only affect health, but also the environment. The challenges facing the food sector are many and complex. Population growth and rising prosperity are increasing demand for food and putting pressure on the supply system. At the same time, climate change, land loss and unsustainable agricultural practices are exacerbating these problems (GODFRAY ET AL., 2010). Promoting healthy diets is a multifaceted endeavour that necessitates the restructuring of agricultural policies and the implementation of nutrition-sensitive interventions (FAO, 2020). Both the FAO and the WHO underscore the importance of a daily intake of a minimum of 400 grams of fruits and vegetables as a fundamental step toward fostering healthier dietary habits (FAO, 2020; WHO, 2020).

In this context, urban agriculture (UA) is becoming increasingly important as it has the potential to address some of these challenges, while having a positive impact on the environment and food security. It is estimated that around 800 million people worldwide are involved in urban agriculture, of which around 60 million are in Latin America. This agricultural situation presents many opportunities and challenges for local government management and collaboration with stakeholders (MATA VARELA ET AL., 2019). However, despite numerous studies, it is very difficult to know the actual extent of urban agriculture (DEGENHART, 2016). Research has only just begun to address important questions about the relationship between agriculture and social dimensions and inequalities, and further research is urgently needed to better understand the long-term impacts of agriculture on society, the economy and the environment. In addition,

the role and actual engagement of civil society should be further explored (TORNAGHI, 2014).

The importance of food to health and well-being in urban areas is undisputed. However, it is critical to give political efficacy to this recognition (MORGAN, 2009). If urban agriculture is to be integrated into urban sustainability policies, it is essential to explore how urban agriculture can be expanded in cities to better understand its potential role in achieving sustainability goals (CONWAY ET AL., 2016).

Therefore, this study aims to investigate the current vegetable consumption patterns of the citizens of Mendoza, measure the interest in growing their own vegetables, gather opinions on urban agriculture and its implementation in the Mendoza region, and identify current obstacles and possible solutions. Given the growing importance of urban agriculture and the role of vegetables in the diet, this study helps to provide insights for sustainable food production and supply in the region. In addition, the results of this study can serve as a valuable model for urban areas worldwide, highlighting the central role of urban planning in integrating urban agriculture into sustainable urban development strategies, ultimately contributing to broader global sustainability goals.

2. Theoretical framework

The concept of urban agriculture is multifaceted and primarily aims to ensure access to food (CANEVA ET AL., 2020; HERRERA, 2018). This practice has become a growing global phenomenon in response to deteriorating conditions for populations, such as rising food prices (HERRERA, 2018), food shortages, urban growth, conflicts and natural disasters (DEGENHART, 2016; SANDOVAL, 2016). Urban agriculture can serve both subsistence and commercial purposes. It takes place in public and private spaces, such as public squares, backyards (DEGENHART, 2016; GRAY ET AL., 2020), rooftops and balconies (ALVINO, 2016). In addition to food self-sufficiency, other objectives often mentioned in the literature include improving urban environmental quality, social equity, and health (TORNAGHI, 2014), and community empowerment and ownership (SANDOVAL, 2016).

The implementation of urban agriculture is influenced by various factors, including agro-ecological conditions, national, regional and local policies, and specific local conditions (DEGENHART, 2016). The socio-economic profile of participants is important, as urban agriculture tends to be more prevalent among economically disadvantaged social groups and during

periods of oppression. In contrast, recreation, leisure and beautification are more important for more affluent social groups (KONTOTHANASIS, 2017). Consequently, gardeners' personal motives influence the extent and nature of urban agriculture. In addition, cultural factors influence urban agriculture through knowledge of techniques, tools, traditions, beliefs and value systems (GRAY ET AL., 2020; SOCORRO CASTRO ET AL., 2017), allowing for the revival of cultural traditions and ethnic identities (Gray et al., 2020), as well as changing values and social patterns (ALVINO, 2016). There are also gender differences arising from cultural reproduction and practices. Commercial urban farmers are predominantly men, while the majority of urban farmers are women (GRAY ET AL., 2020).

The implementation of urban agriculture poses a number of challenges for urban planners. There is a lack of guidelines and standards for good practice. Awareness-raising and education of the public and policy-makers play a crucial role. The perception of urban agriculture depends on how it is conceptualised (SANYÉ-MENGUAL ET AL., 2016). Property rights and the economic viability of production, as well as competition with other forms of development and land use, pose additional challenges for the implementation of urban agriculture (NICHOLLS ET AL., 2020; SAHA & ECKELMAN, 2017). Social acceptance is a key factor for implementation (SPECHT & SANYÉ-MENGUAL, 2017). In particular, technologically advanced systems such as aquaponics, indoor vegetable production, and insect farming have low public acceptance (BUSCAROLI ET AL., 2021). In order to scale up urban agriculture, it is necessary to understand and assess these local challenges and barriers (WEIDNER ET AL., 2019).

Several studies have already explored the motivations and barriers to participation in community gardens (BECKER & VON DER WALL, 2018; LEE & MATARRITA-CASCANTE, 2019), as well as the drivers and barriers to home gardens (CONWAY, 2016; GOODFELLOW & PRAHALAD, 2022; SCHUPP ET AL., 2016) and urban agriculture in Europe and the US (KIRBY ET AL., 2021). The potential and necessary measures to implement urban rooftop agriculture have also been studied (SANYÉ-MENGUAL ET AL., 2016; SPECHT & SANYÉ-MENGUAL, 2017).

The main motivations for allotment gardening are to grow food for personal consumption, to garden as a hobby and to enjoy fresh and high-quality produce. Although cost savings are seen as a less important factor (CONWAY, 2016), participation in community gardens is based on similar motives, including the desire for fresh, healthy food and the

goal of improving physical and mental well-being. Other motives include the enjoyment of being outdoors and the belief that gardening is a leisure activity. Emotional factors also play a role, such as a connection with nature, appreciation of the garden and a sense of relaxation. However, social interaction seems to be less important (LEE & MATARRITA-CASCANTE, 2019).

Both home and community gardens face various barriers to participation. Primary barriers include financial constraints, lack of space and organisational factors, which in turn contribute to secondary barriers. Secondary barriers include issues such as limited access to resources such as land and water, interference from external factors, and communication and interpersonal problems. Barriers to participation resulting from primary and secondary barriers describe frustration and disappointment among gardeners (BECKER & VON DER WALL, 2018). Nine barriers have been identified specifically for home gardens, including lack of time, cost and space (SCHUPP ET AL., 2016), lack of knowledge, housing conditions, soil quality, wildlife and pest problems, mobility issues, lack of support and access, and community-related factors (CONWAY, 2016; GOODFELLOW & PRAHALAD, 2022). These barriers may be perceived or experienced. Knowledge and experience appear to be particularly important for successful production. Land rent is a major barrier, as are physical inputs and the need for materials and resources (GOODFELLOW & PRAHALAD, 2022).

In summary, existing studies on the impacts, motivations and barriers of urban agriculture provide consistent findings, although there are differences depending on the type of urban agriculture. There is a lack of studies on other forms of urban agriculture, such as the use of rooftop gardens and vertical gardens, and on different growing methods, such as hydroponics. There is also a need for a deeper understanding of the interrelationships and influencing factors, taking into account local conditions.

3. Methodology

The methodology of this study was based on a systems perspective that focused on understanding the perspectives of citizens within urban agriculture. This, in turn, allowed for a deeper understanding of the relationships between different factors, opportunities and necessary actions. It was also essential for unravelling the complex interplay of elements and identifying unanticipated consequences.

The inclusion of diverse stakeholder experiences facilitated the identification of areas of support and resistance (FOSTER-FISHMAN ET AL., 2007; HÜGEL & DAVIES, 2020). These processes expand opportunities for citizen participation in decision making and enhance the prospects for collectively supported solutions (HELLRIG ET AL., 2013; NANZ & FRITSCH, 2012).

In the midst of the complex challenges facing society, an imperative shift toward transformative and participatory research is evident. Such an approach not only underscores the responsibility of science to society, but also highlights the importance of fostering collaboration between researchers and communities (SCHNEIDEWIND ET AL., 2016; SCHNEIDEWIND, 2015). Given the increasing complexity of our society, finding effective solutions to complicated problems is challenging. Even when viable solutions are identified, they often encounter resistance from affected groups, making implementation a formidable challenge (HELLRIG ET AL., 2013).

4. Study design

This study used a quantitative research method that aimed to collect numerical data and explain a certain phenomenon (DE VAUS, 2002; SUKAMOLSON, 2007). The study was based on the use of scientific sampling and questionnaires to measure the characteristics of the population with statistical precision (SUKAMOLSON, 2007). Survey research, a type of quantitative research, provides a structured approach to data collection and analysis (DE VAUS, 2002). Surveys are an effective tool for collecting basic or preliminary data on a topic, as well as for exploratory research (WALTER, 2019). This approach was taken because the survey was part of a longer research project on the potential and sustainability of urban agriculture in the Mendoza region and aimed to provide a preliminary insight into the current situation. It was mainly based on semi-open-ended questions, but also included some closed-ended questions.

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The survey instrument consisted of several parts as can be seen in Figure 1:

- Contextual questions: These parts of the survey aimed to collect information on vegetable

consumption, perceptions of agro-farming and environmental awareness.

- Awareness of the concept of urban agriculture: This section explored whether respondents were familiar with the concept and what benefits, preconditions and barriers they associate with it.
- Motivation and interest in urban farming: This section asked about the reasons for participating or not participating in urban agriculture and the interest in participating.
- Socio-economic factors: These questions aimed to collect information on the socio-economic characteristics of the respondents.

The content and structure were based on the results of the literature review.

5. Case study

The study area of this research was the Metropolitan Region of Mendoza (MRM), located in western Argentina at the foot of the Andes. A large part of the population of Mendoza lives in this region, which is characterised by a temperate, Mediterranean and continental climate with arid to semi-arid conditions. The MRM includes urban and agricultural areas created by the intelligent channelling of rivers. It consists mainly of the towns of Guaymallén, Las Heras, Godoy Cruz, Luján de Cuyo and Maipú, located in the northern oasis, as can be seen in Figure 2. About 87.22% of the population of Mendoza lives in the urban area of the MMA, and the total population is about 0.5 million inhabitants (MINISTERIO DE ECONOMÍA Y ENERGÍA, 2022).

Mendoza has a prominent position in agricultural production, especially in vegetable production, which ranks third in the province after wine and fruit production (PEREYRA, 2021). The ProHuerta programme is part of the national public policy to promote urban agriculture and has been in existence for 31 years. The programme, implemented by the National Institute of Agricultural Technology and funded by the Ministry of Social Development, aims to strengthen the food sovereignty and security of people in vulnerable situations. This is achieved through the provision of key resources, mainly vegetable seeds, and technical training (GOBIERNO DE ARGENTINA, 2023).

Data collection and analysis. Data was collected through an online survey using Google Forms. The survey was conducted in two rounds, in January 2023 and April 2023. Respondents were recruited through WhatsApp and email contacts from the research institute and two collaborating municipalities in the

Mendoza region. In addition, snowball sampling was used to reach a wider base of participants.

The survey data were analysed using IBM SPSS-Software (INTERNATIONAL BUSINESS MACHINES CORPORATION (IBM), 2022). The frequency of responses was determined, and correlations were tested using the chi-square and gamma methods. Responses were coded and analysed according to established standards.

The use of quantitative research methods makes it possible to systematically analyse the data collected and draw conclusions about respondents' opinions, attitudes, and behaviours towards the concept of UA. This approach provides a sound and statistically accurate investigation of the research topic and contributes to the achievement of the research objectives.

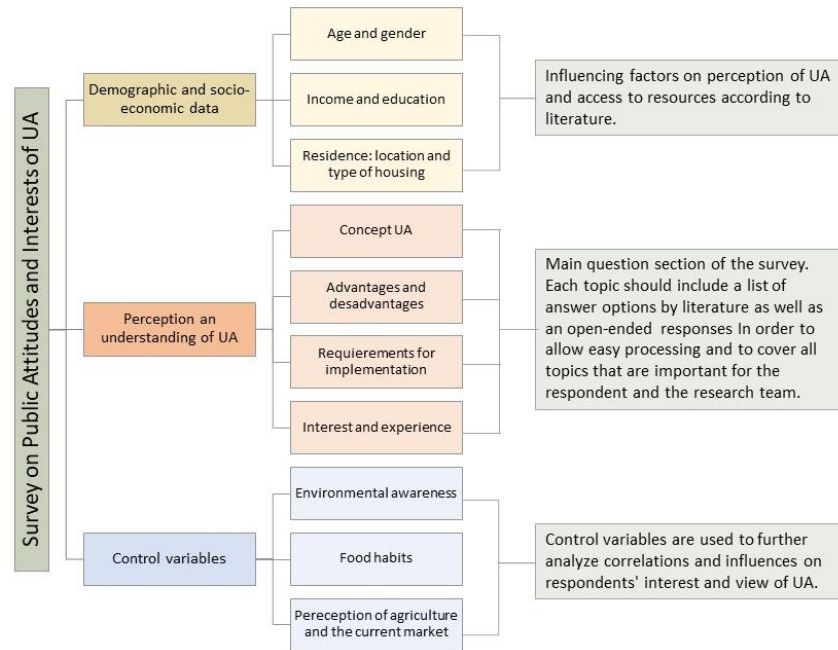


Fig. 1. Themes and variables of the survey (Source: own graphic)

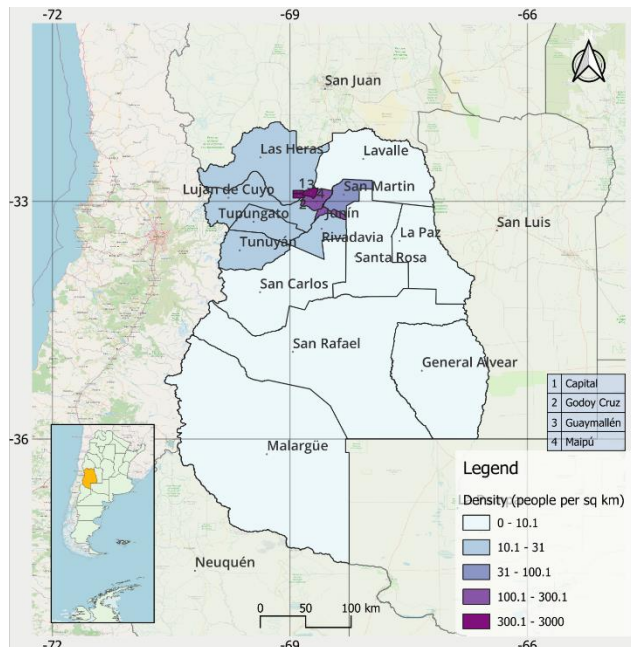


Fig. 2. Mendoza Province demographic distribution (Source: own graphic based on Data of density from National Census of Population, Households and Dwellings 2022, Instituto Nacional de Estadística y Censos (INDEC), 2023)

Representativeness and selectivity. In quantitative surveys, the question of representativeness plays a crucial role (BUTTLER & CHRISTIAN, 2000). Representative surveys are desirable because they allow the results to be generalised to the target population as a whole. This means that the results are applicable not only to the respondents themselves, but to a wider population. Representative surveys are usually conducted using simple random sampling, where each person in the population has an equal chance of being included in the sample (JACOBSEN & RICHTER, 2019). This ensures an equal and random selection of participants.

However, it is important to note that not all surveys are necessarily representative, especially when it comes to specific questions. In some cases, such as exploratory surveys to gather information on unknown topics, representativeness may be less important. In such cases, the aim may be to obtain selected information about groups or sub-groups that does not satisfy all information needs, but does improve knowledge (BUTTLER & CHRISTIAN, 2000). This is called selectivity.

In this survey on Our Agriculture, the aim was to capture a wide range of opinions and attitudes towards the concept. Although a representative sample would be ideal, the survey was conducted through WhatsApp contacts, email contacts and snowball sampling. It should therefore be noted that the sample does not represent the target population in all respects and may therefore have some bias. Nevertheless, statistical analyses were carried out in order to identify trends and patterns in the data and to obtain information that would contribute to the study of the research topic. The results should therefore be interpreted in the light of the composition and representativeness of the sample.

6. Results

A total of 291 respondents completed the survey, although questions 16 and 17 were added in a second round and only 78 respondents completed them.

Demographic distribution. The gender distribution of the participants shows that 68.7% are female and 29.2% are male, the rest is divided into "other" or "I do not want to answer". The age distribution of the participants shows that more than half (57.4%) are between 25 and 44 years old. More than half (51.5%) say they have a bachelor's degree or technical diploma, while 37.5% have a master's degree or doctorate. Only 10% have a school leaving certificate as their highest educational qualification and only 1% have no qualifications at all. This distribution indicates a relatively high level of educational attainment in the sample. Regarding their place of residence, 86%

of the respondents indicated that they live in an urban area, while 14.1% described their place of residence as close to the city. No respondent reported living in a rural area. These results are important as the survey focuses on the concept of urban agriculture. In terms of living conditions, 70% of respondents reported having their own vegetable garden. About 20% do not have access to a garden or terrace. The rest are divided between communal gardens (5.1%), terraces (2.6%) or access to a roof (1.3%).

6.1. Vegetable consumption and conventional farming

Figure 3 shows daily vegetable consumption by age. The survey shows that the majority of respondents (41.2%) consume two portions of vegetables per day. Less than 5% of respondents consume five or more portions per day. In terms of preferences, some vegetables are never consumed by respondents, such as radishes (129), cucumbers (105), beetroot (52), broccoli (48) and cabbage (46). Tomatoes (212), carrots (193), onions (169), lettuce (166) and courgettes (134) are the most consumed vegetables (see Fig. 4). A significant number of respondents also associate these foods with large monocultures (33.9%) and environmental problems (31.5%). Smaller proportions of respondents associate them with ancestral traditions (27.8%) and feed production (10%). It should be noted that some respondents associate conventional agriculture with the lack of new technologies (4 respondents).

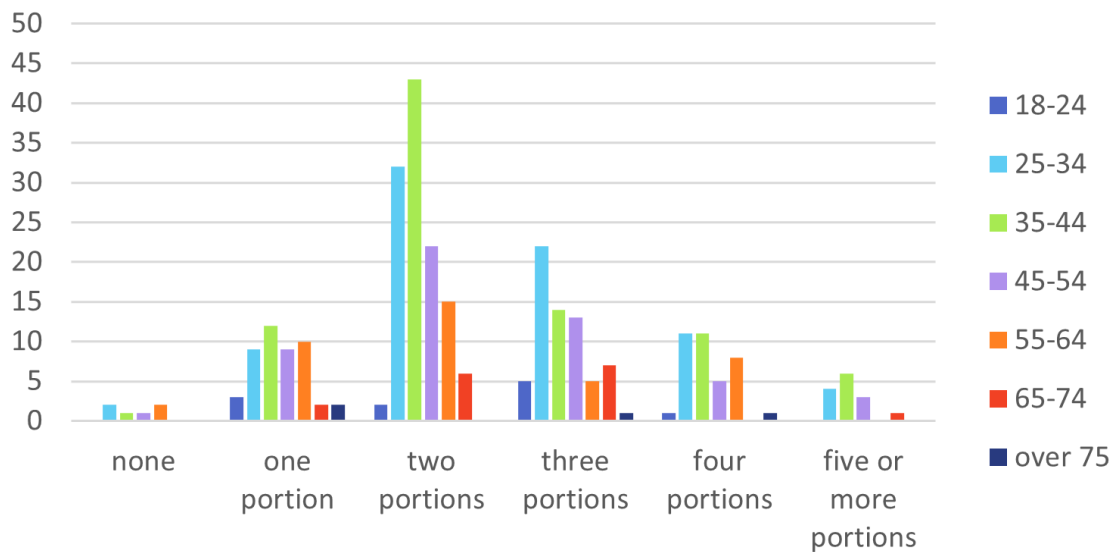


Fig. 3. Daily vegetable consumption by age (Source: own graphic)

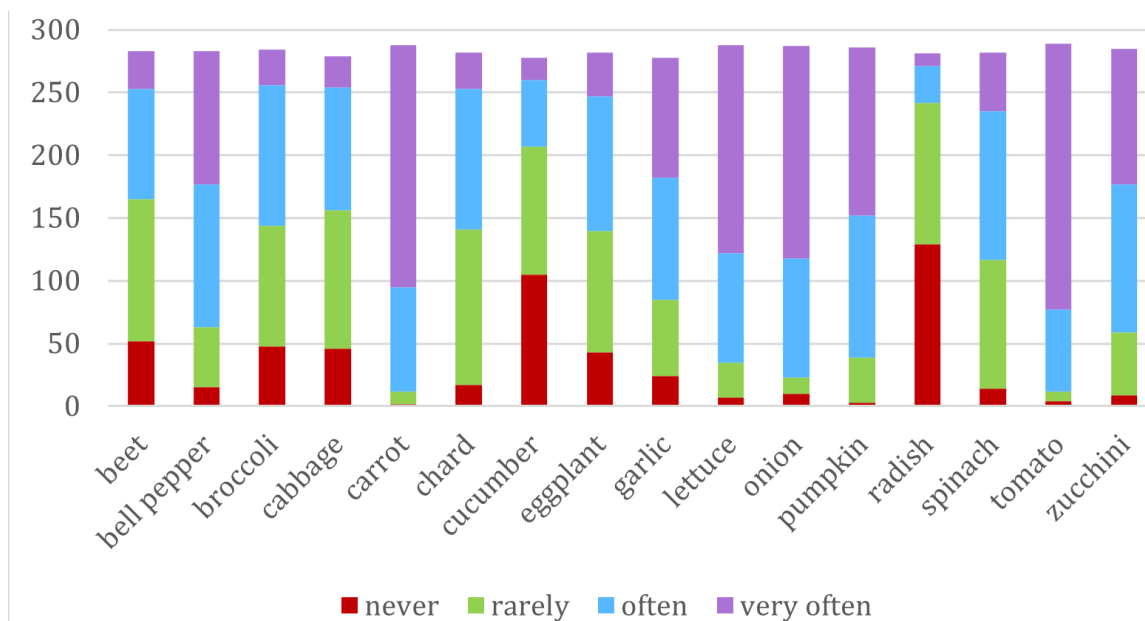


Fig. 4. Absolute vegetable consumption (Source: own graphic)

6.2. Urban agriculture and interest

The majority of respondents (60.1%) are familiar with the term urban agriculture, while 17.9% say they are not familiar with it and 22% are not sure. The most common associations with urban agriculture are rational use of urban space (80.8%), followed by community projects (67%) and local production (62.5%). Amateur gardeners (32.3%) and professional alternatives (26.1%) are also mentioned, while technology and artificial production (2.7%) are less commonly associated with urban agriculture. Self-sufficiency, sustainable production models, food education, closeness to nature, valuing food self-sufficiency and food waste are mentioned as associations with urban agriculture in open-ended responses. More than half of the respondents (58.1%) claim to have experience with urban agriculture. Only one person (0.3%) stated that they do not consume products from urban agriculture, while 36.1% already consume products from urban agriculture. Less than 5% of respondents (3.8%) were not interested in growing their own vegetables. 24.7% already grow vegetables. The main barrier for those not growing vegetables is lack of time and resources (23.7%), followed by lack of knowledge (22.6%). A significant proportion (21.3%) would

like to get involved in community projects, while 2.8% say they do not have space to grow vegetables.

Advantages, disadvantages and shortcomings. Table 1 shows the percentage of positive responses to questions about the benefits, negative aspects, and gaps in the implementation of UA in Mendoza. Less than 1% of respondents see no benefits in UA. More than 70% of the respondents recognise all four dimensions of benefits, namely social (82.5%), structural (82.5%), environmental (75.6%) and economic (73.2%). In addition, individual benefits, nutritional education and closeness to nature as well as improved food self-sufficiency were mentioned as additional benefits. A smaller percentage (8.7%) of respondents said they saw no negative aspects of urban agriculture, less than the positive aspects. The most common negative responses were related to lack of quality control (44.1%) and high time commitment (42.5%). Other negative aspects were high costs (20.5%), air and soil pollution (8.3%), financing and long-term sustainability, poor resource management, insufficient maintenance, low production, and waste production. The majority of respondents said that there was a lack of technical knowledge (65.5%) to implement urban agriculture. Other factors mentioned were initiatives (63.2%), community acceptance (60.5%), political will and support (58.8%) and space (38.1%).

Table 1. Benefits, disadvantages and shortcomings for the implementation of UA in Mendoza (Source: own table)

Missing aspects for implementation (%)		Disadvantages (%)		Advantages (%)	
Technical knowledge	65,6	Lack of quality control	44,1	Social	82,5
Initiatives	63,2	Time consumption	42,5	Structural	77,7
Acceptance	60,5	High costs	20,5	Environmental	75,6
Political will and support	58,8	None	8,7	Economic	73,2
Space	38,1	Contamination	8,3	None	0,7
Market restructuring	24,7				

Correlations. There was a moderately strong correlation (chi-square <0.001, phi 0.505) between consumption of urban agriculture products and interest in growing vegetables. Those who do not consume such products tend to lack interest, while consumers are more inclined to grow their own. Similarly, there was a moderately strong positive correlation (chi-square <0.01, phi 0.375) between negative aspects of organic farming and its consumption.

A very weak positive correlation (Chi-square <0.01, Gamma 0.154) was observed between positive and negative aspects of urban agriculture, suggesting that those who emphasise positive aspects tend to mention fewer negative aspects. A relatively weak positive correlation (chi-square = 0.02, gamma 0.283) linked opinions on conventional agriculture with positive aspects of urban agriculture.

In terms of demographic correlations, gender and level of education didn't correlate with other questions. Age was moderately correlated (chi-square <0.01, phi 0.465) with the lack of conditions for urban agriculture. Housing type was correlated (chi-square <0.047, phi 0.587) with interest in growing vegetables. Those with land and space were more inclined to grow. There was a rather weak positive correlation (chi-square <0.01, phi 0.259) between negative aspects of urban agriculture and the answer 'large time commitment' and interest in growing vegetables, especially among respondents who mentioned subsistence farming as time-consuming.

7. Discussion

The results of this survey provided an important insight into the interest in urban agriculture in Mendoza and allowed us to put the perceived barriers, knowledge levels and attitudes of the participants into a broader context. In terms of interest in UA, it is clear that there is room for improvement in the dietary habits of Mendozans.

Vegetables play an important role in a balanced diet and provide important nutrients (FRANKOWSKA ET AL., 2019). However, the national Ministry of Health recommendation to consume five servings of fruit and vegetables a day (MINISTERIO DE SALUD DE LA NACIÓN, 2020) is met by only 5% of respondents, while more than half consume less than two servings, less than half the recommended amount. These results are consistent with national surveys such as the National Household Expenditure Survey (ENGHo) 2012, which shows that only 32.5% of the recommended amount of fruit and vegetables are consumed (INDEC, 2014). These numbers highlight the need for more education on healthy eating and vegetable consumption, as neither national recommendations nor WHO international recommendations on a healthy diet are being followed (WHO, 2020).

The survey results also showed that certain vegetables are more popular in respondents' diets than others, with tomatoes, onions, lettuce and carrots standing out. These preferences mirror the results of national surveys, which also identified tomatoes, onions, lettuce and carrots as the most commonly consumed vegetables (INDEC, 2014). This highlights the preferences for specific vegetables in the region.

Another important finding concerns respondents' knowledge of conventional agriculture. Although a third of respondents are aware of environmental issues related to conventional agriculture, this knowledge is mainly related to food production. This suggests that knowledge of environmental issues related to agricultural practices could be improved.

In terms of interest in urban agriculture, the survey showed that the majority of respondents are already familiar with the concept of urban agriculture. This indicated a certain level of interest and knowledge about the topic in Mendoza. In addition, more than half of the respondents have already had experience with urban agriculture, suggesting that urban agriculture

is already being practiced in the region and that people are motivated to engage in it. It is particularly encouraging that a significant proportion of respondents indicated that they do not currently consume UA products but would consider doing so. This suggests that the consumption of UA products can be increased by improving supply and education about UA. The survey also showed that the majority of respondents recognised the benefits of UA, including social, structural, environmental and economic benefits. This indicates a general interest and positive attitude towards UA, although some negative aspects such as lack of quality control and high time commitment are also perceived.

The main barrier for those who do not grow their own vegetables is lack of time and resources. This shows that lack of time and scarcity of resources are perceived as crucial factors preventing people from actively participating in urban farming. A significant proportion of respondents show an interest in participating in community projects, suggesting that participation in community initiatives is seen as a way of overcoming the barriers to individual farming.

The correlations found between the consumption of organic products and the interest in growing their own vegetables, and between the negative aspects of organic and the consumption of organic products are highly significant. They show that people who already consume organic products, or are considering doing so, are more willing to grow vegetables and perceive fewer negative aspects. They also show that knowledge of organic farming is positively correlated with interest in consuming organic products and growing one's own vegetables, suggesting that education and awareness-raising could contribute to greater interest in organic farming. It is also interesting to note the correlation between a person's place of residence and their access to healthy and local food.

The high average level of education of the participants is striking, which may be due to the distribution methodology of the survey. It is possible that interest in urban agriculture is greater among people with higher levels of education. This should be investigated further, as most urban agriculture initiatives in the Latin American region target people with lower socioeconomic status (SANDOVAL, 2016; SOCORRO CASTRO ET AL., 2017), while studies in the global North tend to describe the multifunctionality and diversity of urban agriculture and its practitioners (GRAY ET AL., 2020). The ProHuerta initiative, known both in Mendoza and in the rest of Argentina for disseminating information and resources on how to

grow one's own garden, takes essentially the same approach (GOBIERNO DE ARGENTINA, 2023). The uneven gender distribution is also striking. This may indicate that women are more interested in the topic.

In summary, the results suggest that there is some interest in urban agriculture in Mendoza, but also there are perceived barriers such as lack of time and scarcity of resources. To increase interest and participation in agriculture, educational programmes, community projects and better availability of agricultural products could be important steps.

Influences on interest and implementation. In other studies, the majority of respondents were also female (GOODFELLOW & PRAHALAD, 2022). In many parts of the world, women make up the majority of urban farmers, while men dominate commercial urban agriculture. Studies have shown that urban agriculture has provided special economic, social and political opportunities for women in many ways (GRAY ET AL., 2020). Other studies of urban agriculture in different local contexts have identified similar barriers, highlighting in particular a lack of time, space and knowledge (BECKER & VON DER WALL, 2018; GOODFELLOW & PRAHALAD, 2022; SCHUPP ET AL., 2016). The literature has already shown that spatial inequalities, as well as housing conditions such as home ownership and available space, influence participation in gardening activities (SCHUPP ET AL., 2016; GOODFELLOW & PRAHALAD, 2022).

Figure 5 shows the correlations between different socio-economic factors and other aspects that may influence interest in and attitudes towards UA. A coloured delineation shows which correlations have been identified in the literature, which have been identified in the survey, and the extent to which the survey results are consistent with the literature. The survey showed that there is a positive correlation between consumption of UA products, experience of UA, interest in growing one's own vegetables and opinion of UA. Both the survey and the literature confirm the influence of living situation and perception of UA on interest.

However, there are also some aspects that could only be verified in the literature or were not covered by the survey design. These include the economic situation of the respondents and its relationship with interest. In addition, the survey could not confirm a clear influence of educational level on opinion on UA, nor of gender on interest. It is only for these two aspects that there is a clear overall distribution of participants that allows similar conclusions to be drawn.

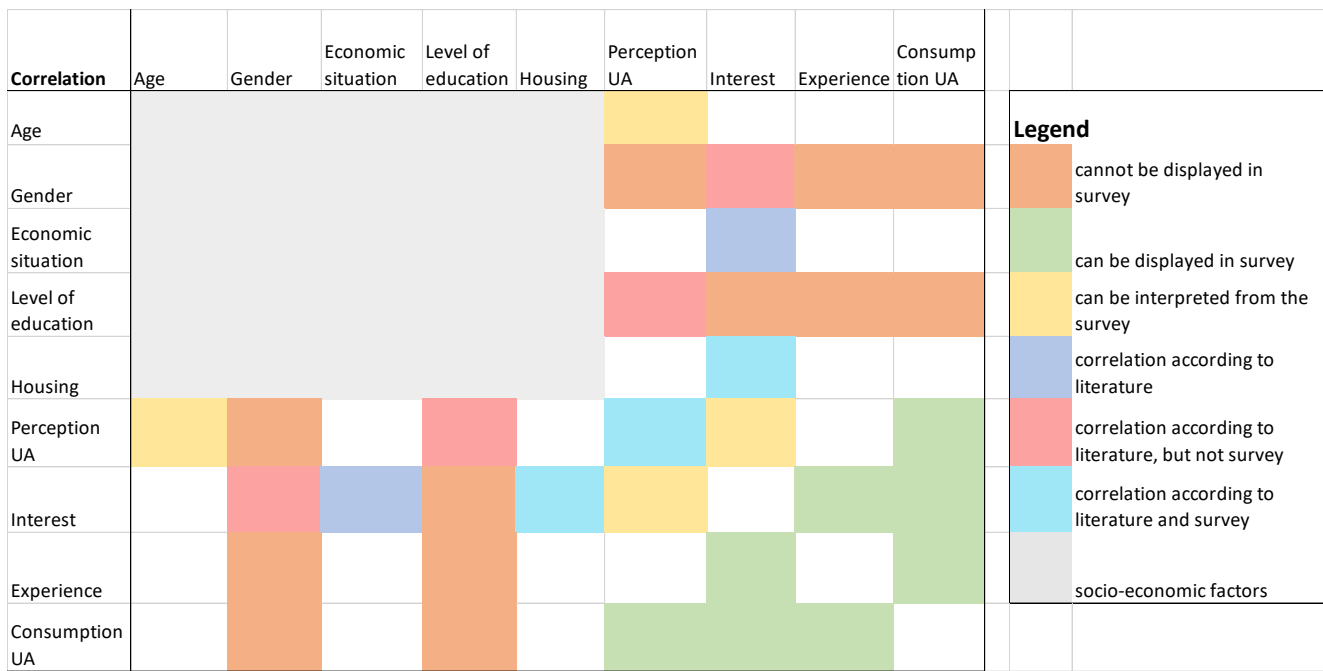


Fig. 5. Correlations according to results of analysis and literature (Source: own graphic)

Relevance to policy and research. The results of the survey and literature review provide valuable insights for policy and research. For a sustainable implementation of urban agriculture, the following policy measures can be recommended.

First, education and awareness-raising are necessary. Educational programmes and awareness campaigns on healthy eating and the benefits of urban agriculture are needed. These programmes should focus on the importance of vegetable production for nutrition and the environmental impact of conventional agriculture. There seems to be a correlation between opinions about urban agriculture and interest in, and implementation of, urban agriculture. Therefore, it is necessary that citizens have an image of UA and understand the benefits of UA, such as the importance of healthy food and environmentally conscious behaviour, in order to implement UA in the long term. Therefore, the positive aspects of UA should be highlighted to increase awareness and acceptance among the population. This can help to highlight the positive social, environmental, and economic impacts of UA. Among other things, it is necessary to inform and raise awareness about the possibilities of growing vegetables on small areas such as roofs, balconies, and walls. This is because the survey results clearly show that the participants who grow their own vegetables so far are those who have their own vegetable gardens, and those who do

not have access to a garden cite space problems as the main obstacle.

To increase acceptance of, and interest in, UA, measures should be taken to improve the availability of UA products in the market. This could include establishing distribution channels and supporting UA producers. This could increase confidence in the products, as a commonly cited negative aspect of human nutrition is poor quality control.

Given the hurdle of lack of time and limited resources, community-based urban agriculture projects should be encouraged and supported. These allow people to grow vegetables together and share resources. The study also showed that there is interest in this topic and that there is currently a lack of community project initiatives in the Mendoza region.

In addition, the target group of the initiatives should be reconsidered, as there is a clear trend in the level of education. Furthermore, the gender differences in participation in the survey and in UA in general should be reconsidered. Programmes and policies could be developed to support women in UA and provide them with economic, social, and political opportunities.

However, more research is needed to better understand the specific needs and potential of urban agriculture in Mendoza. This includes examining spatial inequalities, education levels and socio-economic factors that influence participation in urban agriculture. Further large-scale surveys could

be helpful. Focus groups and interviews with actors in urban agriculture can also be helpful to identify new barriers and potentials for UA and to collaborate on policy measures. Furthermore, spatial analyses of the potential of UA in the study area can be helpful to provide a spatial orientation for policy measures. For example, areas with a need for green space, or locations with potential for community projects could be identified.

Cooperation between government agencies, civil society organisations and research institutions is crucial for the sustainable implementation of urban agriculture in Mendoza and elsewhere. Shared initiatives and resources can increase the effectiveness of interventions. At the same time, cooperation with UA citizens and stakeholders should be sought, and a high level of participation should be ensured from the outset. This is because participatory processes draw public attention to concrete issues and enrich the political debate (NANZ & FRITSCH, 2012). By actively inviting and integrating a variety of opinions and viewpoints, a comprehensive understanding of complex issues can be achieved, leading to informed and jointly supported solutions (HELLRIG ET AL., 2013).

8. Conclusions

This study provides valuable insights into the interest, motivation, and perceived barriers to urban agriculture among the citizens of Mendoza. The findings have important implications for urban policy and future decision making in this region. The insights from this study can serve as inspiration and guidance for action in other regions to support WHO and FAO goals for healthy and sustainable food supplies. The findings on preferences, knowledge, interest, and barriers can help promote targeted educational programs, community initiatives and improved availability of healthy foods in different regions.

It is encouraging to see that there is considerable interest in urban agriculture in Mendoza and that many citizens are interested in growing their own vegetables. This indicates that the population is willing to actively participate in sustainable food production practices. However, it is important to address the barriers identified, such as lack of time, ignorance, and scarcity of resources. Strengthened initiatives, political will and broad community acceptance are crucial.

The consistency of our findings with other studies on barriers and determinants, including gender and housing, underlines the coherence and relevance of

our findings. This illustrates that similar challenges can arise in different contexts and therefore there is a need for action.

However, it is important to note that this study has some limitations, including the use of self-report, limited sample size and potential response bias due to survey instruments.

Future research could include longitudinal studies to track changes in citizens' attitudes and behaviours over time. This would allow a more accurate assessment of the effectiveness of UA policies. In addition, qualitative studies could be conducted to explore participants' emotional experiences in more detail and to better understand their motivations.

Overall, this study provides valuable insights, and lays the groundwork for further research and action to promote sustainable food production and supply in the Mendoza region.

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