ASSESSING PROBLEMS AND PROSPECTS OF URBAN AGRICULTURE IN CEBU CITY, PHILIPPINES: TOWARDS DEVELOPING ACTION PLANS

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ABSTRACT

Background and Purpose: Urban agriculture (UA) has become an even more attractive option for food security and safety brought by the spread of COVID-19 which causes global health crisis. However, studies examining the perceived values, challenges, and needs towards urban agriculture are very limited and this does not exempt even the context of Cebu City in the Philippines. In this regard, this study aimed to assess the problems and prospects concerning urban agriculture in the aforementioned City. The purposes are to propose action plans and offer insights in designing and implementing food and agricultural programs and policies in the planned participatory action research (PAR) for sustainable urban agriculture.

Methodology: This study used Kemmis and McTaggart's (1988) Model of Action Research. The use of this research method is an essential approach towards constructing sustainable developments of urban agricultural systems. However, only the planning stage was accomplished in this phase of action research of which it employed sequential explanatory research design. There were 509 household representatives in this stage of the study who participated in an online survey, 217 and 292 were from the north district and south district, respectively. Subsequently, each district had five representatives who were subjected to interviews to explain the quantitative results.

Findings: Results indicate that Cebuanos positively perceives the social, economic, health, environmental, and aesthetic values of urban agriculture. However, the presence of urban agriculture in the metropolitan is only from moderate to nonexistent due to lack of space or designated area. In

addition, the participants disclosed a lack of training and capital or funding, thus further disengaging them from adopting urban agriculture. Nonetheless, the majority (n=463) expressed willingness to be trained in urban agriculture if given the opportunity.

Contributions: This study provides key points as to how urban agriculture can be promoted. These include designating some portions of public and privately unused lands as "urban agriculture areas". In addition, financing institutions may also allocate small subsidies for marginally low-income families as their starting capital for urban agriculture activities. Finally, universities, non-government, and government agencies in the agriculture sector may train Cebuanos in backyard and rooftop gardening being the widely accepted urban agriculture form.

Keywords: Action research, perceived challenges, perceived needs, perceived values, urban agriculture.

1.0 INTRODUCTION

More than half of the global population is now residing in urban areas because their human capital is reasonably compensated (Duncan & Popp, 2017). However, the constant movement of people from rural to urban centers is predicted to accelerate agricultural land loss in order to drive urban expansion (Pandey & Seto, 2014). In this regard, agricultural land has become an increasingly limited resource in urban areas. Thus, efficient and sustainable land use and farming techniques are critical to balancing the demands for food security of a rapidly growing population with sustainable urban development (Lovell, 2010).

One of the emerging solutions for agricultural land loss, which is receiving increasing attention, particularly in developing countries, is urban agriculture (UA) (Orsini, Kahane, Nono-Womdim, & Gianquinto, 2013). This agricultural activity includes aquaculture, domestication of livestock, and horticulture (de Bon, Parrot, & Moustier, 2010). However, while some see it as a practical solution for lack of jobs and food security, especially among marginalized sectors of the society, yet to others, it is accountable for sheltering and vectoring pathogenic diseases and is an archaic agricultural method that has no space along the route towards development (Hamilton, Mok, Barker, Grove, & Williamson, 2014). A systematic

review also reveals that UA degrades soil property due to the excessive use of animal fertilizers and pesticides (Salim et al., 2019).

Nonetheless, UA remains widely adopted among metropolitan areas in Southeast Asia, such as in Hanoi (Lee, Binns, & Dixon, 2010), Jakarta (Indraprahasta, 2013), and Bangkok (Linwattana, 2013) because it contributes to food security, food safety, income generation, waste mitigation, and pollutant reduction. The commonest crops cultivated in the region are perishable leafy vegetables (de Bon et al., 2010). In the Philippines, particularly in Manila, UA was adopted even before 2000 per mandate of an agricultural policy embedded in the Philippine Five-year Development Plan (1983-1987) (Yeung, 1987). This initiative has spread and is also adopted among its major cities such as in Davao (Miura, Kunii, & Wakai, 2003), Cagayan de Oro (Potutan, Schnitzler, Arnado, Janubas, & Holmer, 2000), and Cebu (Anuada & Melodillar, 2017). The goals of adopting this initiative vary in each domain like facilitating diet improvement programs, providing food resources, generating income, and improving social capital.

At present, UA has become an even more attractive option for food security and safety brought by the spread of COVID-19, a novel coronavirus spreading infectious disease in the global community. This pandemic restricts farmers' movement from accessing marketplaces, resulting in the disposal of perishable and highly valued commodities. This, in effect, disrupts food supply chains (International Labor Organization, 2020). If this problem persists long-term, urban areas will be primarily affected, but UA may be a practical response to food security, food safety, unemployment, etc. In particular, Cebu City is one of the vulnerable communities likely to be affected by this ongoing global health crisis as it houses 922,611 people as of the 2015 National Census.

The introduction of UA in Cebu City may not just be a temporary response to this ongoing threat in the food crisis brought by COVID-19 but even in the post-pandemic period. In this regard, this action research (AR) is conceived to initially examine the perceived values, challenges, and needs towards UA among marginalized sectors in the city to ensure that UA will be accepted by them if it will be introduced. The results of this preliminary stage of AR will offer insights in designing and implementing food and agricultural programs and policies.

1.1 Action Research as a Guiding Framework for Introducing Urban Agriculture

Action research had been used as an essential approach towards constructing sustainable developments of urban agricultural systems as indicated in several reports (Tornaghi, 2013; Bryant & Chahine, 2015; Bousbaine & Bryant, 2016). One explanation for integrating it in this

context is that it was originally used by Kurt Lewin in social science to solve social dilemmas through dialectic approach. It gives credence to participatory or collaborative reflection, discussion, decision-making, and action planning to address social problems. Lack of jobs, food insecurity, and food safety are few of the social problems prevalent at the height of the pandemic which UA intends to address. Hence, adopting AR may also be a practical option to gradually solve these problems while aiming to achieve a sustainable UA in the context.
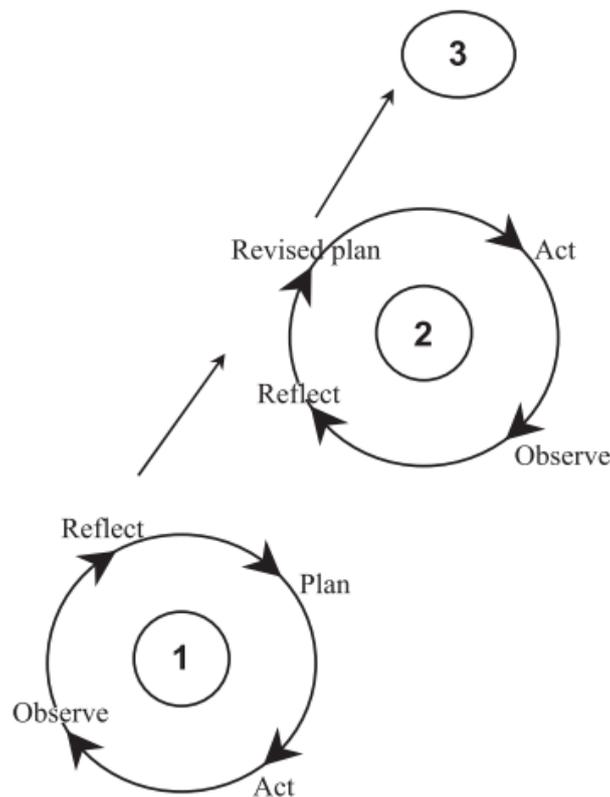

Figure 1: The Kemmis and McTaggart's (1988) Action Research Spiral/Cycle

The model of AR adopted in this study is Kemmis and McTaggart's (1988) Action Research Spiral/Cycle (see Figure 1). It can be read as a group of people or researchers reflecting on their problems and practices, deciding what deficit might have happened, planning for change through a participative intervention, and then executing that change before reflecting on how the intervention effect success to the problem or deficit of interest. The model as shown in the figure is continuous and iterative, as the name suggests, which makes it to be more fluid, open, and responsive. It involves research and development, intellectual inquiry and practical involvement, reflection and action. The norm of success under this model is not whether the researchers have faithfully observed or followed the guidelines of the research process but rather whether they have acquired a strong and authentic sense of understanding and

development in their educational practices in the context or situation where they practice (Kemmis & McTaggart, 2005). However, in the present study, only the planning stage was yet initiated and reported for two reasons. First, it involved a large number of sample size as both districts of the metropolitan were used as the sampling site. Second, depending on the results, the proposed actions at the end of planning stage will not be implemented simultaneously to the whole Cebu City. Rather, one district may be focused first before the other due to the small number of researchers against the target beneficiaries.

The planning stage is characterized by collaborative collection of information regarding the problem of focus. In this AR, the information gathered during the preliminary assessment were the perceived values, challenges, and needs towards UA of marginalized sectors in the city. Hence, the research design, environment, participants, instruments, data gathering procedure and data analysis are subsequently indicated to show how the information were collected and analyzed. On the basis of these information from the preliminary assessment and as informed by the literature, proposed action plans are indicated in the final portion of this report in preparation for the acting stage of AR.

2.0 METHODOLOGY

This study is a mixed-methods sequential explanatory design (quan→QUAL). For quantitative method part, it employed cross-sectional, descriptive design (Type 2) based on the typologies proposed by Johnson (2001). The participants were grouped according to the political district (*i.e.*, north and south) where they belong; hence, the study is classified cross-sectional. Then, they were asked to participate in an online survey to evaluate their perceptions on health, environmental and aesthetic, economic, and social values of UA, intentions of adopting UA, preferred urban agricultural method, intended produce, and perceived challenges when adopting UA activities. For the qualitative method, multiple case studies were used to provide an in-depth description and support the quantitative findings as a feature of mixed-methods research and to execute data polyangulation. The qualitative data were obtained through phone interviews and messaging applications.

2.1 Research Context and Participants

This study was conducted in Cebu City, a first-class, highly urbanized city in Cebu Province. It is the fifth densely populated metropolitan in the Philippines and most populated in the Visayan region, making it a viable environment for introducing UA project. All domains or barangays in the city were involved in the preliminary survey to determine empirically which

group of people or domain have desirable perceptions, submit for, and critically need an UA program. However, this study employed a voluntary sampling design due to travel restrictions caused by the pandemic of which the survey was done online. The voluntary sampling is a new non-probability sampling technique where final samples were drawn from the potential participants who are willing and qualified to participate in the study (Alvi, 2016). In particular, the target participants were household heads. The combined household income which each household head is coming from is less than the official poverty threshold of 10,481.00 Php monthly or roughly 207 US Dollars. In other words, these participants are from marginalized sector of the community because the planned UA program is intended for them. There were 509 household heads who responded in the study of which 217 were from the North district and 292 were from the south district of Cebu. Refer to Table 1 for the combined distribution of these household respondents when grouped according to different socio-demographic profiles. Subsequently, each district had five representatives who were subjected to interviews to build up or justify the quantitative results. They were selected via voluntary sampling provided the diverse socio-demographic profiles were achieved. The profiles of these representatives are reflected in Table 2.

Table 1: Distribution of participants in both political districts when group according to socio-demographic profiles

Socio-demographic Profiles	Categories	North District (n=217)		South District (n=292)	
		n	%	n	%
Sex	Male	85	39.17	107	36.64
	Female	132	60.83	185	63.36
Age (yrs.)	15-24	90	41.47	131	44.86
	25-54	94	43.32	123	42.12
	55-64	31	14.29	35	11.99
	65 and above	2	01.00	3	01.03
Marital Status	Single	99	45.62	148	50.69
	Married	105	48.39	131	44.86
	Separated	1	00.50	2	00.69
	Widowed	12	05.53	11	03.77
Educational Attainment	Primary	44	20.28	44	15.07
	Secondary	86	39.63	94	32.19
	Technical-Vocational	12	05.53	16	05.48
	Tertiary	75	34.56	138	47.26
Occupational Status	Casual	63	29.03	101	34.59
	Full-time	91	41.94	119	40.75
	Marginal	16	07.37	10	03.42
	Part-time	47	21.66	62	21.23

Table 2: Profile of participants interviewed

Participant	Sex	Age	Marital Status	Educational Attainment	Occupational Status
A – South District	Female	37	Married	Secondary	Part-time
B – South District	Female	35	Single	Tertiary	Part-time
C – South District	Female	24	Single	Tertiary	Part-time
D – South District	Female	56	Married	Secondary	Full-time
E – South District	Male	65	Widowed	Primary	Marginal
A – North District	Male	39	Married	Primary	Part-time
B – North District	Female	33	Married	Tertiary	Part-time
C – North District	Female	38	Married	Secondary	Full-time
D – North District	Female	31	Separated	Secondary	Part-time
E – North District	Female	63	Married	Primary	Marginal

2.2 Data Gathering Procedure

The research team sent informed consent and survey questionnaire written in Cebuano dialect to prospect participants. The informed consent contained the statement of purpose, background, procedures, risks and discomfort, confidentiality, and benefits of research for participants' perusal and approval. If approved, the participants responded to the enclosed questionnaire, but they were told not to indicate their names.

2.3 Research Instruments and Data Analysis

The general questionnaire is divided into four parts: (a) socio-demographic profile, (b) perceptions on UA, (c) community profile on UA, and (d) Cebu City residents' propensity to venture in UA. The first part of the survey questionnaire obtained information on participants' socio-demographic information such as sex, age, the domain where residing, marital status, educational attainment, occupation status, and no. of members in the house. The second part examined participants' perceptions on the values of UA in terms of social, economic, health, environmental and aesthetic as proposed by Surls et al. (2014). The scale is named PVUA of which it contained 32 items unevenly distributed into four perception areas. Each item was designed to be rated on a five-point Likert scale (5 = strongly disagree, 4 = disagree, 3 = undecided, 2 = agree, and 1 = strongly agree). The validity of this scale was established through face, content, construct, and criterion validation while reliability was established by calculating Cronbach's alpha. The Aiken's Validity Indices of all items range from 0.8 to 1.00, indicating all items passed content validity. For Exploratory Factor Analysis (EFA), the total percentage of variance explained by the four factors indicated above is 83.849. Meanwhile, for Confirmatory Factor Analysis, the resulting values for goodness-of-fit indices (GFIs) are reported in another publication but the values indicate reasonable to good model-data fit. Thus, these provide confirmatory evidence for the factor structure generated during EFA. In terms of test for correlation as other evidences of construct and criterion validity, all items were statistically significant at the $p < 0.01$ level. These may demonstrate weak construct discriminant validity correlation but these also reveal criterion concurrent validity. The conceptual distinctions of each factor is one of the reasons for retaining them all in the scale although the correlations coefficients are all strong. Finally, the scale reliability as determined by Cronbach's alpha ranges from 0.957 to 0.980 within subscales and .991 for the entire scale. These results indicate that the scale has ideal stability. The third part of the questionnaire examined the community profile on UA. Specifically, it described the presence of UA, observed methods of UA practiced in the community, UA produce of the community, and

barriers of adopting UA in the community. Finally, the fourth part of the questionnaire examined respondent's propensity to venture in UA. Specifically, it sought to determine the interest and intention of urban residents in a UA program, preferred UA method to venture with, intended UA produce, perceived challenges, and intentions when adopting UA.

The analysis of data collected included the following: (a) determining mean scores and standard deviations in the perception section; (b) independent samples *t*-test to compare perceptions scores in four areas of two political districts; (c) frequency counting in the following sections, namely: socio-demographic profiles of the participants, community profile in terms of UA, and propensity to venture in UA of both districts; (d) multivariate statistics in the development and validation of questionnaire which examined urban dweller's perceptions towards UA; and (e) thematic coding for narrative accounts and other relevant artifacts. These qualitative data were coded and thematized according to the constructs reflected in the questionnaire. For example, the perception areas on the values of UA have four, namely: social, economic, health, environmental and aesthetic. The narrative accounts generated during interviews were examined and eventually assigned to any of the area above which these could support with.

3.0 FINDINGS AND DISCUSSION

3.1 Perceived Values of Urban Agriculture of Cebu City Residents

3.1.1 Social Values

As shown in Table 3, the mean ratings to all items in *social values of UA* are above the midpoint value for both districts, interpreted as an indication of participants' agreement to all 11 items. In general, the participants seemed to agree that UA has social relevance to their lives, specifically on social relationships and interactions among members of the community and the environment they are collectively building.

Table 3: Perceived social values of urban agriculture by the participants when grouped according to political district

#	Item Statement	North District		South District	
		Mean ± SD	Adjectival Rating	Mean ± SD	Adjectival Rating
1	Urban agriculture encourages social interaction.	1.93±.937	Agree	1.92±1.011	Agree
2	Urban agriculture functions as medium for youth development opportunities.	1.88±.935	Agree	1.91±.955	Agree
3	Urban agriculture may lead to awareness of environmental issues and ethics.	1.88±.974	Agree	1.87±1.003	Agree
4	Urban agriculture builds social capital in communities.	1.98±.930	Agree	1.90±.983	Agree
5	Urban agriculture instills value for farmland preservation.	1.90±.942	Agree	1.88±.995	Agree
6	Urban agriculture creates a sense of pride in place.	1.89±.937	Agree	1.90±.932	Agree
7	Urban agriculture provides access to land.	1.93±.959	Agree	1.91±.950	Agree
8	Urban agriculture promotes tourism haven.	1.95±.906	Agree	1.89±.973	Agree
9	Urban agriculture may lead to sustainability and food systems.	1.80±.943	Agree	1.83±.997	Agree
10	Urban agriculture enhances community development.	1.82±.953	Agree	1.77±.950	Strongly Agree
11	Urban agriculture functions as medium for learning experiences	1.94±.913	Agree	1.88±.972	Agree
	Overall	**1.91±.939**	**Agree**	**1.88±.897**	**Agree**

In fact, participants living in barangays of the South District of Cebu City even strongly agreed that UA enhances community development. These positive perceptions of the social values of UA are very consistent with previous findings of Ngahdiman, Terano, Mohamed, and Sharifuddin (2017) and Hussain, Yusoff, Tukiman, and Samah (2019) and participants' responses to the semi-structured interviews. Some participants acknowledged that engaging to UA develops their social skills, *e.g.*

Gardening allows me to interact with my neighbors who share the same interest as me. We call ourselves "plantito" or "plantita." With this agricultural activity, we get to bond and have recreation in our common time. (Participant E – South District)

I consider my engagement in UA as my share of our collective effort towards developing a cleaner and greener community, and I take pride in that. I really post my plants on social media to encourage my friends also to do the same. (Participant D – South District)

These responses are further consistent with results reflected in Figures 3a and 3b. A considerable number of them revealed their perceived intentions when they would engage with UA include bonding with friends (n=143), an avenue for leisure or recreational activity (n=186), and providing activity for family (n=239). Also, a participant emphasized that the social value of UA is not limited to promoting interaction but could even lead to the reduction of crimes, specifically in abandoned spaces, which are usually haven for crimes, if converted into greened lots. This was a finding earlier indicated in the study of Garvin, Cannuscio, and Branas (2012).

3.1.2 Economic Values
In terms of *economic values of UA*, Table 4 shows the mean ratings to all nine items for both districts. All are still above mean which indicates participants' agreement to all items. In other words, UA is viewed by them to boost the economic success and activities of the community through creating jobs and incubating new business trends.

Table 4: Perceived economic values of urban agriculture by the participants when grouped according to political district

#	Factor/Item Statement	North District		South District	
		Mean ± SD	Adjectival Rating	Mean ± SD	Adjectival Rating
12	Urban agriculture creates reliable markets for small farmers to expand their operations.	1.96±1.036	Agree	1.87±1.055	Agree
13	Urban agriculture yields more affordable produce.	2.01±.977	Agree	1.92±1.059	Agree
14	Urban agriculture saves personal money.	2.01±1.002	Agree	1.93±1.035	Agree
15	Urban agriculture saves money for government agencies maintaining vacant lots.	2.06±.963	Agree	2.02±.996	Agree
16	Urban agriculture creates jobs.	1.92±.931	Agree	1.90±.998	Agree
17	Urban agriculture incubates new business industries.	1.95±.943	Agree	1.86±.988	Agree
18	Urban agriculture provides skills training.	1.91±.936	Agree	1.86±.993	Agree
19	Urban agriculture reduces food expenditures.	1.92±.934	Agree	2.01±1.055	Agree
20	Urban agriculture supports low-income residents.	1.95±1.020	Agree	1.93±1.046	Agree
	Overall	**1.97±.971**	**Agree**	**1.93±.940**	**Agree**

Eventually, these will have profound impacts on improving their savings, income, and lifestyles. As also shown in Figures 4a and 4b, some of their intentions if they will engage with UA include generating income (n=316) and minimizing expenditures for food (n=234). These intentions may be grounded on their perceptions that UA may improve their local economy. Such positive perceptions are also congruent with their ideas on the economic role and significance of UA as revealed in the interview, *e.g.*

UA reduces our daily expenses for food. Instead of purchasing foods in the market, you can raise or plant them in your yard. (Participant E – North District)

The more produce of fruits and vegetables we have in the community, the more we will likely reach the market. If that is so, then the price will likely be very low because of competition. If we understand the law of demand and supply, everybody can understand what I mean. (Participant B – North District)

Exported goods are no longer necessary because we can locally produce the products that we need through UA. (Participant E – South District)

UA can be a business venture, thus, creating jobs or services such as packing and delivery. (Participant A – North District)

We can sell surplus produce in the market or to our neighbors. (Participant A – North District)

UA may promise sustainable food supplies in densely populated areas and may ensure food prices will not spike even if the demands for these food supplies are very high. (Participant B – South District)

3.1.3 Health Values

Concerning the *health values of UA*, there are no changes with the agreement of the participants in all seven items for both districts as shown in Table 5. The mean scores for all seven items are above the midpoint. These results indicate that participants seemed to agree that UA provides people access to safe and nutritious foods, improves or promotes physical, emotional, and mental well-being, and leads to food and health literacy. In this regard, Figures 4a and 4b reveal self-therapy, relaxation, calmness (n=323), and exercise (n=217) as perceived intentions of the participants if they are to engage in UA. Over time, the health impacts continue to gain as a popular area of research (*e.g.,* Brown & Jameton, 2000; Theresa & Pride, 2017; Audate, Fernandez, Cloutier, & Lebel, 2018; Hussain et al., 2019). People are also health-conscious, and they believed in the many health benefits of it, as revealed by the following transcripts:

Communities have several health problems and of those is obesity. Urban gardening may provide an opportunity for people to increase their physical activity. (Participant B – South District)

Urban gardening ensures healthy living because the food we consume is homegrown and free from synthetic fertilizers, herbicides, and pesticides. (Participant C – South District)

Table 5: Perceived health values of urban agriculture by the participants when grouped according to political district

#	Factor/Item Statement	North District		South District	
		Mean ± SD	Adjectival Rating	Mean ± SD	Adjectival Rating
21	Urban agriculture ensures food safety.	1.91±.915	Agree	1.86±.984	Agree
22	Urban agriculture increases fruit and vegetable consumption.	1.92±.960	Agree	1.90±.984	Agree
23	Urban agriculture fosters the quality of physical health.	1.93±.973	Agree	1.87±.984	Agree
24	Urban agriculture enhances population's quality of life.	1.93±.971	Agree	1.85±.984	Agree
25	Urban agriculture leads to food and health literacy.	1.90±.952	Agree	1.84±.984	Agree
26	Urban agriculture improves mental well-being.	1.90±.948	Agree	1.94±.984	Agree
27	Urban agriculture is environment friendly.	1.93±.974	Agree	1.87±.984	Agree
	Overall	**1.91±.955**	**Agree**	**1.88±.912**	**Agree**

We should plant and eat vegetables to keep us healthy and prevent us from getting sick. (Participant E – South District)

Urban gardening promotes mental well-being by giving us joy in the form of recreation, diverting our attention from thinking of our problems, and relieving us from stressful days. (Participant B – North District)

The plants that surround us can give us fresh air for the proper functioning of our body. We may even talk to plants to share our problems, although they do not respond but the idea that we can release the confines of our thoughts and emotions through them can ease the burden of what we think and feel. (Participant D – South District)

Some participants, who previously lived in the countryside, even disclosed during the interview that they are missing their laidback and healthy lifestyles before. Some of them prefer to go back there once they retire from work to do gardening again as it was part of their daily activities growing up. They are missing the fresh foods and air they get from it.

3.1.4 Environmental and Aesthetic Values

Finally, as to the *environmental and aesthetic values of UA*, the agreement of participants remains the same. Table 6 shows that the mean rating scores for all items for both districts are still above the midpoint, indicating a positive agreement that UA brings attractiveness or aesthetic quality to urban spaces. These results are supported by the following transcripts obtained during interviews, *e.g.*

Table 6: Perceived environmental and aesthetic values of urban agriculture by the participants

when grouped according to political district

#	Factor/Item Statement	North District		South District	
		Mean ± SD	Adjectival Rating	Mean ± SD	Adjectival Rating
28	Urban agriculture promotes the use of organic fertilizer.	1.92±.930	Agree	1.89±.989	Agree
29	Urban agriculture increases urban green areas and open spaces.	1.87±.946	Agree	1.88±1.04	Agree
30	Urban agriculture promotes waste mitigation.	1.95±.950	Agree	1.90±1.033	Agree
31	Urban agriculture enhances the quality of urban environments.	1.93±.974	Agree	1.85±.982	Agree
32	Urban agriculture enriches visual quality of a city.	1.93±.937	Agree	1.90±.985	Agree
	Overall	**1.92±.946**	**Agree**	**1.89±.940**	**Agree**

UA creates greener spaces. (Participant D – South District)

Involving ourselves in agricultural activities educates us to cultivate and preserve lands for their sustainable use. (Participant A – North District)

Green spaces are pleasing to our sight because of their beauty. These also give us a positive outlook in life and on the people who may see them. (Participant C – South District)

UA is already beautiful in its sense. Its beauty boosts our moods. (Participant E – North District)

The participants agree that UA mitigates waste or pollution and prevents the accumulation of synthetic residues from fertilizer, pest, and herb controls. They narrated the following:

Pollution in any form is present in urban areas, such as air, soil, and noise pollution. Green spaces help us improve the climate within the city by increasing the amount of moisture while reducing temperature. We know very well that the canopies of the trees are good shades while their leaves absorb dust and greenhouse gases which contributes to global warming (Participant C – South District).

I am part of an organization in our barangay, which is into the beautification of public places. In this regard, we do landscaping of which we use different varieties of plants and collect materials such as used tires, containers, and cans. We do not just collect these materials, but we exchange them with rice. Since then, I notice that litters are very minimal. We get to beautify the public places while preventing garbage from being dumped over the streets. (Participant B – South District)

We do not apply synthetic materials to our plants. Instead, we use rice water for our edible and herbal plants while urine for our ornaments and cut flowers as fertilizer. (Participant B – North District)

In summary, Table 7 shows the descriptive results whereby no difference in participants' perceptions of UA's social, economic, health, and environmental and aesthetic values are observed. However, these mean scores do not actually inform us whether there is no significant difference or there is a significant difference between Southern and Northern *barangays* of Cebu City in four perception areas. In this regard, the independent samples *t*-test was performed four times in IBM SPSS. As predicted, results indicate no significant differences between the Northern district (*M*=1.89, *SD*=.858) and Southern district (*M*=1.88, *SD*=.897) perceptions of the social values of UA, t=.172, p=.863. Likewise, there is no significant difference between the Northern district (*M*=1.96, *SD*=.883) and Southern district (*M*=1.90, *SD*=.881) perceptions of the economic values of UA, t=.356, p=.722. Also, no significant difference between the Northern district (*M*=1.90, *SD*=.881) and Southern district (*M*=1.87, *SD*=.912) perceptions of the health values of UA is recorded, t=.293, p=.720. Finally, there is no significant difference observed between the Northern district (*M*=1.92, *SD*=.873) and Southern district (*M*=1.89, *SD*=.940) perceptions of the environmental and aesthetic values of UA, t=.354, p=.724. The lack of difference and desirable perceptions of residents in Cebu City towards four perception

areas of UA may indicate positive implications on ease in cultivating their love for UA and facilitating them to engage in programs and policy relating to UA.

Table 7: Independent samples t-test results of northern and southern districts across four perception areas of urban agriculture

Factor	Political District	N	Mean	Std. Deviation	df	*t*-value	p-value
Social Value	North	217	1.89	.858	507	.172	.863
	South	292	1.88	.897			
Economic Value	North	217	1.96	.883	507	.356	.722
	South	292	1.93	.940			
Health Value	North	217	1.90	.881	507	.293	.770
	South	292	1.87	.912			
Environmental and Aesthetic Value	North	217	1.92	.873	507	.354	.724
	South	292	1.89	.940			

3.2 Profile and Perceived Challenges in Adopting Urban Agriculture in Cebu City

To better understand the profile or state of urban agriculture in Cebu City, the participants were asked several questions, which results are reflected in Figure 2. Majority of the participants, of which 185 were from the North District and 258 were from the South District, observed that the presence of UA is from nonexistent to moderate. Meanwhile, only a few participants, of which only 32 were from the North District and 34 were from the South District, observed that its presence in the city is from high to extremely high. The UA methods well observed by these participants are backyard gardens (see Figure 3a for sample) and tactical gardens (see Figures 3b for sample). The participants have several explanations for the prevalence of backyard gardens, such as the following: "growing popularity," "diverse products which are very accessible to households," "grown in soil or ground and pots." These explanations are earlier indicated in the studies of Kortright and Wakefield (2011) and Keatinge et al. (2012).
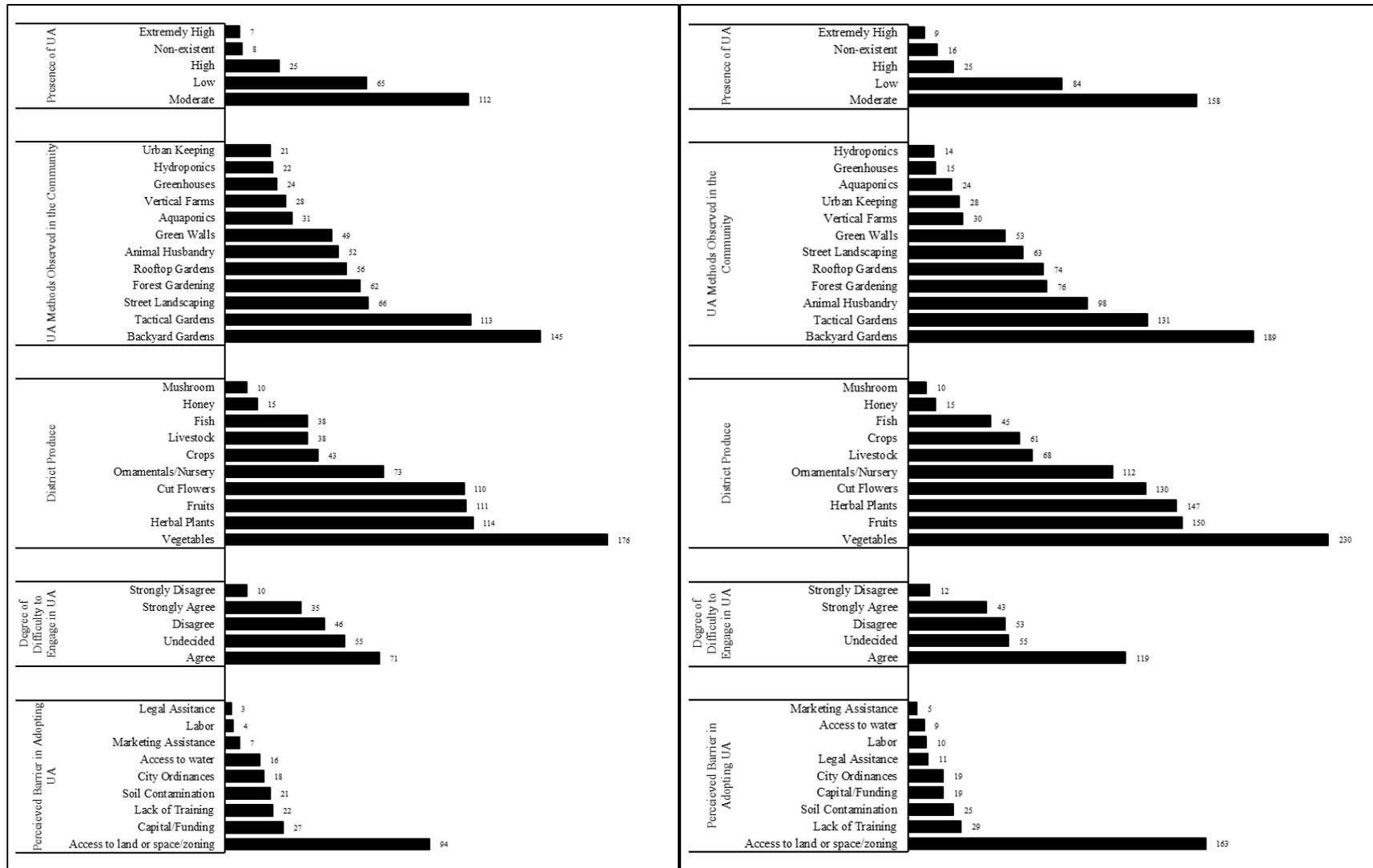
Figure 2: Profile and perceived challenges by the participants in adopting urban agriculture in Northen (left) and Southern (right) Districts of

Cebu City

Meanwhile, tactical gardens are also well-observed because public places (*e.g.*, plaza, schools, and churches) and business hubs adapt this to beautify, transform, or revitalize their areas. The least observed UA methods (n<50) are urban keeping, greenhouses, hydroponics, aquaponics, vertical farms, and green walls. The respondents explained that possible reasons for this include "capital outlay," "maintenance cost," and "technical training."

As to the produce widely noticed in both districts, vegetables topped the list. It is typical among developing communities that venture into UA for food resources and even developed communities such as Montréal, Canada (Haberman et al., 2014), and Boston, USA (Saha & Eckelman, 2017). However, the variety of vegetables grown depends on the City's climate condition, available technology, and cultural preferences. In the City, the vegetables which are commonly grown include, but are not limited to, sweet potato, horseradish, okra, eggplant, Malabar spinach. Other produce with more than 100 observations are fruits, herbal plants, cut flowers, and ornamentals or nursery. Meanwhile, crops, livestock, mushroom, and honey are the least observed produce. The participants explained that these are only available in identified agroecosystems in the city as revealed in the following narrative accounts, *e.g*.

> I only see crops cultivated and honey produced in large acres of land usually in mountain areas of Cebu City. (Participant A – North District)

> You cannot raise livestock in an agglomerated households and business establishments; otherwise, you will be sued for the foul smell of their manure and urine. (Participant B – North District)

> The fish are also the least observed produce in the city because a significant portion of its area is not situated in coastal zones (Participant B – South District).

When the participants were asked about their observed difficulty in engaging with UA, 161 and 217 responses fall from undecided to strongly agree in North District and South District, respectively. There is a consensus that access to land or space is the major barrier observed among these participants. According to them, apart from the fact that they do not have enough space or available land, there is limited to no areas which are designated by the government as green open spaces. Nonetheless, this is a common problem even among its neighboring countries, such as in Bangkok, Thailand (Suteethorn, 2009) and Jakarta, Indonesia

(Indraprahasta, 2013). Hence, a practical solution done among private companies in Jakarta is permitting local communities to use their lands for agricultural activities (Indraprahasta, 2013). Some participants also explained that the available areas they have are rented or sold which were converted to business hubs or offices, a manifestation of a liberating economy and opening up to international markets which is a similar scenario in Hanoi, Vietnam (Lee et al., 2010). Other observed challenges were only identified less than thirty times. Specifically, these are capital or funding, lack of training, soil contamination, city ordinances, access to water, marketing and legal assistance, and labor. These challenges may be addressed by providing appropriate support and collective efforts between different stakeholders (*e.g.,* government agencies, private companies, stakeholders, and others). These supports may be knowledge and technology transfer, provision of loans or subsidy for interested individuals in UA, marketing and legal services, and among others.
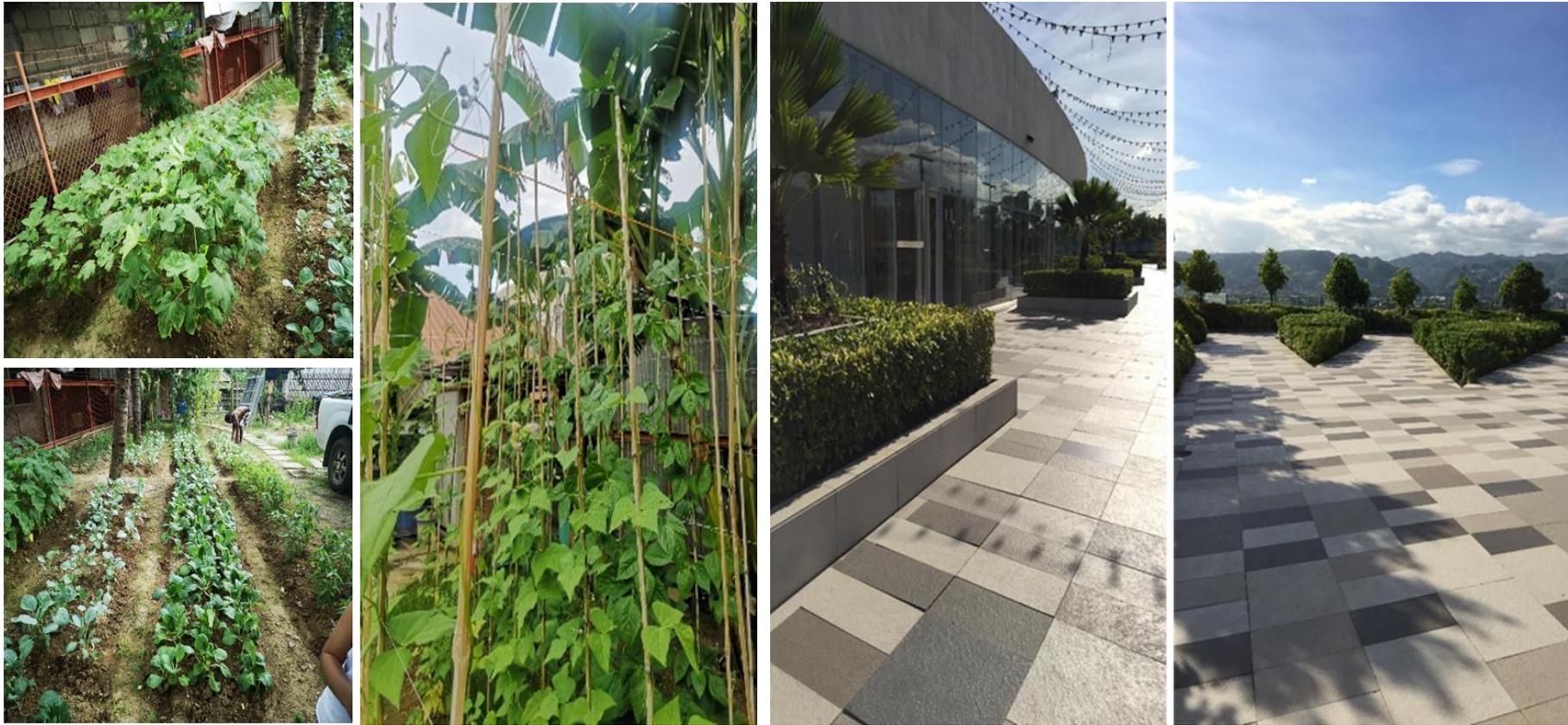
Figure 3a. Vacant land converted into backyard garden in San Nicolas Pardo, Cebu City to cultivate vegetables

Figure 3b. Tactical gardens outside a supermall located in South Road Properties, Mambaling, Cebu City

3.3 Propensity or Perceived Needs in Adopting Urban Agriculture in Cebu City

To better understand Cebuanos acceptance of UA and whether they perceive it as predominantly positive or negative activity, they were asked to answer several questions, which results are shown in Figures 4a and 4b. First, 466 from 509 participants responded that they lack training on UA while the remaining 43 participants disclosed that they had previous training in backyard gardening (n=42) and tactical gardening (n=1). These participants who are not previously trained in UA expressed willingness to be trained in the area of backyard gardening (n=394). Then, street landscaping and green wall follow backyard gardening as an area of interest for training North District and South District, respectively. However, a large difference in responses is observed from the priority to the second area of interest for training. Meanwhile, aquaponics, hydroponics, urban keeping, animal husbandry, vertical farms, and tactical gardening received responses of less than 60 in one or both districts. The participants have several explanations for these, *e.g.*

> It is complicated to set-up aquaponics and hydroponics. We need technical training in various aspects of it. Also, both would require a considerable amount of capital outlay and maintenance cost. (Participant B – South District)

> Domesticating livestock is not appropriate in our area, although we have a backyard. We will certainly be complained by our neighbors. (Participant B – North District)

> I only see vertical farms and hotels. That would not look appropriate in our house. (Participant B – South District)

When participants were asked about their intended produce if they will venture in UA, vegetables and fruits top the list for both districts. Then, herbal plants and cut flowers follow. Their intended produce may be explained by their primary intentions such as food resources, income generation, self-therapy, relaxation, and calmness. However, access to land, capital, lack of training, access to water, and soil contamination are their perceived barriers that may interrupt them from adopting backyard gardening and cultivating intended produce. These are essential requirements for their preferred UA method to be adapted. Fish, crops, livestock, mushroom, and honey are the least intended produce.
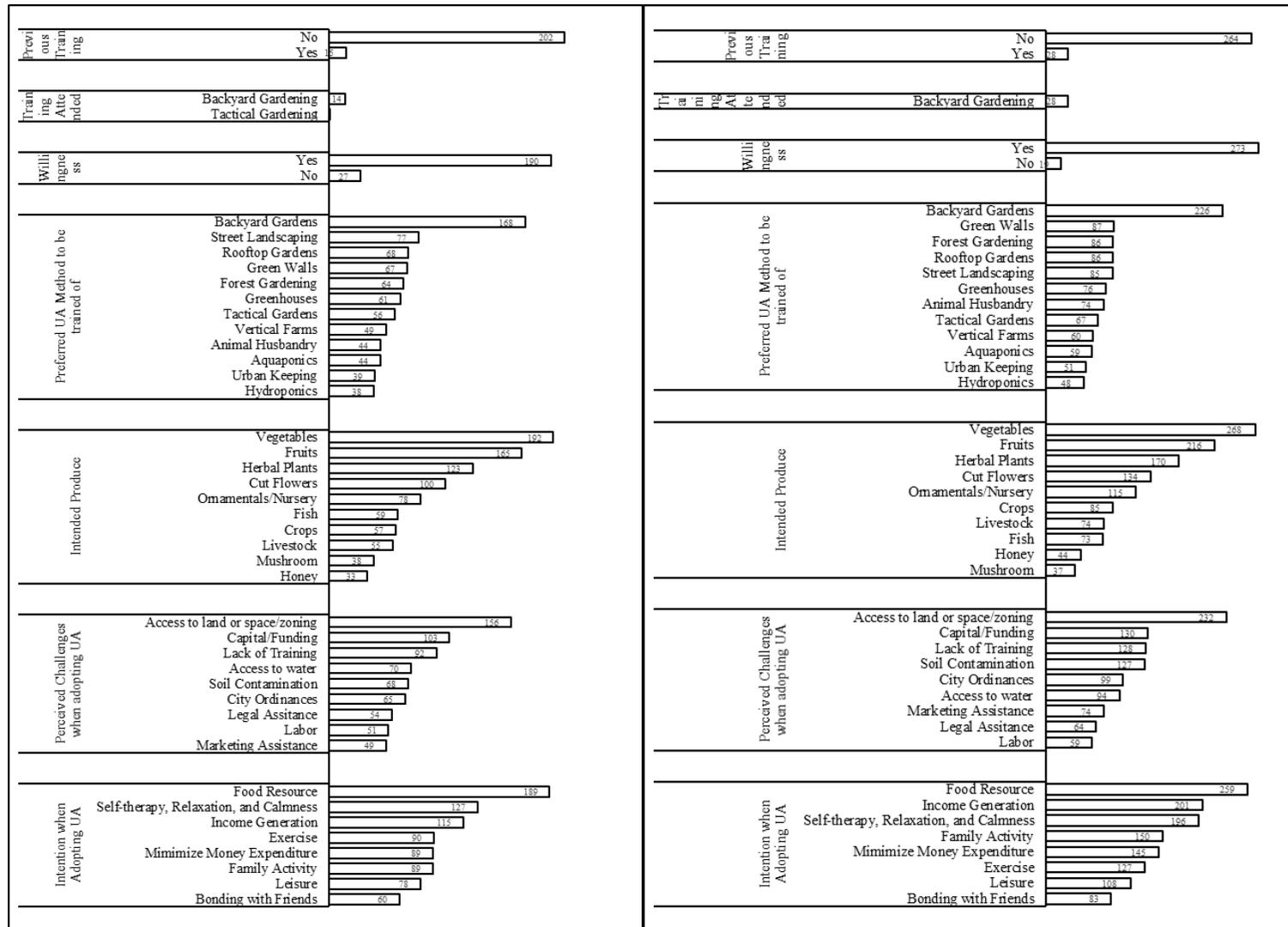
Figure 4: Propensity or perceived needs of residents in Northern (left) and Southern (right) District of Cebu City to venture into urban agriculture

4.0 CONCLUSION AND PROPOSED ACTION PLANS

Cebuanos are in consensus that UA has social, economic, health, environmental, and aesthetic values. However, the majority observed that its presence in the metropolitan is from moderate to nonexistent primarily due to inadequate access to land or space/zoning. Arable lands are gradually transformed into business hubs or offices to pave the way for the City's ongoing and expanding industrial revolution. Also, *Cebuanos* perceived the lack of training and capital or funding as secondary barriers in their engagement to UA. Nonetheless, 91 percent of 509 respondents expressed willingness to be trained in UA if given the opportunity. They are interested primarily in the area of backyard gardening, although access to land or space is their observed and anticipated barrier. In particular, they intend to plant vegetables, fruits, herbal plants, and cut flowers. These intended harvests can be explained by their intentions if they will engage in UA, which are as follows: as food resources, to generate income, to relax, and experience calmness and self-therapy. In view of these, some action plans are recommended below.

For the lack of access to land or space, the following action plans are proposed: i) The local government may designate privately owned or vacant and unused lands as "UA areas" (UAA). The owner of these UAAs may then apply for tax incentives to the properties while the lands are used. This policy may limit landowners from encouraging them to sell their unused properties. Instead, the marginalized families without access to lands may be given the benefit of cultivating these lands; ii) In the same manner, a portion of public lands where government institutions are established such as schools or universities, parks, offices, and others may be assigned as "UA areas." The government and interested individuals may enter into a memorandum of agreement that vacant spaces of the government institutions may be used for agricultural activities for a certain period. This initiative can also benefit the government because its institutions are mandated to provide extension programs for the community; iii) Housing loans may be provided to families who do not own house and lot. The spare space may be used to cultivate vegetables, fruits, cut flowers, and herbal plants.

For most respondents, the lack of capital is also a major bottleneck that restrains them to engage, maintain, and expand agricultural activities. Thus, affordable food production in the city remains a distant goal. Several factors may explain the lack of capital. Firstly, the salary received by a particular family is primarily allocated for basic needs, and engaging to UA may already be a luxury on their end. Secondly, UA is not legalized or can be considered as informal. Thus, both government and private financing institutions are reluctant to grant loans to individuals who intend to engage in UA. Thirdly, applying for loans require collateral, a

business plan, and even a feasibility study. In this regard, financing institutions may allocate small amounts of UA subsidies that only marginally low-income families can benefit if loans cannot be granted.

For lack of training and problem regarding soil contamination, the following action plans are suggested: i) Universities, non-government organizations, and government agencies in-charge in the agriculture sector may form committees whose task is to train them in backyard gardening. As revealed in this study, backyard gardening is the most intended form UA which Cebuanos prefer to venture with of which their intended produce are vegetables, fruits, cut flowers, and herbal plants. This training should also empower them to become agriculturists in their own right, meaning they will be trained to think and act scientifically in their gardening; ii) Rooftop gardening may also be introduced if there are no available lands and contaminated lands because their intended harvests can also be cultivated on rooftops. However, these individuals need to be trained properly to cultivate plants in this area because they deal extra physical stressors that could affect their growing conditions.

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