Awareness of Daegu Citizens on Urban Agriculture

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Abstract

The purpose of this study was to investigate the awareness of Daegu citizens on urban agriculture. A questionnaire was conducted for 15 days from May 9, to May 25, 2015, and a sample group consisting of 328 residents of Daegu. The cognitions of awareness to effects and preferences of urban agriculture were analyzed. The cognition level of urban agriculture is in a very low state, the level of satisfaction in experienced groups were high. In addition, intentions of participation in the future were very high. The potential capability of urban agriculture is very strong. In motivation and purpose of urban agriculture activities, such as 'Hobby and leisure activities', 'Safe food production' were shown as high frequency. In cognition towards the effects of urban agricultural activity, 'Safe agricultural products', and 'Change in dietary life' were shown to be in high points of agreement. Furthermore, in preferences of the type and activities, 'Rooftop garden', 'Learning/education type home garden', 'Home garden utilizing the pieces of small land', 'Box home garden', and 'Personal weekend farm' were shown to be highly preferred types. Within the effects of urban agriculture, 4 factors were categorized; 'Negative effects of urban agriculture', 'Positive effects of urban agriculture', 'Environmental Improving effects', and 'Benefits effects'. In addition, 3 factors are prevalent in type and activities of urban agriculture, 'Participations of experiencing/education programs', 'Cultivation of rental home gardens', and 'Lifestyle home garden type'. Conclusively, although the situation of urban agriculture is in the beginning stages, the potential capability of urban agriculture is great. In the future, diverse types of hardware and software programs, such as diverse education/experiencing programs and information supporting programs, will both be required for development.

Key words: *city farming, cognition to urban agriculture, effects, preferences*

I. Introduction

Korea's total population is 51.53 million, and 47.29 million people are living in urban areas. Therefore, the urbanization ratio of Korea is 91.79%. The urban population has been constantly increasing by 5.88% each year since 1997 (MOLIT, 2015). This urbanization create many urban problems, such as environmental disruption, eco-system damage, spreading of pollution, and the urban heat island effect (Jang, 2006). To cope with these environmental problems, restoration of eco-systems and safe foods are the top highlighted issues. As a solution measure for securing food sources and safe foods, urban agriculture is beginning to get in the spotlight as a capable measure for sustainable development and food security (Park, 2007).

Urban agriculture is a recent emerging issue as a strong

measure for solving urban problems, such as shortage of green areas and environmental pollution (Kim et al., 2002). In addition, it is also considered to have a good function of leisure and rest by experiencing the agricultural activities in nature (Lee, 2013).

Within urban agriculture, small family gardening activities in diverse inner city areas, such as small urban home gardens, rooftop gardens, balcony gardens, backyard kitchen gardens, are increasing very rapidly (Lee et al., 2013).

At the moment, governments started developing many community gardens in open spaces and parks, including roadsides and suburbs. The law of rearing and supporting urban agriculture was established in 2011, and implemented in 2012. Many regulations for the activation of urban agriculture were established and implemented by each local government.

According to the statistical data by The Ministry of Agriculture, Food and Rural Affairs (MAFRA), the area of an urban family garden in 2010 was 104 ha, and it has increased to 668 ha in 2014. Furthermore, the number of participants were 153,000 in 2010, and increased to six times as much

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being 1,084,000 in 2014. In addition, the number of urban family vegetable gardens have increased to 16 times from 4,093 in 2011 to 69,244 in 2014 (Shin, 2015).

In order to activate the culture of urban agriculture, Daegu-city has hosted the annual fair of urban agriculture at the Daegu agricultural high school since 2012. The city has proclaimed the activation plan of urban agriculture, investing 4,160 million won until 2017. This investment increases the population of urban farmers to 250,000, which is 10% of the total population of citizens of Daegu (MAFRA, 2015).

At the moment, this research is performed in order to investigate the awareness of Daegu citizens on urban agriculture, such as cognition to urban agriculture, participation intention, preference of activities and further needs. The results of this survey are utilized as basic data for the activation policy of urban agriculture in Daegu city.

II. Theoretical basis

In 2012, Korea enacted the ‘Law of Nurturing and Supporting Urban Agriculture’. Within this law, urban agriculture is defined as “An action of growing or cultivating crops, utilizing lands and buildings or diverse life spaces in the city area, for a hobby, leisure, learning and experiencing” (<http://www.lawnb.com>). Jang (2009) has defined urban agriculture as “An agriculture of expanding plural functions of agriculture, for mitigating or solving urban problems and eco-oriented lifestyles”. Na (2010) has also stressed multiple common benefits of urban agriculture.

Effects and functions of urban agriculture are presented by precedent researches. Na (2011) has suggested the functional effects of urban agriculture as ①Energy saving effects, ②Environmental improvement effects, ③Food safety effects, ④Community activation effects, ⑤Experiential education effects, ⑥Health and recreational effects, and ⑦Social welfare effects. Lee & Hwang (2012) have presented 8 functions of urban agriculture as ①Environmental conservation, ②Disaster prevention, ③Community activation, ④Activation of local economy, ⑤Environmental education, ⑥Leisure activities, ⑦Health and recreation, and ⑧Social welfare.

In the ‘Law of Nurturing and Supporting Urban Agriculture’, urban agriculture is divided into 5 types; ①Residential types,

②Neighborhood types, ③Downtown types, ④Farm & park types, and ⑤School education types (<http://www.lawnb.com>). Kim et al. (2010) have categorized urban agriculture into 5 types of agricultural activities; ①Industrial type agriculture, ②Experiential type agriculture, ③Learning-education type agriculture, ④Exchanging type agriculture, and ⑤Cycling type agriculture.

Lee (2013) has suggested health seeking lifestyles have more influence on urban agricultural policy. And he also has reported that groups of women and higher incomes showed higher preferences for urban agricultural activities.

This paper, focused mainly on cognition to urban agriculture, awareness on effects of urban agriculture, and preference in types and activities of urban agriculture.

III. Research method

1. Survey Period & Sample Group

A questionnaire was conducted in the downtown area (Dongseong-Ro, 2·28 memorial park) of Daegu city, from May 9, to May 25, 2015. Self-administered questionnaire was done with a sample group of 340 respondents. Thus, final data of 328 respondents were analyzed with the exclusion of 12 sheets of insincere answer.

2. Design of survey form

Current research papers were reviewed and reclassified as survey question items, for the preference of types and activities in urban agriculture (Jeong et al., 2012; Jeong et al., 2013; Lee et al., 2013). In addition, to secure the validity of assessment tools, two expert professors examined the survey items.

34 question items total for the survey of awareness and attitude of Daegu citizens; were prepared in Table 1. Five items of demographic characteristics and eight items of awareness of urban agriculture were presented on nominal scale. In addition, each of the 20 items of the cognition to effect of urban agriculture, and the preference of types and activities in urban agriculture, were presented on a 5-point Likert type interval scale.

Table 1. Survey contents.

Variables	Categories	Scale	No. of questions
Demographic characteristics	Gender, age, education, resident area, occupation	Nominal	5
Awareness on urban agriculture	1) Awareness of the term urban agriculture 2) The experience of urban agriculture activities (1) Experience period (2) Satisfaction of experience (3) Future ongoing intention 3) The purpose (motivation) of urban agriculture activities 4) To anyone with the urban agriculture activities 5) Source of urban agriculture activity information 6) Intention of participation in urban agriculture activities 7) Rent home garden size (area) 8) Annual fee for rent	Nominal	8
Awareness on overall effects of urban agriculture	1) Health promotion 2) Make changes in dietary life 3) Psychological sense of stability 4) Recovery of humanity through nature sympathy 5) Revitalization of local communities 6) Effect of learning experiences related to agriculture 7) Create employment in the city 8) Supply of safe agricultural products 9) Promotion of urban and rural exchanges 10) Activation of Agriculture by local farming 11) Economic benefits (Food security) 12) Prevention of urban floods and disasters 13) Mitigation of the urban heat island phenomenon 14) Improving the local environment 15) Lack of living space by urban gardens 16) Lack of urban green space by urban agriculture 17) Damaging urban landscapes 18) Occurrence of environmental pollution 19) Bad influence on the rural economy 20) Pest occurred by the cultivation of the crops	Interval	20
Preference in types and activities of urban agriculture	1) Indoor cultivation of vegetable gardens 2) Apartment balcony vegetable gardens 3) Home garden cultivation utilizing the boxes 4) Home garden cultivation utilizing the rooftops 5) Cultivation of residents' common vegetable garden in apts. 6) Home garden development utilizing pieces of small land 7) Personal weekend farm cultivation in suburban areas 8) Cultivation of rental gardens in urban agricultural parks 9) Cultivation of rental gardens from public institutions 10) Cultivation of rental garden in private farmlands 11) Learning-education type garden cultivation in schools 12) Donate-produced agricultural products to low-incomes 13) Participate in healing garden and nature learning centers 14) Participate in the agricultural experience program 15) Participate in rural education farm experiences 16) Participate in eco-friendly compost productions 17) Participate in gardening education programs 18) Participate in horticultural healing programs 19) Join urban agriculture leadership training programs 20) Join urban agriculture fairs and exhibitions	Interval	20

3. Statistical Analysis

The data, collected by questionnaires, were processed by cleaning and coding for statistical analysis. SPSS Statistics 19.0 program was used for the statistical analysis. Frequency analysis was used for demographic attributes of respondents, and awareness to urban agriculture. For the analysis of awareness for effects and preferences of type and activities of urban agriculture, the mean values of each item were compared, and

Table 2. Demographics of respondents.

Variable	Categories	Freq.	%
Gender	Male	137	41.8
	Female	191	58.2
Age	10 ~ 19 years	4	1.2
	20 ~ 29 years	37	11.3
	30 ~ 39 years	60	18.3
	40 ~ 49 years	125	38.1
	50 ~ 59 years	91	27.7
	Over 60 years	11	3.4
Education level	Elementary school	2	0.6
	Middle school graduate	11	3.4
	High school or graduate	103	31.4
	College or graduate	191	58.2
	Graduate school	21	6.4
Resident Area	Nam-Gu	72	22.0
	Dalseo-Gu	18	5.5
	Dong-Gu	54	16.5
	Buk-Gu	41	12.5
	Seo-Gu	20	6.1
	Suseong-Gu	60	18.3
	Jung-Gu	32	9.8
	Dalseong-Gun	5	1.5
Occupation	Self-employed	55	16.8
	Office worker	73	22.3
	Technical engineer	19	5.8
	Public servant	28	8.5
	Student	36	11.0
	Housewife	76	23.2
	Professional	27	8.2
	Unemployed	12	3.7
	Etc	2	0.6
	Total	328	100.0

the reliability tests by using Cronbach's alpha value were also performed. To verify the validity of each variables of awareness for the effects and preferences of type and activities of urban agriculture, exploratory factor analysis by the varimax rotation method was also performed.

IV. Results and Discussions

1. Demographics of Respondents

The items for demographic characteristics were gender, age, education level, monthly income, resident area, and job. The results of frequency analysis for these demographic characteristics were shown in Table 2.

In gender, number of women (58.2%) are more than that of men (41.8%). In age, forties was the biggest group by 38.1%, and then fifties (27.7%). Thirties (18.3%) was the next in frequency. In education level, college/univ. (58.2%), high-school (31.4%), and graduate school (6.4%) were high in frequency, respectively. In resident areas, Nam-gu (22.0%), Suseong-gu (18.3%), Dong-gu (16.5%), and Buk-gu (12.5%) were high, respectively. In occupation, housewives (23.2%), office workers (22.3%), and self-employed (16.8%) were high in frequency, respectively.

2. Awareness on Urban Agriculture

1) Cognition to Urban Agriculture

In the results of cognition to urban agriculture, 'Have heard, don't know exact meaning' and 'Never heard, don't know what's mean' were as high as 55.8% and 22.9%, respectively. Therefore, the 'Knowing' group of urban agriculture was just 21.3% (Fig. 1).

Fig. 1. Awareness of urban agriculture term.

To compare this, the precedent research reported that the ‘Knowing’ group of urban agriculture is up to 33.8% in Kyeong-nam residents (Kim et al., 2011). This means that the cognition level of our sample to urban agriculture is very low.

2) Experience extents of urban agriculture

In the results of frequency in experience of urban agriculture, those in the ‘No experience’ group were 67.4%, and those in the ‘Experience’ group was just 32.6%. Then, in the experiencing periods, ‘Less than a year’ and ‘Less than 5 years’ were 45.4% and 35.2%, respectively. Therefore, the experiences and its periods of urban agriculture are shown to be very low and relatively short. The results show little difference with the precedent report that Kim et al. (2011) reported showing the ‘Experienced’ group as 25.9% in Kyeong-nam residents. This means that the stage of urban agriculture in Korea is at the beginning stage.

Nevertheless, the satisfaction level of experience in urban agriculture is very high. 90% of respondents answered over

than moderate satisfaction. In addition, the future ongoing intention of urban agriculture was also high. Over 85% of respondents answered over than moderate agreement to ongoing urban agricultural activities in the future. This is a similar result to the precedent research, the participation will was shown to be 82.7% (Jeong et al., 2013).

3) Purpose of urban agriculture

For the purpose of urban agriculture, ‘Safe food production’ and ‘Hobby and leisure activity’ were shown to be high frequency, 53.2% and 33.5%, respectively. Also, ‘Physical and mental health’ was shown as 8.5%. Kim et al. (2011) have reported ‘Safe food production’ (55.7%), ‘Experiencing education’ (17.6%), and ‘Environmental improvement’ (12.5%). Hence, ‘Safe food production’ is said to be the main purpose of urban agriculture. Detailed results are shown in Table 4.

4) Awareness on urban agriculture

Partners in urban agricultural activities, ‘Spouse and family’ was absolutely high at 83.9%. ‘Neighbors’ and ‘Friends, colleagues’ were next at 11.0% and 4.9%, respectively. And, in the source of obtaining informations on urban agriculture, ‘Newspaper, broadcast and internet’ was the highest frequency as 48.5%. Then, ‘Neighbors and relatives’, ‘Related books’, and ‘Agricultural technology center’ were high at 23.2%, 15.2%, and 6.7%, respectively.

In participation intention in the future, ‘Moderate’ was the most high at 42.1%. Then, ‘Agree’ and ‘Strongly agree’ was high at 37.% and 6.4%, respectively. This means that in spite of very low awareness and experience level, the participation

Table 3. Experience extent of the urban agriculture.

Variable	Categories	Freq.	%
Experience	No experience	220	67.4
	Experience	108	32.6
	Total	328	100
Experience period	Less than 1 year	49	45.4
	1 ~ 4 years	38	35.2
	5 ~ 9 years	14	13.9
	More than 10 years	6	5.6
	Total	108	100
Satisfaction of experience	Very dissatisfied	2	2.8
	Dissatisfied	8	7.4
	Neither dissatisfied nor satisfied	46	42.6
	Satisfied	45	41.7
	Very satisfied	5	5.6
	Total	108	100
Future ongoing intention	Extremely not	4	4.6
	Not so	11	10.2
	Average	38	35.2
	So	43	39.8
	Extremely so	11	10.2
	Total	108	100

Table 4. Purpose of urban agriculture.

Categories	Freq.	%
Safe food production	174	53.0
Hobby and leisure activity	110	33.5
Physical and mental health	28	8.5
Children’s experience education	7	2.1
Rural perfume	4	1.2
Recovery of neighbor community	2	0.6
Return to farming	3	0.9
Total	328	100.0

willingness was very high. This result could be interpreted as a very high capability of urban agriculture. As for the size of rent garden, in the case of lease a garden, the wanted size of a garden is shown as '16.5~33 m²' (31.7%), '9.9~16.5 m²' (28.4%), 'Less than 9.9 m²' (16.5%), '33~49.5 m²' (14.0%), and '49.5~66.5 m²' (9.5%), respectively. Total average size was calculated as 23.7 m² (7.2Pyeong). In annual rent, 'less than 50,000won' was the top frequency at 34.1%. 50,000~100,000won (32.0%), 100,000~150,000won (23.8%), 150,000~200,000won (9.1%) were high in order, respectively. Total average annual rent was calculated as about 80,000won.

3. Awareness on effects of urban agriculture

Total 20 variables for effects of urban agriculture, were

Table 5. Frequency of awareness to urban agriculture.

Variable	Categories	Freq.	%
Partners	Spouse and family	275	83.9
	Neighbors	36	11.0
	Friends, colleagues	16	4.9
	Etc.	1	0.2
Information gathering	Newspaper, broadcasting and internet	159	48.5
	Related books	50	15.2
	Close friends and relatives	76	23.2
	Agricultural technology center	22	6.7
	Farm operators	11	3.4
	Etc.	10	3.0
Participation intention to urban agricultural activities	Strongly disagree	9	2.7
	Disagree	37	11.3
	Moderate	138	42.1
	Agree	123	37.5
	Strongly agree	21	6.4
Size of rent garden	Less than 9.9 m ²	54	16.5
	9.9 ~ 16.5 m ²	93	28.4
	16.5 ~ 33.0 m ²	104	31.7
	33 ~ 49.5 m ²	46	14.0
	49.5 ~ 66.1 m ²	31	9.5
Annual rents	Less than 50,000won	112	34.1
	50,000 ~ 100,000won	105	32.0
	100,000 ~ 150,000won	78	23.8
	150,000 ~ 200,000won	30	9.1
	More than 200,000won	3	0.9
	Total	328	100.0

tested for reliability. Cronbach's α value was shown very high at 0.943, and no variable was recommended to exclude. This means that the reliability of each variables were very high with the high level of internal consistency.

In the awareness on effects of urban agriculture, mean score of 'Supply of safe agricultural products' was the highest score at 3.83 in the 5-point Likert scale (1=strongly disagree, 5=strongly agree). Then, 'Effect of the learning experience in agriculture' (3.79), 'Psychological sense of stability' (3.78), 'Health promotion' (3.65) were high-scored variables. On the other hand, the negative effects, such as 'Damage and inharmonious of urban landscape' (2.43) and 'Bad influence on rural economy' (2.51), estimated at very low average scores. This means that the negative effects were evaluated as not so much significance (Table 6).

These results were very similar to the precedent research, which was reported as, "urban agriculture is very beneficial leisure activity which have diverse effects, such as nature appreciation, supplying safe agricultural products, pleasure in cultivating garden products, rehabilitation of body and mind, and happiness of sharing with neighbors" (Park, 2011).

Next, an exploratory factor analysis was conducted using the validity test by the KMO (Kaiser-Meyer-Olkin) test and Bartlett's sphericity test. KMO value was 0.862 and the significance of Bartlett's sphericity test was 0.000. This means the factor analysis is adequate and valid, verifying common factors. In the factor analysis, factors having over 1 in eigenvalue and varimax rotation methods were adopted. Generally, the criteria for construct validity of each variable's factor loading score is over 0.5. In this result, factor loading scores of all variables were estimated to be over 0.6, thus the construct validity of variables is verified.

As the result of rotated factor pattern, there were 4 factors. In factor 1, 'Bad influence on rural economy', 'Lack of urban green space by urban agriculture', 'Damaging urban landscape by urban agriculture', 'Occurrence of environmental pollution', 'Pest occurred by the cultivation of the crops', and 'Lack of other living space by urban gardens' were categorized. Therefore, factor 1 was named as 'Negative effects of urban agriculture'. In factor 2, 'Health promotion', 'Psychological sense of stability', 'Recovery of humanity by nature sympathy', 'Revitalization of local community', 'Make change in dietary life', and 'Activation

Table 6. Cognition of the overall effect of urban agriculture.

	Component	Factor loadings	α	Eigen value	% of Variance	Communality	M $\pm$ SD ^z
Factor 1	Bad influence on the rural economy	0.819	0.874	3.754	18.77	0.702	2.51 $\pm$ 0.84
	Lack of urban green space by urban agriculture	0.814				0.683	2.53 $\pm$ 0.80
	Damaging urban landscape by urban agriculture	0.790				0.699	2.43 $\pm$ 0.83
	Occurrence of environmental pollution	0.787				0.662	2.58 $\pm$ 0.78
	Pest occurred by the cultivation of the crops	0.747				0.602	2.80 $\pm$ 0.80
	Lack of other living space by urban gardens	0.719				0.571	2.65 $\pm$ 0.82
Factor 2	Health promotion	0.787	0.865	3.676	18.38	0.734	3.65 $\pm$ 0.86
	Psychological sense of stability	0.780				0.745	3.78 $\pm$ 0.85
	Recovery of humanity by nature sympathy	0.761				0.672	3.55 $\pm$ 0.95
	Revitalization of local community	0.672				0.663	3.33 $\pm$ 0.85
	Make changes in dietary life	0.603				0.652	3.83 $\pm$ 0.80
	Activation of Agriculture by local farming	0.593				0.691	3.16 $\pm$ 0.90
Factor 3	Mitigation of urban heat island phenomenon	0.798	0.822	3.444	17.22	0.689	3.31 $\pm$ 0.77
	Prevention of urban flood and disaster	0.752				0.635	3.14 $\pm$ 0.79
	Improving local environment	0.729				0.624	3.28 $\pm$ 0.82
	Create employment in the city	0.684				0.549	3.13 $\pm$ 0.83
	Promotion of urban and rural exchange	0.603				0.674	3.11 $\pm$ 0.88
Factor 4	Supply of safe agricultural products	0.769	0.780	2.327	11.63	0.721	3.83 $\pm$ 0.81
	Effect of the learning experience in agriculture	0.662				0.629	3.79 $\pm$ 0.79
	Economic benefits (Food security)	0.635				0.605	3.53 $\pm$ 0.84

^zMeans $\pm$ SD.

Cumulative % = 66.03, KMO = 0.862, Bartlett's Chi-Square = 3554.06 (df=190, p=0.000), Mean = Average value of 5-point Likert Scale (1=strongly disagree, 5=strongly agree).

of agriculture' were categorized. Thus, named 'Positive effects of urban agriculture'. In factor 3, 'Mitigation of urban heat island', 'Prevention of urban flood and disaster', 'Improving local environment', 'Creating urban employment', and 'Promotion of urban and rural exchange' were categorized. Thus, factor 3 was named 'Environmental Improving effects'. In factor 4, 'Supply of safe agricultural products', 'Effect of learning experience in agriculture', and 'Economic benefits' were categorized. Therefore, factor 4 was named 'Benefits effects'. The percent of factor 1 for total variance was 18.77%, factor 2 was 18.37%, factor 3 and factor 4 were 17.21%, and 11.63% respectively. Cumulative variance of total factors was 66.03% (Table 6).

4. Preference in type and activities of urban agriculture

Twenty total variables for preference, in type and activities of urban agriculture, were also tested for reliability. Cronbach's

α value was shown very high at 0.868, and no variable was recommended to exclude. This means the reliability of each variables is also high with a high level of internal consistency.

The average score of preference by each variable, 'Home garden cultivation utilizing the rooftops' was the highest score at 3.84, in 5-point Likert scale (1=not at all prefer, 5=very highly prefer). Then, 'Learning education type home garden cultivation' (3.64), 'Home garden development utilizing piece of small land' (3.62), 'Home garden cultivation utilizing the boxes' (3.60) 'Personal weekend farm cultivation in suburbs' (3.56) were high-scored variables. On the other hand, 'Participate in eco-friendly compost production' (3.20), and 'Join urban agriculture leadership training program' (3.23) estimated as relatively low average scores (Table 7). These results were similar to precedent research, which reported that 'Vegetable harvesting' was the most preferred activity, and that 'Fertilizing' was the least preferred activity (Jeong et al., 2013).

Table 7. Preference of type and activity in urban agriculture.

	Measurement item	Factor loadings	α	Eigen value	% of Variance	Communality	M $\pm$ SD ^z
Factor 1	Participate in the rural education farm experience	0.847				0.769	3.33 $\pm$ 0.95
	Participate in the agricultural experience program	0.847				0.780	3.37 $\pm$ 0.94
	Participate in gardening education programs	0.829				0.781	3.39 $\pm$ 0.93
	Participate in eco-friendly compost production	0.810				0.711	3.20 $\pm$ 0.93
	Join urban agriculture leadership training programs	0.791	0.934	6.208	31.041	0.696	3.23 $\pm$ 0.91
	Participate in horticultural healing programs	0.789				0.659	3.52 $\pm$ 0.92
	Join urban agriculture fairs and exhibitions	0.789				0.696	3.38 $\pm$ 0.96
	Participate in healing gardens and nature centers	0.784				0.673	3.49 $\pm$ 0.93
	Donate-produced agricultural products	0.534				0.489	3.36 $\pm$ 0.91
	Learning education type home garden cultivation	0.453				0.473	3.64 $\pm$ 0.86
Factor 2	Cultivation of rental gardens in urban agricultural parks	0.851				0.792	3.46 $\pm$ 0.86
	Cultivation of rental gardens from public institutions	0.851				0.791	3.47 $\pm$ 0.88
	Cultivation of rental gardens in private farmlands	0.789	0.891	4.086	20.429	0.696	3.40 $\pm$ 0.88
	Personal weekend farm cultivation in suburbs	0.743				0.640	3.56 $\pm$ 0.90
	Home garden development utilizing pieces of small land	0.613				0.648	3.62 $\pm$ 0.91
Factor 3	Apartment balcony vegetable garden culture	0.820				0.784	3.51 $\pm$ 1.03
	Home garden cultivation utilizing the boxes	0.807				0.794	3.60 $\pm$ 0.90
	Home garden cultivation utilizing the rooftops	0.786	0.887	3.618	18.089	0.714	3.84 $\pm$ 0.91
	Indoor cultivation of vegetable gardens	0.784				0.721	3.40 $\pm$ 1.04
	Cultivation of residents common vegetable garden in apts.	0.560				0.605	3.49 $\pm$ 1.02

^zMeans $\pm$ SD.

Cumulative % = 69.56, KMO = 0.910, Bartlett's Chi-Square = 5412.84 (df=190, p=0.000), Mean=Average value of 5-point Likert Scale (1=not at all prefer, 5=very highly prefer).

An exploratory factor analysis was also conducted with the validity test by the KMO (Kaiser-Meyer-Olkin) test and Bartlett's sphericity test. The KMO value was 0.910, and the significance of Bartlett's sphericity test was 0.000. This means, the factor analysis was adequate and valid in verifying common factors. In this result, factor loading scores of all variables were estimated at over 0.5, except 'Learning education type home garden cultivation'.

As the result of the rotated factor pattern, there were 3 factors. In factor 1, 'Participate in the rural education farm experience', 'Participate in the agricultural experience programs', 'Participate in gardening education programs', 'Participate in eco-friendly compost production', 'Join urban agriculture leadership training programs', 'Participate in horticultural healing programs', 'Join urban agriculture fairs and exhibitions', 'Participate in healing gardens and nature centers', 'Donate-produced agricultural products', and 'Learning education type

home garden cultivation' were categorized. Therefore, factor 1 was named 'Participations of experiencing/education programs'. In factor 2, 'Cultivation of rental gardens in urban agricultural parks', 'Cultivation of rental gardens from public institutions', 'Cultivation of rental gardens in private farmlands', 'Personal weekend farm cultivation in suburbs', and 'Home garden development utilizing pieces of small land' were categorized. Thus, was named 'Cultivation of rental home gardens'. In factor 3, 'Apartment balcony vegetable garden culture', 'Home garden cultivation utilizing the boxes', 'Home garden cultivation utilizing the rooftops', 'Indoor cultivation of vegetable gardens', and 'Cultivation of residents common vegetable garden in apts' was categorized. Thus, factor 3 Was named 'Lifestyle home garden type'. The percent of factor 1 for total variance was 31.04%, factor 2 was 20.43%, and factor 3 was 18.09%. Cumulative variance of total factors was 69.56% (Table 7).

V. Summary

The purpose of this study was to investigate the awareness of Daegu citizens towards urban agriculture. The intentions of participation and preference of type and activities were the main survey topics, and the results could be utilized as basic data for the activation of urban agriculture of Daegu city.

In cognition of urban agriculture, 78.7% of respondents were of no recognition group, and also 67.1% were of no experience group. This means that the cognition level to urban agriculture is in a very low state. Although, the experienced group had a short period of experience, the level of satisfaction in the experienced group was high. And intentions of participation in the future were also very high. This means that the potential capability of urban agriculture was very strong.

In motivation and purpose of urban agriculture activities, 'Hobby and leisure activities' and 'Safe food production' were shown as high frequency. In addition, a majority of respondents answered 'Spouse and family' as their participation partners. In cognition towards the effects of urban agricultural activity, 'Safe agricultural products', 'Change in dietary life', 'Learning experience', and 'Psychological sense of stability' were shown as a high average score of agreement. In preferences of the types and activities, 'Rooftop gardens', 'Learning/education type home gardens', 'Home garden utilizing the pieces of small land', 'Box home garden', and 'Personal weekend farm' were shown to be highly preferred types. From the result of factor analysis for 20 variables of effects of urban agriculture, 4 factors were categorized; 'Negative effects of urban agriculture', 'Positive effects of urban agriculture', 'Environmental Improving effects', and 'Benefits effects'. In addition, there were 3 factors in preferences for types and activities of urban agriculture; 'Participations of experiencing/education programs', 'Cultivation of rental home gardens', and 'Lifestyle home garden type'.

In conclusion, the cognition and experience of Daegu citizens in urban agriculture is very low. Although the situation of urban agriculture is in its beginning stages, the potential capability of urban agriculture is great. In the future, diverse types of hardware and software programs, such as education/experiencing programs and information supporting programs, will both need to be required for development. Especially, regarding the result of this research, development of daily life

space home gardens such as rooftops, balconies, and box home gardens, should be strengthened as policy and measures for urban agriculture of Daegu city.

VI. References

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