Survey on the Use of Farming Materials in the Elementary School Vegetable Garden in Jeonbuk Area

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ABSTRACT

The purpose of this study is to analyze the patterns of farming materials required for creating and operating elementary school vegetable gardens and to propose a plan for vitalizing business related to urban agriculture. As a result of the survey, the farming materials purchased most for the operation of the school gardens were seeds materials focused on seedlings, compost/fertilizer, and farming tools focused on trowels, sprinklers, and hoes. Purchases of farming materials were made mostly through the internet, while most purchases of seedlings were made in pesticide stores. Therefore, it is necessary to provide information and education related to the use of farming materials. Thus, establishment and maintenance of highly accessible and reliable internet sources are recommended to provide the lists of farm products necessary as well as related information to help users in purchase and use in order to create and operate the school garden. In order to supply high-quality seedlings, it is necessary to provide information and education on the kinds of seedlings, management, cultivation, delivery methods, and the like, focusing on pesticide stores producing and distributing seedlings. Providing such information for participants will improve their satisfaction. Also, if businesses related to urban agriculture use these study results in producing, preparing, managing and selling seedlings and farming materials, they will also be able to generate profits and vitalize urban agriculture.

Keywords: compost, farming tools, school farm, seed, seedling

Introduction

There is a growing interest in urban agriculture as a hobby or leisure activity of urban dwellers along with rapid urbanization. Compared to 2010, the area of urban vegetable gardens in 2016 increased by 9.6 times from 104ha to 1,001ha, and the number of participants in urban agriculture increased by 10.5 times from 153,000 to 1,599,000. Urban agriculture is divided into five categories according to Article 8 of the Act on Development and Support of Urban Agriculture, and participation in urban agriculture for school education was highest at 43.4% (Ministry of Agriculture, Food and Rural Affairs, 2017).

Urban agriculture for school education is referred to as school vegetable garden, school garden school farm, farm school, etc. and has value as a space for life and agricultural experience through farming, educational opportunity to blend

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in with nature, healthy culture and diet, and communication with the community (Min, 2011). Moreover, it has effects on integrated character cultivation (Lee, 2012), and improvement of emotional intelligence, social skills and school adjustment of elementary school students (Han, 2014). Furthermore, experience-based education in school gardens increased students' interest and competency (Moon et al., 2012; Klemmer et al., 2015), while also increasing their physical activities (Wells et al., 2014).

With the promotion of urban agriculture for school education such as school gardens, urban farming programs have been developed in association with elementary school subjects (Rural Development Administration, 2013), along with various educational activities and programs using school gardens to improve scientific research ability (National Institute of Horticultural and Herbal Science, 2010, 2012, 2013a, 2013b, 2014), mathematic ability (National Institute of Horticultural and Herbal Science, 2008), peer relations among elementary school students (Kim, 2013), and creative experience activities of elementary schools (Jae, 2015). In addition, materials are being published on the characteristics of crops and cultural practices to cultivate crops on school gardens (National Institute of Horticultural and Herbal Science, 2013c, 2013d, 2013e, 2013f, 2015a, 2015b, 2015c).

However, it was still difficult to find academic data or reports on information to use farming materials, such as what farming materials are needed for school garden activities, where to purchase them and how to use them, as compared to information on related programs or crop cultivation.

Therefore, this study is conducted to determine the list of farming materials related to school gardens as well as current state of use and problems to increase efficiency in creating and operating school gardens in elementary schools. Furthermore, it is to provide improvement plans and baseline data to vitalize related industries by analyzing the patterns of farming materials required to create and operate school gardens.

Research Methods

This study is conducted on 52 elementary schools in Jeonbuk in April 2016 with the cooperation of Jeollabukdo Office of Education.

The list of farming materials were in 7 categories such as seeds materials (seeds, seedlings, rootstocks), compost/fertilizer (compost, solid fertilizer, liquid fertilizer), mulching material(non-woven fabric, mulching film, chaff, plastic paper), pest control (pesticide, disinfectant, herbicide), training material (wire trellis, trellis netting, supports & stakes), farming tools (trowel, sprinkler, shovel, rake, hoe, sickle, mattock, pick rake, lift rake, pitchfork, hammer, scissors, scratching, knife, sprayer), and others (signpost, sack, hat, gloves, bucket). The list of materials was divided into self-purchase and institutional or business support.

Regarding purchase of farming materials, we investigated information collection route, main purchase channel and reason, product selection standard, purchase cost, ratio of purchase cost for each farming material, and problems and points to improve in purchasing farming materials. Regarding use of farming materials, we investigated problems and points to improve in using farming materials.

Regarding purchase and use of seedlings, we investigated the amount and type of seedlings purchased, purchase channel, selection standard, and problems and points to improve in purchasing seedlings.

We determined the frequency and percentage of the surveyed contents, and multiple responses could be provided for some of the contents, which were reflected on the frequency. We provided the mean for the purchase cost of farming materials and the average ratio for the ratio of purchase cost for each farming material. The types of seedlings purchase were listed in the order of the biggest amount of purchase, giving 5 points to the first, 4 points to the second, 3 points to the third, 2 points to the fourth and 1 point to the fifth.

Results and Discussion

List of farming materials

List of materials possessed by the schools

In the list of farming materials possessed by the schools, most schools possessed seedlings (39.8%) among Seeds material, followed by seeds (33.6%) and rootstocks (26.6%), and most possessed compost (51.5%) among compost/fertilizer, followed by solid fertilizer (32.3%) and liquid fertilizer (16.2%). For mulching material, most schools possessed plastic paper (34.8%), followed by mulching film (27.0%), non-woven fabric (22.5%), and chaff (15.7%), and for Pest control, most possessed pesticide (44.5%), followed by herbicide (29.6%) and disinfectant (25.9%). For training material, most schools possessed supports & stakes (46.5%), followed by wire trellis (34.9%) and trellis netting (18.6%). For farming tools, most schools possessed trowel (9.6%), followed by sprinkler (9.6%), hoe (9.6%), shovel (9.0%), hammer (9.0%), and scissors (7.0%). For others, most possessed bucket (27.4%), followed by signpost (21.6%), gloves (21.6%), and hat (13.7%) (Table 1).

Table 1. List of farming materials owned by school

Item	Sub item	Frequency	%	Total (%)
Seeds materials (n=128)	Seedlings	51	39.8	100.0
	Seeds	43	33.6	
	Rootstocks	34	26.6	
Compost/fertilizer (n=99)	Compost	51	51.5	100.0
	Solid fertilizer	32	32.3	
	Liquid fertilizer	16	16.2	
Mulching materials (n=89)	Plastic paper	31	34.8	100.0
	Mulching film	24	27.0	
	Non-woven fabric	20	22.5	
	Chaff	14	15.7	
Pest control (n=54)	Pesticide	24	44.5	100.0
	Herbicide	16	29.6	
	Disinfectant	14	25.9	
Training materials (n=86)	Supports & stakes	40	46.5	100.0
	Wire trellis	30	34.9	
	Trellis netting	16	18.6	
Farming tools (n=156)	Trowel	15	9.6	100.0
	Sprinkler	15	9.6	
	Hoe	15	9.6	
	Shovel	14	9.0	
	Hammer	14	9.0	
	Scissors	11	7.0	
	Mattock	10	6.4	
	Rake	9	5.8	
	Sickle	9	5.8	
	Sprayer	9	5.8	
	Lift rake	8	5.1	
	Pick rake	7	4.5	
	Scratching	7	4.5	
	Knife	7	4.5	
	Pitchfork	6	3.8	
Others (n=51)	Bucket	14	27.4	100.0
	Signpost	11	21.6	
	Gloves	11	21.6	
	Hat	8	15.7	
	Sack	7	13.7	

Possession route

For the possession route of farming materials, 4.1% of the schools received institutional support such as Agricultural Technology Center or National Agricultural Cooperative Federation, and 95.9% purchased the materials on their own. Seeds material (33.3%) took up the highest ratio of farming materials possessed by institutional support, followed by mulching material (22.2%) and compost/fertilizer (18.5%). Among the farming materials that purchased by school budgets, farming tools (24.5%) showed the highest ratio, followed by seeds material (18.7%) and compost/fertilizer (14.8%) (Table 2).

Table 2. Possession route of school-owned farming materials

Item	Sub item	Institutional support			Using school budget		
		Frequency	%	Total (%)	Frequency	%	Total (%)
Seeds materials (n=128)	Seedlings	3	33.4	33.4	40	33.6	18.7
	Seeds	4	44.4		47	39.5	
	Rootstock	2	22.2		32	26.9	
	Sub total	9	100.0		119	100.0	
Compost/ fertilizer (n=99)	Compost	3	60.0	18.5	48	51.1	14.8
	Solid fertilizer	2	40.0		30	31.9	
	Liquid fertilizer	0	0		16	17.0	
	Sub total	5	100.0		94	100.0	
Mulching material (n=89)	Plastic paper	2	33.3	22.2	18	21.7	13.1
	Mulching film	1	16.7		23	27.7	
	Non-woven fabric	1	16.7		13	15.7	
	Chaff	2	33.3		29	34.9	
	Sub total	6	100.0		83	100.0	
Pest control (n=54)	Pesticide	1	25.0	14.8	23	46.0	7.8
	Herbicide	1	25.0		13	26.0	
	Disinfectant	2	50.0		14	28.0	
	Sub total	4	100.0		50	100.0	
Training materials (n=86)	Supports & stakes	1	33.4	11.1	29	34.9	13.1
	Wire trellis	1	33.3		15	18.1	
	Trellis netting	1	33.3		39	47.0	
	Sub total	3	100.0		83	100.0	
Farming tools (n=156)	Trowel	0	0	0.0	15	9.6	24.5
	Sprinkler	0	0		15	9.6	
	Hoe	0	0		14	9.0	
	Shovel	0	0		9	5.8	
	Hammer	0	0		15	9.6	
	Scissors	0	0		9	5.8	
	Mattock	0	0		10	6.4	
	Rake	0	0		7	4.5	
	Sickle	0	0		6	3.8	
	Sprayer	0	0		8	5.1	
	Lift rake	0	0		14	9.0	
	Pick rake	0	0		11	7.0	
	Scratching	0	0		7	4.5	
	Knife	0	0		7	4.5	
	Pitchfork	0	0		9	5.8	
	Sub total	0	0		156	100.0	
Others (n=51)	Bucket	0	0	0.0	11	21.6	8.0
	Signpost	0	0		7	13.7	
	Gloves	0	0		8	15.7	
	Hat	0	0		11	21.6	
	Sack	0	0		14	27.4	
	Sub total	0	0		51	100.0	
Total		27		100.0	636		100.0

Jang et al. (2016) reported that farming materials mostly used by urban dwellers are seeds/seedlings, small farming tools like watering sprinkler, trowel and hoe, and working tools like gloves. This study also includes the list of items above. According to the survey, seedlings were the most common seeds material possessed by schools or were provided by institutions. This is because they tend to purchase and use seedlings in appropriate sizes according to the planting period rather than using seeds that require facilities, cultivation, management and time consideration for the raising of seedlings. For compost/fertilizer, compost showed higher possession and institutional support than solid or liquid fertilizer, which is in light of the demand from the members of the schools trying to take more environmentally friendly approach rather than using chemical fertilizers. In terms of frequency only, the farming materials that are most commonly purchased and possessed by schools were farming tools like trowel, sprinkler and hoe. Since farming tools are higher-priced than Seeds materials, it can be considered in pursuing profit generating projects related to school gardens.

Based on the survey, we can come up with a list of basic farming materials necessary for creation and operation of school gardens, and determine the farming materials to prepare depending on the school's budget and crops for cultivation. Farming materials companies related to urban agriculture can use the study results to prepare seeds, raising of seedlings and farming materials to support school gardens.

Purchase and use of farming materials

Information collection route

Most schools used the internet (33.3%) as the information collection route to purchase farming materials, followed by farming materials dealer (29.4%) and others (people with experience, farmers, etc. 25.5%) (Table 3).

Main purchase channel

For the main purchase channel of farming materials, pesticide store (61.5%) took up more than half, followed by flower

Table 3. Purchase routes and factors affecting the purchase

Item	Sub item	Frequency	%	Total (%)
Information gathering route (n=51)	School gardening support organizations	5	9.8	100.0
	Agricultural booklet	1	2.0	
	Internet	17	33.3	
	Farming goods dealer	15	29.4	
	Others	13	25.5	
Main purchase route (n=52)	Flower garden (flower store)	8	15.4	100.0
	Supermarket	4	7.7	
	Internet	4	7.7	
	Pesticide store	32	61.5	
	Others	4	7.7	
Reasons for purchase (n=45)	It is easy to buy.	28	62.3	100.0
	It is cheap.	1	2.2	
	They sell various goods.	5	11.1	
	I can get information about the farming material.	10	22.2	
	Others	1	2.2	
Product selection standard (n=54)	Price of product	3	5.6	100.0
	Product performance/quality	25	46.3	
	Product design/packaging unit	1	1.8	
	Seller's recommendation	19	35.2	
	Eco-friendly products	5	9.3	
	Others	1	1.8	

store (15.4%), hypermarket, online stores, and others (local market, etc.) (all 7.7%). Most of them used such purchase channel because it is easy to purchase (62.3%), followed by 'because they can obtain information related to farming materials' (22.2%), 'because various products are sold' (11.1%), and 'because it is affordable' (2.2%).

Product selection standard

Product performance and quality (46.3%) showed the highest ratio among product selection standard for purchasing farming materials, followed by seller's recommendation (35.2%), eco-friendly products (9.3%), and price of product (5.6%).

Ratio of purchase cost

The average purchase cost of farming materials was 257 thousand won a year, and the ratio of purchase cost was highest for seeds material (33.3%), followed by compost/fertilizer (25.0%) and farming tools (18.8%) (Table 4).

Problems and points to improve in purchase

The most common problem in purchasing farming materials was that it is difficult to obtain information in using farming materials (62.5%), followed by the need to purchase more than they need because the packaging units are too big (18.8%), and only few options because there are not many types of products (12.5%). For points to improve in purchasing farming materials, most schools pointed out the need to provide information on purchasing and using farming materials (44.4%), followed by the need to more easily get the products by increasing sellers (22.21%), and the need to make the packaging units smaller (16.6%).

Problems and points to improve in use

The item that was most problematic in using farming materials was seeds/seedlings (46.3%), followed by pest control materials (24.1%), farming tools (13.0%), compost/fertilizer (7.4%), and mulching material (7.4%). More specifically, lack of information on the use of farming materials (34.9%) showed the highest ratio, followed by difficulty in maintenance (20.9%), poor quality (18.6%), inconvenience in transport (9.3%), and inconvenience in storage (4.7%). For others (11.6%), the schools responded that they do not know how to control insects because use of pest control materials are banned at school, and that pest control materials are hazardous to students and are difficult to manage and use.

For points to improve in using farming materials, most schools pointed out the need to provide related information and education on using farming materials (48.1%), followed by improving quality and implementing a certification system (23.1%), operating a warehouse (21.1%), and developing products that are convenient to transport (7.7%) (Table 5).

Table 4. Percentage of purchases made for farming materials

Item		Percentage (%)
Percentage of purchases	Seeds materials	33.3
	Compost/fertilizer	25.0
	Mulching materials	12.1
	Pest control	11.0
	Training materials	12.5
	Farming tools	18.8
	Others	13.3

Table 5. Problems and improvements in purchasing farming materials

Item	Sub item	Frequency	%	Total (%)
Problems when purchasing (n=16)	I do not know where to buy	0	0.0	100.0
	The price of the product is expensive	1	6.2	
	The type of product is simple	2	12.5	
	Buy large packaging units, more than necessary	3	18.8	
	Information on the use of farming materials is unknown	10	62.5	
Improvements in purchasing (n=18)	Expansion of sales place, ease of purchase	4	22.2	100.0
	Lower price	0	0.0	
	Quality improvements	1	5.6	
	Product diversification	1	5.6	
	Packing of products	3	16.6	
	Purchase of farm products and information	8	44.4	
	Others	1	5.6	
Items that are problematic when using (n=54)	Seeds / seedlings	25	46.3	100.0
	Compost / fertilizer	4	7.4	
	Mulching material	4	7.4	
	Pest control	13	24.1	
	Farming tools	7	13.0	
	Others	1	1.8	
Usage problems (n=43)	Poor quality	8	18.6	100.0
	Discomfort during transportation	4	9.3	
	Inconvenience of storage	2	4.7	
	Difficult to maintain	9	20.9	
	Inadequate information on the use of farming materials	15	34.9	
	Others	5	11.6	
Improvements in use (n=52)	Quality improvement and certification system	12	23.1	100.0
	Development of convenient transportation	4	7.7	
	Warehouse operation	11	21.1	
	Provide information on the use of farming materials and conduct education	25	48.1	

Jang et al. (2016) also claim that in the current state of using farming materials among participants of urban agriculture, most of them responded that the biggest problem in purchasing farming materials is that it is 'difficult to obtain information on using farming materials.' To facilitate activities based on school gardens, participants must be able to easily obtain the necessary farming materials as well as their features and related information. Members of the schools mostly used the internet to obtain information on purchasing farming materials, because they are likely to find all kinds of related information online. However, the data are so sporadic and extensive that beginners of school gardens may face difficulty in obtaining accuracy of information and selecting products. Accordingly, agricultural science book digital publication plaza 'Nong/Seo/Nam/Book (<http://lib.rda.go.kr/pod/main.do>)' operated by Rural Development Administration provides full texts of various books it has published for free, as well as many books about school gardens. In particular, 'School Garden A to Z (National Institute of Horticultural and Herbal Science, 2015c)' provides all kinds of information about farming materials necessary for school gardens, and 'Urban Agriculture Farming Materials for Complete Beginners in Urban Farming (National Institute of Horticultural and Herbal Science, 2016a)' provides information on farming materials required for urban agriculture. However, even though the books are provided in e-book, their immediate accessibility is low because the participants must understand the contents of the entire book or search and download them. Thus, it is necessary to build a systematic online website that provides accurate and current information on urban agriculture farming materials related to school gardens. 「Urban Agriculture Comprehensive Information Service」 'Everyone is an Urban Farmer (<https://www.modunong.or.kr:449/main.do>)' operated by the Korea Agency of Education, Promotion and information Service in Food, Agriculture, Forestry and Fisheries provides all kinds of information on

urban agriculture, but information on farming materials merely connects users to sellers of farming materials. The agricultural technology portal 'Nongsaro (<http://www.nongsaro.go.kr/portal/portalMain.ps?menuId=PS00001>)' run by Rural Development Administration provides all kinds of information about school gardens, but it does not have a separately organized section on farming materials. Thus, it is necessary to propose and implement a system in which knowledge and technological information can be uploaded on an online website related to urban agriculture that is in good use and has public confidence so that users can search and purchase such information as a one-stop service. Moreover, through this system, companies can submit online and offline seller information of farming materials and provide service after undergoing a series of qualification procedures.

Furthermore, it is necessary to develop and supply farming materials and tools suitable for urban agriculture (Park and Oh, 2011). Companies developing and selling farming materials for urban agriculture must try to provide sufficient information on product features and use on their online websites, and this must also be recommended in terms of policy measures.

Aside from the internet, schools tended to purchase and collect information about farming materials through pesticide stores. Thus, it is necessary to provide education for pesticide stores selling farming materials for urban agriculture so that they can provide accurate information, and also use pesticide stores as the base that provides information and how to access such information, and advertises the online websites.

Purchase and use of seedlings

Species and amount of seedlings purchased

Most schools (41.2%) purchased 10-15 seedlings at once, followed by 5-10 (29.4%), 50 or more (23.5%), and 1-5 (5.9%) or less (Table 6).

Most of them (64.7%) purchased 2-5 species of seedlings at once, followed by 5-10 species (23.5%) and 1-2 species (11.8%). Pepper (47 points) took up the most amount of seedlings purchased, followed by lettuce, tomato, eggplant and cucumber (Table 7).

Purchase channel of seedlings

Pesticide store (52.9%) showed the highest ratio in the purchase channel of seedlings, followed by flower store (35.3%), hypermarket (5.9%), and online (5.9%). They used that channel because it is easy to purchase (71.4%), because it offers a variety of goods (21.4%), and because it is affordable (7.2%) (Table 8).

Table 6. Number of vegetable species and quantity of seedlings purchased for school garden

Item	Sub item (ea)	Frequency	%	Total (%)
Quantity of seedlings per each purchase	Less than 1 ~ 5	1	5.9	100.0
	5 ~ 10	5	29.4	
	10 ~ 50	7	41.2	
	More than 50	4	23.5	
Number of different species of seedlings per each purchase	1 ~ 2	2	11.8	100.0
	2 ~ 5	11	64.7	
	5 ~ 10	4	23.5	

Table 7. Species of seedlings used in school garden

Item	Point
Pepper	49
Lettuce	30
Tomato	27
Eggplant	22
Cucumber	14
Sweet potato	10
Peanut	5
Cabbage	5
Ginger	4
Young radish	4
Corn	4
Spinach	3
Green onion	3
Perilla	3
Potato	2
Burdock	2
Chives	2
Korean knotweed	1
Pumpkin	1
Crown daisy	1

Table 8. Places used to purchase seedlings and problems and improvements in purchasing seedlings

Item	Sub item	Frequency	%	Total (%)
Main purchase place of seedlings (n=17)	Flower gardens	6	35.3	100.0
	Supermarkets	1	5.9	
	Online stores	1	5.9	
	Pesticide stores	9	52.9	
Reason for choosing the place (n=14)	Easy to buy	10	71.4	100.0
	Affordable price	1	7.2	
	Variety of goods	3	21.4	
Selection standard for seedlings (n=17)	Prices of seedlings	0	0.0	100.0
	Quality of seedlings	7	41.2	
	Seller's recommendation	5	29.4	
	Eco-friendly seedlings	3	17.6	
	Others	2	11.8	
Problems when purchasing seedlings (n=21)	Difficult to buy desired seedlings at desired time	3	14.3	100.0
	Lack of information on crop names and varieties	12	57.1	
	Prices of seedlings are expensive	1	4.8	
	Uncomfortable packaging and transportation	4	19.0	
	Poor seedlings quality	0	0.0	
	It is difficult to obtain information on crop cultivation	1	4.8	
Improvement in purchase of seedlings (n=16)	Expanded sales points, easy to buy at any time	5	31.2	100.0
	Provide information on crop names and varieties	6	37.5	
	Lower seedling prices	0	0.0	
	Development of easy-to-carry packaging products	4	25.0	
	Good seedlings for sale	0	0.0	
	Provide information or training opportunities for growing crops	1	6.3	

Seedling selection standard

For selection standard of seedlings, quality of seedlings (41.2%) showed the highest ratio, followed by seller's recommendation (29.4%), eco-friendly seedlings (17.6%), and others (ease of purchase, etc.) (11.8%).

Problems and points to improve in purchasing seedlings

Regarding problems in purchasing seedlings, most schools (57.1%) responded that there is not enough information on crop names and varieties, followed by the response that packaging and transport are inconvenient (19.0%), and that it is difficult to purchase the right seedlings at the right time (14.3%). For points to improve, most schools pointed out the need to provide information on crop names and varieties (37.5%), followed by the need to be able to easily obtain seedlings at the right time by increasing sellers (31.2%), develop packaging goods that are easy to carry (25.0%), and provide information or education on cultivation of crops (6.3%).

The biggest problem in using farming materials was ‘seeds/seedlings,’ which is consistent with the study result by Jang et al. (2016). Moreover, the internet was the most common purchase channel for farming materials, whereas the pesticide store was the most commonly used channel to purchase seedlings. While there are some specialized and systemized pesticide stores, many stores get the supply of seedlings and sell them only during March-May and August-September when seeds or seedlings for urban agriculture are mostly sold. There may be confusion in the species of seedlings in this process, and there may be damage due to low temperature at night outdoors after receiving the delivery. Planting low quality seedlings will only disappoint the students that are the main participants of school gardens, and deteriorate their interest in urban agriculture.

Thus, it is necessary to develop and supply a guidebook on cultivating crops or purchasing seeds for urban agriculture (Park and Oh, 2011), and to provide and promote education for pesticide stores selling farming materials about classifying seedlings and seeds, managing quality, and packaging and delivering seedlings for distribution (National Institute of Horticultural and Herbal Science, 2016b). Moreover, it will be possible to gradually implement the ‘quality improvement and certification system (Jang et al., 2016)’ of seedlings for urban agriculture. With these efforts, positivity of urban agriculture experience will be enhanced, and it will also be possible to expand urban agriculture and secure its sustainability.

However, this study has limitations as it is conducted only on some elementary schools in Jeonbuk. Thus, it is necessary to expand the scope of research to the national level in order to generalize the results.

Conclusion

This study is conducted to analyze the patterns of farming materials required in creating and operating school gardens by determining the list of farming materials, current state of use and problems related to elementary school gardens, and propose plans to make improvements and activate programs related to urban agriculture.

The results of this study showed that the farming materials required for managing school gardens were Seeds material focused on seedlings, compost/fertilizer focused on compost, and farming tools focused on trowel, sprinkler and hoe. Farming materials were mostly purchased on the internet, while seedlings were mostly purchased at pesticide stores. The biggest problem in purchasing and using them was lack of information. Accordingly, many participants responded that there is a need to provide information and education regarding use of farming materials. Therefore, it is necessary to provide the list of farming materials required in creating and operating school gardens, and establish and constantly manage a highly accessible and reliable online website to provide related information on purchase and use. Furthermore, there is a need to provide information or education on types of seedlings and methods of management, cultivation and delivery for pesticide stores producing and distributing seedlings in order to supply high quality seedlings. Providing such information for participants of school gardens will not only improve participant satisfaction but also contribute to generating profit and vitalizing urban agriculture if businesses related to urban agriculture use these study results in producing, preparing, managing and selling seedlings and farming materials.

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