

Preferences of Farmers for Educational Materials to Build their Capacity for Small-Scale Urban Gardening: A Case of Maryland

Lila B. Karki and Prem Bhandari

The University of Maryland Eastern Shore, USA

Corresponding author: lkarki@umes.edu

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ABSTRACT: *This paper explores the preferences of urban gardening farmers for various training modules, learning resources, and timing for participation in training programs. Capacity building programs are critical to empowering urban gardeners to sustain farming. Using the data collected in 2021 from 14 urban gardeners in Maryland, the results show that farmers preferred audio-visual learning modules such as digital learning videos and comprehensive training manuals the most. These were followed by one-on-one consultation, peer-to-peer interaction, hands-on training, interactive meetings, and participatory workshops. Partnerships with local and community farmers' markets; partnerships with farmers' forums, groups, and associations; and educational events such as training programs were among the three top preferred learning resources. Regarding the time and schedule preferences, they recommended day-long multi-session weekend workshops over weekdays. These findings suggest a need to adapt the capacity building modalities and timing of training to increase clientele participation for effective program impact.*

KEYWORDS: capacity building, urban gardening, learning modality, timing preference

INTRODUCTION

This paper uses data collected in 2021 to elucidate the perceived needs reported by small, socially disadvantaged minority (SSDM) urban gardening (UG) farmers in Maryland and their preferences for capacity building training programs, learning resources, and timing of participation in training events. It is well recognized that small farms, most of which are family farms, are the backbone of U.S. agriculture (Moak, 2015; Dorn, 2021). In 2017,

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these small family farms accounted for 96% of all U.S. farms (Dorn, 2021). Overall, \$318 billion worth of agricultural products were produced by small, medium, and large family farms, and 19% of the value of all agricultural products sold in 2017 came from small family-owned farms including 45% of direct-to-consumer sales (Dorn, 2021).

Despite the significance of these small farms, small farmers across the U.S. are at the crossroad of survival (Semuels, 2019; Goetz and Debertin, 2001; Lobao and Meyer, 2001). These farmers have been daunted due to ever-increasing challenges while striving to obtain their livings from the farm, an important and sustainable source of household income (Goodwin and Gouldthorpe, 2013). The evidence suggests that they are declining in number. A significant portion of these small-scale producers have been abandoning farms they inherited and farms they owned (Goetz and Debertin, 2001; Lobao and Meyer, 2001). On top of this, the next generation (iGeneration or Generation Z) appears reluctant to enter agricultural professions due to a lack of competitive or lucrative returns. Maryland farmers are no exception. According to GICA (2011), the trend of abandoning inherited and owned farms in Maryland has been increasing for 40 years. Furthermore, according to the 2012 Agriculture Census, Maryland farmers are also a largely aging population.

Moreover, farmland has become more expensive for those younger generations wishing to enter agriculture or expand their operations, resulting in similarly higher cost for both producers and consumers. Like a chain effect, the loss of farmland (abandoned farms) also dries up the ability of community markets to sell commodities to other farmers, adversely affecting local employment. The economic sustainability of smallholder farmers, who work hard to supply fresh produce to the kitchen table is in jeopardy.

The willingness of smallholder farmers, including urban gardeners, to remain in agriculture is greatly challenged by several factors, including inadequate demand-driven knowledge and skills, limited access to hands-on and experiential learning opportunities, a lack of market information (produce prices, supply and demand in the community) and market access, lack of regular outreach, and limited education. A needs assessment survey of beginning farmers in Maryland reported that land, marketing, and financing were among the high-ranking issues reported by beginning farmers (Dill et al., 2012).

Recently, the concept of urban agriculture (UA) has received much attention and interest from scholars and academic institutions across the U.S. (Siegener, Sowerwine, and Acey, 2018). The history of urban gardening dates back to 1970s, when urban farming became part of the social justice movement that encouraged sustainability. By the 1990s urban gardening became an essential part of inner cities to provide fresh produce. As cities grew, many green spaces for growing food were replaced by high-rise buildings. This loss of green space encouraged indoor farming or gardening.

Urban agriculture not only provides access to fresh produce, but also minimizes the use of harmful pesticides. In the United States, urban gardening has grown by more than 30% in the past 30 years (Altieri, 2019; Siegner, Sowerwine, and Acey, 2018). It is estimated that urban agriculture alone could meet 15 - 20% of global food demand (Altieri, 2019).

Smallholder farmers such as urban gardeners, are increasingly struggling with various challenges that influence their capacity to increase production and move towards profitable farming practices negatively impacting their sustenance (Fan and Rue, 2020). However, very few studies focus on challenges of small and minority farmers including those of urban gardening farmers (Keller, 2014; Tritsch et al., 2022). These challenges range from the availability of space, an abundance of rules and regulations, and possibly a lack of adequate sunlight. Further there is a scarcity of access to appropriate production technologies, needs-based educational opportunities, and knowledge and skills about emerging climate-smart urban gardening practices. Other challenges include the high transaction costs associated with community markets, and increasingly expensive production inputs. Other pressing challenges are limited space, lack of rules and regulations, and possibly a lack of enough sunlight. With fast-changing technological advancements and rapidly expanding globalization, the environments for production and marketing of these small and urban farms have become more competitive. Farmers require training to enhance and continually update their knowledge and skills. In a needs assessment survey conducted by Karki and Escobar (2022) in Maryland, 89% of farmers revealed a lack of production knowledge and skills as one of the major problems impeding their progress in farming. Similarly, in an exploratory case study carried out in 2022 in Maryland, nearly 79% of small, beginning and minority farmers reported that a lack of production knowledge and skills is either an extremely important or a very important problem they are facing (Karki and Bhandari, 2022). This evidence suggests that farmers seriously realize the need for training to empower themselves to remain in and succeed in farming.

Extension personnel have put considerable effort into building and enhancing the capacity of farmers to succeed. However, while extension personnel are abreast of the changing modalities of the training programs, in general, they use various conventional approaches such as in-house or in-class trainings. The effectiveness of conventional teaching-learning models are questionable in this iGeneration era heavily influenced by information and internet technologies. In addition, most of the capacity building training for farmers, run by government funded extension, is conducted on weekdays. There has been little emphasis on studying farmer preferences for teaching-learning modules learning resources, or on the optimal timing of farmer training programs. Cognizant of the fast-changing teaching-learning environment for farmers, this study investigated but was not limited to the

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following: i) the usefulness of capacity building modules; ii) the relative importance of various learning resources; and iii) the timing preference to participate in training.

Literature/Theoretical underpinning

Learning Modules for Farmers

Farmers require regular capacity enhancing/building training programs to keep abreast of cutting edge technologies and emerging practices. Updating knowledge and information is critical to empowering small-scale minority farmers in particular. These farmers have limited access to knowledge, improved technologies and other relevant information. Thus, availability and access to various learning materials become essential in the absence of sufficient extension agents to reach all farmers wishing to receive extension services (Zoundji et al., 2016; Bentley et al., 2015).

Extension professionals have often used a variety of formal and informal methods to build and enhance the capacity of farmers. The formal teaching-learning modules primarily focus on the classroom teaching approach rather than hands-on or real-life world experiential learning. Whereas, the informal learning takes place outside the classroom or curricula of educational institutions (Venkatram & Sakthirama, 2018). While formal classroom learning modules are more suitable for young students, informal training modules are relevant for adult farmers. Below, we discuss various conventional teaching and learning modules for farmers. These learning modules are grouped under audio-visual learning aids and interpersonal interactive learning aids.

Audio-Visual Learning Aids

The audio-visual learning aids encourage self-directed and self-motivated learning by the farmers. These aids do not allow for interaction between the learner and the resource personnel.

Digital learning video. A digital learning video is an electronic medium of learning through videos such as a digital versatile disc (DVD) with learning material (Zoundji et al., 2016). This is one of the commonly used and preferred modules of self-directed learning (Bentley et al., 2015). Farmers watch recorded videos of subject matters of their interest and learn methods and techniques. Oftentimes, these videos are prepared and sold in the market to the farmers. However, agricultural extension offices prepare these educational videos for free distribution. This module is important where farmers are sparsely located and support from extension agents is quite limited, for example, the rural U.S. or in developing countries.

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YouTube videos. Farmers often use YouTube videos to learn about different methods or techniques, or to learn some new practices of interest. These videos are usually published by private and public institutions or individuals and are available online.

Radio and television programs. Exposure to media is one important factor contributing to technology adoption. Radio and television, as extension tools, are mass communication approaches that reach a large audience as compared to other methods. Radio and television are able to reach even rural smallholder and disadvantaged illiterate farmers and provide them with information on all aspects of agricultural production (Parvizian, Lashgarara, and Nejad, 2011). When there are limited extension agents who cannot reach a large number of sparsely distributed farmers, this method of learning is very useful for many farmers.

Extension publications. Publishing and distributing extension materials such as factsheets, flyers, brochures, pamphlets, operational manuals, technotes and newsletters to farmers as an extension tool is an age-old practice of informal learning. These short communication kits are important learning resources for farmers.

Training manual. A training manual is a published material in the form of a book that provides a set of step by step instructions for learning. The training manual is commonly used by experts or professionals during in-person, remote, or on-demand training. This is another commonly used module of learning for farmers.

Interpersonal Interactive Learning Aids

Interpersonal interactive learning aids allow interpersonal interaction between a resource person and a learner. Below are a few examples of interpersonal interactive learning.

Peer-to-peer interaction. Peer-to-peer (P2P) learning is an approach of learning things from one's peers. In P2P interaction, farmers meet and learn from fellow farmers. Farmers learn directly from other farmers in multiple ways: through conversations, visual observation of farming practices (Sutherland and Marchand, 2021). The P2P interaction is one of the most effective learning modules recognized by farmers and extension professionals when the participants are dealing with complex and multifaceted problems (Karki and Escobar, 2022; Karki and Bhandari, 2022).

One-on-one counseling. One-on-one counseling as an extension tool is useful when a farmer seeks specific information or advice from an expert or extension professional, for example, on farm planning, budgeting, enterprise selection, farm management or marketing. This can be done face-to-face, by telephone, or by other means of communication such as messenger.

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One-on-one consultation. One-on-one consultation provides the opportunity to learn things via consultation with experts or extension professionals (subject matter specialists, agents, educators, etc.). This is one of the important tools to teach more specific but complex issues or to solve complex problems. This tool can be ideal for improving farmers' knowledge and skills and helping them achieve their goals in a direct and learner-friendly way.

Online webinar/interactive/meeting/workshop/training. With the growth and development of internet facility and online platforms such as Zoom, Blue Jeans, Teams, and many others. Organizing events through interactive webinars has become a common practice, especially since the COVID-19 pandemic, in teaching-learning. Farmers enhance their knowledge on various areas of interest while staying at home or in the office.

Farm visit/tour. A farm tour gives farmers exposure to other farmers' fields or demonstration plots. Farm tours provide an opportunity for participants to observe actual farms, their production, and the use of various tools, techniques, and technologies in practice. Farm tours also provide an opportunity to interact with the owner or manager of the farm and other fellow farmers and discuss problems or challenges they face. In addition, according to Jameson (2016), a farm tour can be an excellent marketing tool for those hosting the event.

Field days. Farmer field days are educational events organized by farms or agricultural extension programs at universities or extension services on their farms. Field days are important events for sharing innovative ideas (SARE, nd). They are organized to demonstrate different methods, tools, equipment, and techniques or results to the interested farmers, researchers, students, community members, media, and agricultural professionals. This is an approach where farmers receive the opportunity to meet with other farmers and experts, learn about new technology, and observe the performance of the technology being shared or applied. According to Emerick and Dar (2020), farmer field days enhance farmers' learning, help increase adoption of an improved technology, and are cost-effective and impactful for disadvantaged and poor farmers.

Hands-on training. Hands-on training (also known as experiential learning) is one important extension tool that allows farmers to learn by doing. Hands-on training allows farmers to put theory into practice and apply their knowledge in real-world settings.

Virtual presentations. With the development of internet facilities and virtual presentation platforms such as Zoom, Blue Jeans, Microsoft Teams and Google Meet, resource persons are widely using virtual presentations as a teaching-learning tool and participants benefit from them without long-distance travel, additional costs, and other routine work. Virtual presentations allow live interpersonal communication between instructors and learners, but

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the interaction is often limited unless there is a discussion session. One significance of virtual presentation is that it has reduced the geographical barrier and the need to travel.

METHODOLOGICAL APPROACH

An exploratory case study of urban gardening was conducted in 2021 with small-scale minority farmers in Maryland to investigate the situation, scope, and issues of urban agriculture and urban gardening farmers. The University of Maryland Eastern Shore (UMES)- UMES Extension, in collaboration with the local people identified 14 farmers, mostly from the greater Baltimore area. These farmers were identified as urban gardening farmers/gardeners, synonymously called urban agriculture (UA) and community gardening (CG). A convenience sample was applied as reported by Barbieri and Mahoney (2009); Pool (2014) cited in Tritsch et al. (2022) small producers are not formally organized making it difficult to follow a probability sampling technique for a representative sample. As this was a case study, we collected information from only a small group of farmers.

Data were collected using a semi-structured quantitative survey (also called a needs assessment survey), which was designed to collect farmers' background information, farming experience, size and scale of farming, reasons for farming, and identification of problems/needs. In addition, an in-person interactive workshop, an online survey, email and telephone communications, and farm-field visits were conducted to gather necessary information for triangulation. The data collected through the quantitative survey was examined using Excel and SPSS software. Due to the exploratory nature of the study and small sample size, the focus was primarily on descriptive results such as frequencies and percentages. In addition, where appropriate, we calculated the average priority index for ranking and comparative analysis of items measured on a 5-point Likert scale (e.g., extremely important/useful with a weight of 5 to not at all important/useful with a weight of 1). The priority index was calculated using the equation:

$$[(n*5) + (n*4) + (n*3) + (n*2) + (n*1)/N]$$

where,

n is the number of responses or observations in each column

N is the total number of samples (here the participating farmers)

Numbers 5, 4, 3, 2, and 1 - the Likert scale ranging from 5 to 1.

The results are described below. Due to the small sample size as well as non-random nature of the samples, the results and conclusions should be used with caution.

RESULTS/FINDINGS

The results and discussions follow the background characteristics of the participating farmers, the usefulness of various learning modules as reported by the farmers, the perceived capacity building expectations and timing of training as reported by the farmers, and the inferred conclusions.

Farm Characteristics*Demographic characteristics*

The overall ages of the farmers ranged from 26 to over 60 years, with nearly half over the age of 50. Overall, 35.6% of the participants were women (Table 1). A large majority of the farmers were from Baltimore County and Baltimore City (42.8%) and Somerset County (36%). The farmers belonged to a diversity of ethnic minorities: Hispanic/Latino (7%), White/Caucasian (7%), Non-Hispanic/Latino (7%), African American (15%), and Asian (64%).

Characteristics	Percent
Gender	
Female	35.7
Male	64.3
Age group	
26-34	14.3
35-44	35.7
45-50	7.1
51-59	35.7
Over 60	7.1
County of residence	
Anne Arundel	14.3
Baltimore	42.8
Somerset	35.7
Wicomico	7.1
Race/ethnicity	
Black or African American	14.3
Hispanic or Latino	7.1
White	7.1
Asian	64.3
Non-Hispanic Latino	7.1

Table 1: Farms' Characteristics (n=14).

Type of farmer

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According to the survey results, nearly 86% of the farmers reported that they were seasonal farmers and the rest were part-time farmers. One-half of them had more than 10 years of experience in farming, while the other half were beginning farmers, and nearly 36% of them had 1-5 years of farming experience. Nearly 86% of them farmed in backyard kitchen gardens and the remaining 14% in community gardens. The average size of the farm was 1.20 acres (with a median size of 0.38 acres) that ranged from 0.06 acres to 11 acres (only one farmer).

Reasons for farming

Regarding the primary reasons for farming, 79% reported it was for outdoor and physical activity and. Similarly, 79% mentioned that urban gardening was to produce food for family consumption (Table 2). Fifty-seven percent stated it was for supplemental income, followed by passing the time (50%), educational opportunity (14.3%) and for the ease of tax benefits (only 7%).

Reasons	Percent
Outdoor and physical activity	78.6
Produce for family consumption	78.6
For supplemental income	57.1
Time pass	50.0
Educational purpose	14.3
For tax benefits	7.1

Table 2: Primary Reasons for Farming (n=14).

Farm enterprises

Most of the farmers reported growing vegetables, fruits, specialty crops, and herbal medicinal plants. A large majority (93%) of the farmers reported that they cultivated vegetables (Figure 1). Nearly 36% of them reported fruits, followed by medical herbal plants 28.6%, 14% raised poultry, and 7% reported peacock, mussel, oyster, and duck. The top five most grown vegetables were tomatoes, spinach, beans, eggplant, and chili. Apple, pear, and fig were among the fruit crops reported.

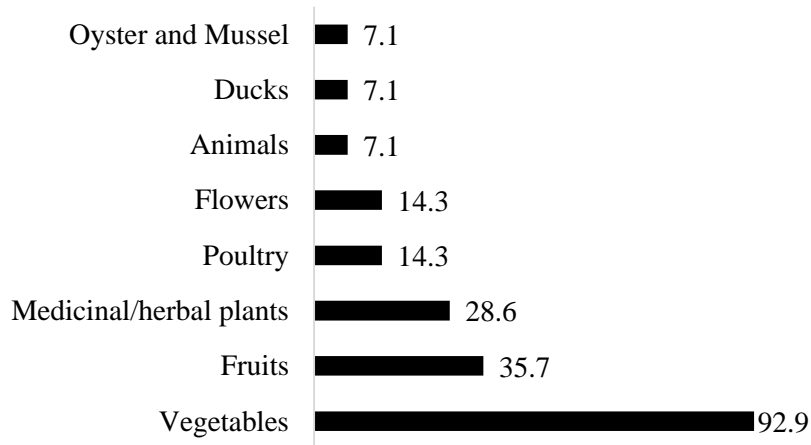


Figure 1: Farm enterprises (n=14).

Usefulness of Learning Modules for Urban Gardening Farmers

As discussed earlier, there are various ways farmers acquire or update their knowledge and skills about new technologies and practices for their self-improvement. In this study, participant farmers ranked the most preferred learning modules included in the survey. Of the 13 learning modules, the farmers ranked them into eight categories based on index value (Table 3). The responses were measured on a five-point Likert scale - extremely useful (5) to least useful (1). Based on the ranking index, the descending index value shows their preferences as follows: digital learning video (4.3); comprehensive training manual (4.2); followed by one-to-one consultation, peer-to-peer interaction, and hands-on training, each with an index value of 3.7. Virtual presentations/learning (3.1), and a radio or tv program (2.7) were among the least preferred modules.

Learning models/materials	Level of usefulness (percent)					Index value
	Least useful	Slightly useful	Moderately useful	Very useful	Extremely useful	
1. Digital learning video	0	7.1	0	50.0	42.9	4.3
2. Comprehensive training manual on farm business management of agri. enterprises	0	7.1	0	57.1	35.7	4.2
3. Peer-to-peer interaction	0	28.6	0	42.9	28.6	3.7
4. One-on-one consultation	0	28.6	0	42.9	28.6	3.7
5. Hands-on training	0	14.3	7.1	71.4	7.1	3.7
6. Extension publications (factsheet, flyer, brochure, pamphlet, newsletter)	0	14.3	21.4	57.1	7.1	3.6
7. Webinar/interactive meeting/workshop/training	0	28.6	7.1	50.0	14.3	3.5
8. YouTube video	0	21.4	14.3	57.1	7.1	3.5
9. Farm visit/tour	0	35.7	0	50.0	14.3	3.4
10. Field days	0	21.4	28.6	35.7	14.3	3.4
11. One-on-one counseling	0	35.7	0	57.1	7.1	3.4
12. Virtual presentations	0	35.7	21.4	42.9	0	3.1
13. Radio or TV program	0	64.3	7.1	21.4	7.1	2.7

Table 3: Usefulness of Learning Modules to Increase Farming Knowledge and Skills (n=14).

Usefulness of Learning Resources for Urban Gardening Farmers

Reducing the knowledge gap for small-scale, minority, and beginning urban gardening farmers is paramount for sustainability of their livelihoods. There are various resources such as partnership with farmers' markets, farmers' organizations, association, groups, forums, educational events such as workshops, and many others available to farmers from which they can learn, update, build, and strengthen knowledge and skills related to farming in general and urban gardening in particular. In this study, participating farmers were asked to rate the degree of importance of seven learning resources on a five-point Likert scale, from most important (5) to least important (1). Using these responses, an average index was calculated to rank their preferences.

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Resources	Level of importance (percent)					Index value
	Least important	Slightly important	Moderately important	Very important	Extremely important	
1. Local partnerships	0	7.1	28.6	21.4	42.9	4.0
2. Farmers' organizations	0	7.1	7.1	71.4	14.3	3.9
3. Educational events	0	7.1	7.1	78.6	7.1	
4. Training and education (in-person)	0	7.1	21.4	57.1	14.3	3.8
5. Incubator farms	0	7.1	7.1	71.4	7.1	3.8
6. Digital training materials	0	14.3	28.6	50.0	7.1	3.5
7. Virtual training	0	21.4	21.4	50.0	7.1	3.4

Table 4: Learning Resources Based on the Degree of Importance (n=14).

Local partnerships with farmers' markets, food chains, and community gardens were among the top learning resources reported by these farmers (an average index of 4.0). This was followed in descending order of index values, by farmers' organizations (e.g., farmers' group, commodity group, farmers' forum, farmers' association, farmers' cooperative) and educational events (e.g., interactive workshops and meetings, hands-on training, farmers' conferences (3.9)), incubator farms, and in-person training and education (e.g., consultation and counseling (3.8)), digital training materials, such as videos (3.5), and virtual training such as farmers' school (3.4). These results suggest that the farmers prefer resources that provide opportunities for interpersonal communication, such as farmers' markets and farmers' groups. Learning resources with less interaction, such as virtual training and digital training materials, were relatively less preferred by the participant farmers.

Timing (Scheduling) of Training

The timing of training is critical for farmers when they are busy during peak farming seasons. In general, capacity building training programs are organized during the week days to suit the convenience of experts and extension professionals rather than the needs of the farmers. Thus, participating farmers were asked for their thoughts on the type and timing of training programs they preferred.

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Programs	Percent
1. Multi-sessions weekend workshops	50.0
2. Multi-sessions weekday evening workshops	35.7
3. One-day weekend workshop	28.6
4. One-day weekday workshop	14.3

Table 5: Timing of Training Programs (n=14).

In general, farmers preferred weekends over weekdays for training purposes. Half of the participating farmers indicated a preference for multi-session weekend workshops over multi-session weekday evening workshops (35.7%) (Table 5). Similarly, 29% of them favored a one-day weekend workshop over a one-day weekday workshop (14.3%). Moreover, participants preferred shorter but multiple weekend sessions over a single one-day event.

DISCUSSION

Farmers use various learning resources to keep up-to-date with the changing agricultural practices or technologies. This case study of urban gardening farmers in Maryland revealed that learning through digital videos (audio-visual aids) was among the most useful learning tools for farmers to improve and update their farming knowledge and skills. Similarly, these farmers ranked the comprehensive training manual second to the digital video out of 13 possible choices. This finding suggests that farmers may prefer self-learning materials, if they have access to them such materials. Although extension publications such as factsheets, flyer, brochure, pamphlets, and newsletters were also useful to them, they ranked these resources below average. This could be because such publications are more directed at providing awareness of introductory/basic information rather than enhancing their knowledge and skills on actual methods or technologies directly applicable to field conditions.

After audio-visual aid and digital learning and training manuals, one-on-one consultation, peer-to-peer interaction, and hands-on training are identified as the most useful learning resources. Farmers may first attempt to learn and practice on their own. However, if they find it difficult to learn through the use of digital videos or training manuals, they prefer to consult with agricultural professionals or interact with other fellow farmers to discuss their difficulties and learn real-world applications of methods and techniques via hands-on training. This was followed by interactive workshops, webinars and trainings, and YouTube videos. Farmers reported that farm visits and tours, farm field days, and other modules were relatively less useful for gaining knowledge and skills compared to other modules. This is because such exposure visits are primarily designed to increase farmers' awareness and interest in specific practice.

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Among various learning resources, farmers preferred local partnerships with farmers' markets, local food vendors and community gardening farmers. In addition, they expressed that farmers' organizations such as farmers' associations, farmer forums, farmer groups and farmer cooperatives were among the important learning resources. They also confirmed the importance of educational events such as workshops, trainings, interactive meetings, and conferences which were followed by trainings and incubator farms over digital training materials and virtual trainings. This evidence suggests that farmers prefer resources that allow interpersonal communications.

In general, there is a practice of organizing farmers' trainings during weekdays without considering the preferences of the farmers regarding their timing needs. The evidence presented here indicates that farmers prefer weekend training programs over weekday programs. Moreover, farmers preferred multi-session weekend workshops over multi-session weekday workshops. Likewise, a fairly good proportion of them favored a day-long weekend workshop over a day-long weekday workshop. Overall, participants preferred shorter but multi-session workshops on the weekend.

Implication to Research and Practice

Although the findings and conclusions of this study are based on a case study of a small group of urban gardening farmers, these findings will be extremely valuable for extension professionals and researchers to update the modality of farmers pedagogy – extension education and training. Indeed, the findings will have a substantial implication in developing preferred learning modules such as instructional videos or training manuals to strengthen farmers' knowledge and skills, leading to technical, allocative, and economic efficiency. Such learning modules will certainly help farmers make informed decisions and prepare and implement data-driven production and marketing plans. However, the evidence and conclusions derived from a small group of farmers should be considered with care.

CONCLUSION

The findings reveal that urban gardening farmers prefer audio-visual digital learning videos and hands-on training manuals to enhance their farming knowledge and skills, suggesting that farmers prefer self-learning educational materials if they have access to them. Next, farmers prefer learning modules that encourage interpersonal communication such as one-on-one consultation, peer-to-peer interaction, and hands-on training. It is obvious that farm visits or farm tours, farm field days, and other modules that are designed to increase awareness and interest are less useful to the farmers to enhance their knowledge and skills. These findings suggest a need to tailor capacity building training modules and tools, as well as the appropriate timing of training to farmers' preferences.

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Among learning resources, farmers prefer local partnerships with farmers' markets, local food vendors and community gardening farmers, followed by farmers' organizations such as farmers' associations/groups/forums and cooperatives. In general, the evidence suggests that farmers prefer resources that focus on interpersonal communication. The results further imply that farmers prefer multi-session training on weekends over weekdays, and that they prefer shorter but multiple sessions on the weekend over any weekday sessions.

We believe that the various modules and learning resources presented to the participating farmers have different meanings depending upon the stage and situation of their farms, their interests, and their reasons for farming. For example, one module may be quite useful to innovators, while the same module may be less relevant to those who are in the early stages of adoption – one size may not fit all. Given the field situation, a radio or television program or a flyer may be important to generate awareness, while a digital learning video or a training manual may be important at the later stages of applying the methods and techniques. Because the participating farmers in this study had varied levels of farming experience, their needs may differ, which requires an in-depth study.

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