



The Contribution of Women Groups in Bogor-Urban Agriculture Homework to Upscale Their Practices Towards Sustainable Horticulture Value Chain

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Abstract. This action research was undertaken in 2019 as part of the “Our Garden, Our Healthy Food” initiative of the DeTara Foundation in Bogor, Indonesia and as a master thesis project for the Agriculture Production Chain Management program at Van Hall Larenstein University of Applied Sciences. The purposes of this research were to determine the sustainability implications of urban agriculture activities of women groups and to suggest the projected horticultural value chain to enhance the efficacy of urban agricultural practices. A sample of eight (8) women’s groups was taken for this study. Additionally, Agriculture and Food Security Agencies, two (2) educational institutions, three (3) voluntary communities, three (3) supermarkets as horticultural-produces retailers, and five (5) horticulture product outlets in Bogor were interviewed for this study. This study analysed quantitative data using Multiple Linear Regression and Cost-Benefit Analysis, and qualitative data using PESTEC. Four social elements have a significant influence on urban agriculture practices: organizational structure and rule, legality of the organization, group’s activity type and motive, and network. We discovered that species diversity of flora is associated with the level/category of the women group in (elementary, intermediate I, and intermediate II). There was significant effect between urban agriculture land and fauna diversity. However, urban agricultural methods were less advantageous from a business standpoint. This study proposed two models of horticulture value chain techniques for scaling up urban agricultural practices by referencing local food and the concept of a short supply chain.

Keywords: Urban agriculture · Bogor City · Women groups · Horticulture value chain

1 Introduction

In some countries, urban agriculture presents a potential to provide environmental benefits and as well as to vary the diets of people living in urban areas. According to Mlozi et al. [1], there is a rising interest in urban agriculture as a strategic component of urban resilience and climate change adaptation planning. This interest has been developing

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in recent years. The unique characteristic of urban agriculture is its integration into the urban economic and ecological system; urban agriculture is embedded within and interacts with the urban ecosystem [2].

The Food and Agricultural Organization (FAO) [3] states that women are active in a range of agricultural production and make up 40–50% of the agricultural labour force in Eastern and South-eastern Asia. Indonesia has recognized women-farmer organisation (called as *Kelompok Wanita Tani/KWT*) since 1979. Uniquely, women-farmer organizations are organized not just in rural regions, but also in urban areas in Indonesia. In urban areas, women groups engage in urban agriculture on a modest scale and with a range of land sizes. According to Saptana et al. [4], the formation of women groups is one of the strategic ways to achieving food security and diversity of local foods for families.

Bogor City is one of the Jakarta megacity's neighbourhoods. As part of its "Green City" initiative, the Bogor municipal government actively supports women groups' engagement in urban agriculture. In accordance with the Indonesian government's program "Sustainable Food Houses Region/*Kawasan Rumah Pangan Lestari (KRPL)*" that is currently called as P2K (*Pekarangan Pangan Keluarga/Family Food Yard*), the number of women groups has risen in Bogor City. According to the Agriculture Agency of Bogor [5], there were 166 women groups dispersed throughout six districts in Bogor City.

After over a decade of women groups' development in Bogor, the local government supports women groups to transform their urban agricultural practices into sustainable urban agribusiness. Lack of data on the impacts of urban agriculture hinders the Agriculture and Food Security Agencies to measure the sustainability of urban agriculture activities of women group.

This research aims to (1) identify the sustainability impacts of urban agriculture activities of women groups and (2) identify the prospective horticultural value chain to improve the effectiveness of urban agricultural practices.

This research intends to answer two primary questions about scaling up women group's horticultural value chains:

- To what extent do urban agriculture activities of women groups promote economic, social, and environmental sustainability?
- What is possible approaches to the horticulture value chain to improve the effectiveness of future urban agriculture practices?

2 Methods

This research was part of student's master thesis at Van Hall Larenstein University of Applied Sciences [6] and the project of Our Garden-Our Healthy Food of the DeTara Foundation in Bogor, Indonesia. This research was carried out between June and August of 2019. In June, a literature review and secondary data collection were conducted. The fieldworks were carried out from July 6th–August 11th, 2019. Multiple methodologies, including participatory research (FGD and group interview), field survey on biodiversity, stakeholder interviews, and interviews, were used to collect the primary data.

2.1 Participatory Research

Focus Group Discussion (FGD) and group interviews with eight women groups were used to undertake participatory research. According to Laws et al. [7], participatory research facilitates respondents rather than attempting to collect information from them. This research's participatory components were conducted to determine the environmental, economic, and social aspect. Firstly, a FGD was held by inviting two representatives of each women group. The group interviews were carried out after FGD by visiting the groups on-site.

2.2 Survey on Biodiversity

The field study visited women group's gardens. It was performed by following the garden's main paths and surveying the garden's perimeter at a radius of 5 to 10 m (depended on the type of border). The species list approach was used to determine the avifauna, insect, and plant biodiversity. According to Bibby et al. [8], the species list approach is the easiest way to determine the richness of the site's fauna. Visual Encounter Surveys (VES) were employed to observe herpetofauna biodiversity (reptiles and amphibians). According to Crump & Scott, as referenced by Eekhout [9], the VES methodology may be characterized as a time-constrained method for obtaining species richness and abundance information along a survey route. The faunal diversity survey was undertaken twice each location.

2.3 Stakeholders Interview

Several stakeholders, including Bogor Agriculture and Food Security Agencies, two universities, and three voluntary based-communities, three supermarkets and five stores in Bogor, participated in the interviews. The purpose of the interviews with local agencies, universities, and voluntary based-communities was to determine the role of these stakeholders in supporting the urban horticulture value chain. The purpose of the interviews with retailers of fresh horticulture produces (supermarket) and horticulture processed products (culinary stores) was to determine the customer's requirements.

2.4 Data Analysis

2.4.1 Statistical Investigation

Using multiple linear regressions, the associations between predictor and dependent variables were analysed. By fitting a linear equation to observed data, multiple linear regressions seek to predict the connection between two or more explanatory factors and a response variable. Each value of the independent variable x corresponds to a certain value of the dependent variable y [10]. Total species biodiversity of animals and total species biodiversity of flora were examined as dependent variables. IBM SPSS Statistics 25 software was used to organize the qualitative analysis.

2.4.2 CBA (Cost-Benefit Analysis)

According to Nugent [11], economically significant implications of urban agriculture include the price effects of urban agricultural production on food, land, and human resources; the opportunity cost of time and other non-priced resources; and other non-price impacts. This research considered both direct cash flow and intangible elements.

2.4.3 PESTEC Analysis

The qualitative analysis was based on the responses to open-ended questions posed during FGD, group interviews with women groups, individual interviews with a number of stakeholders, and additional results from field observation [6]. To better organize the data, matrix coding was used. According to Laws et al. [7], coding is the process of finding data content associated with codes or categories. After that, a PESTEC (Political, Economic, Social, Technology, Environment, and Culture) analysis was conducted to identify the opportunities and obstacles in establishing the horticultural value chains of women groups in Bogor.

3 Analytical Framework

3.1 Food Value Chain Conceptualization

According to Faida [12], a value chain is a special type of supply chain—one where the players know each other well and build solid, long-term connections. They help each other so they may collectively boost their efficiency and competitiveness. They commit time, effort and financial to attain a shared aim of serving customer requirements that allows them to improve their profits. While the supply chain is a series of links between players where there are no binding/sought-after formal/informal ties, until when the products, services and financial agreements are actually transacted [12]. A food value chain comprises of all the stakeholders who engage in the coordinated production and value-adding activities that are required to create food products [13]. More simply, Deloitte [14] described the food value chain as the network of stakeholders engaged in farming, processing, and marketing the food that customers eat (from farm to table). The Food and Agricultural Organisation (FAO) [13] described that sustainable food value chain (SFVC) is profitable chain throughout all of its stages (economic sustainability); has broad-based benefits for society (social sustainability); has a positive or neutral impact on the natural environment (environmental sustainability).

3.2 Urban Agriculture and Local Horticulture Product

Urban agriculture can be characterised as city and sub-urban agriculture that takes the shape of backyard, roof-top and balcony gardening, community-gardening on empty lots and parks, roadside urban fringe and animal grazing in open area [15]. Urban agriculture and community gardening are two separate concepts. Greensgrow [16] noted that the distinction between urban farming and community gardening is a degree of commerce, urban farming or urban agriculture is producing goods to be sold, as opposed community

gardening is more for personal use or sharing. Urban agriculture has become a tool to expand access to locally cultivated food. It also attempts to enlighten the customer about how food grows and what locally and seasonally grows.

There is no uniform definition of size or location of urban agriculture. In some circumstances, local municipalities are offering part of their park systems to let urban farmers growing their crops. Sanyé-Mengual [17] defined urban agriculture as farming operations that take place in and around the city that beyond food production provides environmental services (soil, water and climate protection; resource efficiency; biodiversity), social services (social inclusion, education, health, leisure, cultural heritage) and supports local economies by a significant direct orientation of urban market. Veenhuizen and Danso [18] divided urban agriculture into two subdivisions; those are intra-urban and peri-urban agriculture.

According to Danso et al. as stated by Veenhuizen and Danso [18], women form a significant component of urban farmers as they tend to have most of the duty for feeding the homes, while males opt to pursue alternative urban work. If the plot is near to home, agricultural activities may be more readily blended with their other duties in the family. Urban agriculture is often specified by proximity to markets, significant competition for land, limited area, utilisation of urban resources such as organic solid wastes, low degree of farmer organisation, and mostly perishable goods [19]. Mouster and Renting [20] mentioned that food produced in and near cities in Africa and Asia is generally supplied via relatively short chains. The short-chain in the marketing of the produces/products has a favourable influence on the reduction of transaction costs in the marketing of perishable products of variable quality standards.

According to the definition issued by the U.S. Congress in the 2008 Food, Conservation, and Energy Act as referenced by Martinez et al. [21], local horticulture product can be described as any crop that is locally or regionally cultivated, produced, and distributed fewer than 400 miles from its origin. However, there is no uniform definition of “local” in terms of the distance between production and consumption. The most frequently recognised term linked with “local” food if it is eaten within 100 miles of where it was produced.

3.3 Women Groups in Agriculture in the City of Bogor

There are many types of women group in Indonesia. The women group that is specialised in farm operations named *Kelompok Wanita Tani* (KWT). The KWTs have been available both in the village area (regency) as well as in urban region (city). In certain regions, such in Bogor, the operations of KWTs are synergised with government’s programs on family welfare empowerment that is called PKK (*Pemberdayaan Kesejahteraan Keluarga*) and food security and diversification that is called KRPL (*Kawasan Rumah Pangan Lestari*). The KPRL program has been continuing as P2K (*Pekarangan Pangan Keluarga/Family Food Yard*) since 2019. According to Agriculture Agency of Bogor City [5], there are 166 KWTs in the city of Bogor that comprises of 49 groups in Bogor Selatan; 45 groups in Bogor Barat; 28 groups in Tanah Sareal; 21 groups in Bogor Utara; 12 groups in Bogor Timur; and 11 groups in Bogor Tengah.

Table 1. Women groups, establishment year, level, and acknowledgement

No	Name of Group	Founded	Level	Recognition
1	KWT HePi	2018	Beginner	Village
2	KWT Flamboyan	2015	Intermediate I	Village
3	KWT Kentagor	2015	Intermediate II	District
4	KWT Ciharashas	2018	Beginner	Village
5	KWT Melati	2008	Beginner	Village
6	KWT Mawar Kencana	2015	Beginner	Village
7	KWT Alam Lestari	2015	Intermediate I	District
8	KWT Mawar	2012	Intermediate I	Village

The primary regulation concerning farmer groups in Indonesia is Ministry of Agriculture Regulation No. 82/Permentan/OT.140/8/2013 and Agriculture Ministry's Regulation No. 67/Permentan/SM.050/12/2016. However, the formation of women groups (KWT) in Bogor City refers more on Agriculture Ministry's No. 43/Permentan OT.140/10/2009 about accelerating food diversification based on local resources and Ministry of Agriculture Regulation No. 14/2019 related on poverty alleviation toward the agricultural sector [6]. By referring to those Ministry Regulations, the facilitation of KWT is under two governmental entities in Bogor City; those are Agriculture Agency and Food Security Agency. Both agencies are under the same ministry, the Ministry of the Agriculture Republic of Indonesia, although they have distinct programme in the facilitation of women groups.

4 Results

4.1 Women Groups and Their Social Effects

4.1.1 Group Legitimacy

Minimum legality for any women organization is a letter of permission from the local office. There are three degrees of categorization for each of the eight women groups. The group level may be raised based on an evaluation by the Agriculture Agency. There are four types of group level categorization: Elementary, Intermediate I, Intermediate II, and Advance. Table 1 compares eight women groups by year of establishment, status, and degree of acknowledgement [6].

4.1.2 Organisational System

This study discovered that women groups had evolved into formal organizations. Every group is governed by rules, albeit the majority of them are unwritten. Table 2 depicts the typical organizational structures of women groups [6].

Table 2. Organisational System of Women Groups

No	Elements	System
1	Vision & mission	Vision-mission is developed by representing the group's interest
2	Type of hierarchy	Vertical
3	Structural unit	In combination between positions roles and individual roles
4	Basis for communication	Proximity
5	Control mechanism	Rules, but norms are still very strong
6	Activity arrangement	Planned/scheduled but sometimes spontaneous
7	Group leadership	Explicate
8	Documentation	Book-records type documentation

Table was adopted from [22].

4.1.3 Activities and Motives

This study divides the group's activities into three primary categories based on their value chain function. The first activity category is the group that engaged in farming but consumed more than 50% of their harvest for themselves. Six out of eight groups of women engaged in this activity.

The second activity model is the group that engages in cultivation and the sale of its products. It occurred in KWT Kentagor, where they obtained advantage by directly selling their horticulture produces to their members at a cheaper price than the local store. The last activity type is the group that not only cultivates the horticulture but also sells fresh and processed goods. It was implemented by KWT HePi, who routinely sold their produces and sometimes sold processed garden products to the surrounding community.

4.1.4 Network

The approval of the local government is one of the most important prerequisites for connecting to the networks. In this study, eight women groups have significant ties to the Agriculture Agency and the Food Security Agency. This study revealed that some CSOs (Civil Social Organisation) in the form of voluntary based communities have been involved in the facilitation of women groups in Bogor. The relationship between CSO and women group was discovered at KWT HePi, where a mosque community facilitates the relationship.

4.2 Environmental Consequences from Urban Agriculture Activities

This study revealed that women groups controlled land of varying sizes. On the plot, seven women group cultivated allotment gardens with a variety of crops and planted perennial tree species. One women group, KWT HePi, used agroforestry techniques to cultivate a communal garden. This organization utilizes unoccupied land in the

Table 3. Total of flora biodiversity and several predictors

No	Group	Flora Biodiversity	Members	Level	Type
1	HePi	27	15	1	Agroforestry
2	Flamboyan	49	20	2	Allotment garden
3	Kentagor	59	35	3	Allotment garden
4	Ciharashas	40	30	1	Allotment garden
5	Melati	51	15	1	Allotment garden
6	Mawar Kencana	39	33	1	Allotment garden
7	Alam Lestari	82	20	3	Allotment garden
8	KWT Mawar	68	30	2	Allotment garden

neighbourhood and maintains a variety of perennial plants that were already growing there.

4.2.1 The Flora Biodiversity

The field assessment on flora biodiversity revealed that KWT Alam Lestari has the greatest number of flora species, totalling 83 types of plants. Table 3 displays the overall species diversity of flora at each group location, as well as predictors that may be associated with flora biodiversity [6].

$R^2 = 0.650$ and adjusted $R^2 > 20\%$, $F(1,6) = 10.437$, $p < 0.01$ were the results of a linear regression using group-level as the predictor. The total of flora biodiversity (y) equals $24 + 16x$, where x represents the level of the group: “elementary” is coded as 1, “intermediate I” is coded as 2, and “intermediate II” is coded as 3. The association between total flora species and group level is shown in Fig. 1. There is no significant deviation, indicating that the residuals have a normal distribution.

4.2.2 The Fauna Biodiversity

The KWT HePi site has the greatest number of species of fauna, 45 in total. Table 4 provides the overall faunal diversity as well as variables that may be associated with faunal diversity. Total fauna biodiversity and several predictors are shown in Table 4.

Multiple-linear regression was run to predict the relationship of the total biodiversity of fauna based on land size, total flora species and main border. A significant regression was found that there is a relationship between the total of fauna species and land size. Linear regression produced adjusted $R^2 > 20\%$, $F(1,6) = 17.560$, $p < 0.05$. The total biodiversity of fauna in the site (y) is equal to $17 + 0.1x$, where x is the land size. Figure 2 shows the normality of residuals test with normal P-P plot. There is no strong deviation that indicates the residuals are normally distributed.

Multiple-linear regression was used to estimate the association between total fauna biodiversity and size of land area, total plant species, and major boundary. It was discovered that there is a considerable association between the total number of fauna species

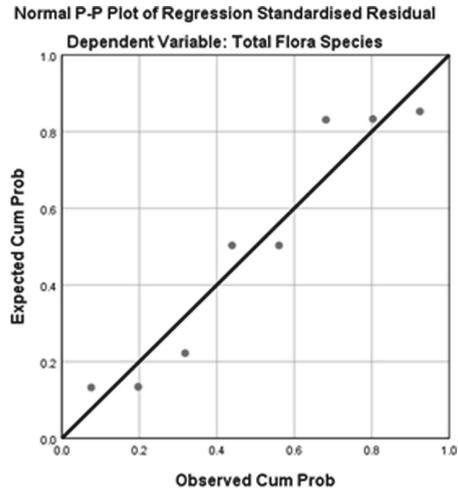


Fig. 1. Association between total of flora species and group level, Adapted from Satyasari.

Table 4. Total of faunal diversity and several predictors

No	Group name	Fauna Biodiversity	Flora Biodiversity	Land Size (m ²)	Main Borders
1	HePi	45	27	3,000	Gardens & River
2	Flamboyan	20	49	100	Settlements
3	Kentagor	41	59	1,000	Settlements
4	Ciharashas	15	40	400	Settlements
5	Melati	18	51	150	Gardens & River
6	Mawar Kencana	15	39	200	Settlements
7	Alam Lestari	19	82	500	Gardens & River
8	Mawar	24	68	400	Settlements

and size of land. The corrected R² for linear regression >20%, $F(1,6) = 17,560$, $p < 0.05$. The total fauna diversity (y) is equal to $17 + 0.1x$, where x is the land area. Figure 2 depicts the normality test for residuals with a normal P-P plot. There is no significant deviation that indicates the residuals are normally distributed [6].

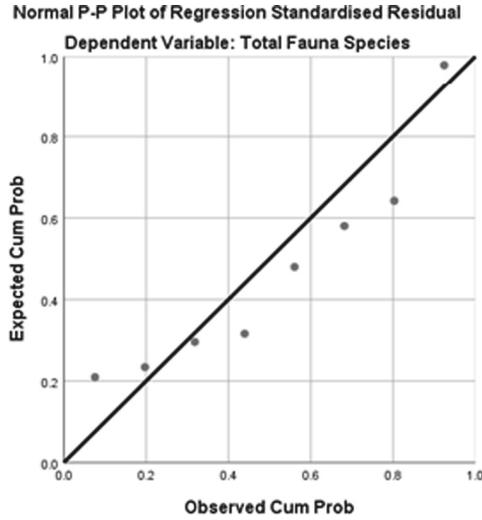


Fig. 2. Association between total fauna diversity and size of land, Adapted from Satyasari.

Table 5. Annual cost-benefit of urban agriculture [6]

Group Name	Land Size (m ²)	(A) Costs without land tax (IDR)	(B) Costs + land tax (IDR)	(C) Annual Benefit (IDR)	Lost (C - A)
HePi	3,000	11,027,250	15,527,200	10,750,000	-277,250
Flamboyan	100	3,334,500	3,484,450	1,437,000	-1,897,500
Kentagor	1,000	5,626,350	7,126,300	5,613,750	-12,600
Ciharashas	400	6,687,900	7,287,850	1,185,000	-5,502,900
Melati	150	3,759,150	3,534,200	1,467,500	-2,066,700
Mawar Kencana	200	4,429,500	4,729,450	2,486,000	-1,943,500
Alam Lestari	500	3,452,950	4,202,900	1,162,500	-2,290,450
Mawar	400	7,079,500	7,679,450	3,633,500	-3,446,000

4.3 Economic Impacts of Urban Agriculture Activities

This research examined the yearly cost-benefit cycle of urban agricultural practices of eight women groups, particularly in the horticulture sector. Table 5 summarizes the annual cost-benefit analysis of urban agriculture.

4.4 Potential Customers and Product Requirements

This research sought to discover possible retailers for women groups’ horticulture products. During the research, two distinct groups of retailers were interviewed; those who

Table 6. The customers' requirements on horticulture produces and products

Products	Requirements
Fresh Horticulture Produces	Permit from local agencies related produces safety
	Meet minimum volume
	Organic certification is needed if the produces are labelled as "organic"
Processed Horticulture Products	Minimum permit from health agency related food safety
	Taste & packaging will be checked
	"Halal" certification would be good point

distributed fresh horticultural produces and those who sold processed horticultural items. Three of supermarkets accept produces from local farmers. They required that the horticulture produces must be fresh; in particular, vegetables should be shipped as soon as possible after harvest. In addition, five culinary souvenir stores were surveyed. The majority of the stores mainstream the local cuisine, despite the fact that the majority of the raw ingredients and products did not originate from Bogor and neighbouring places. Table 6 summarizes the overall retailers'/customers' requirements.

5 Discussion

5.1 Social Sustainability of Urban Agriculture

Membership in women group is very unique that its members come from a variety of occupational backgrounds. Due to their non-farming background, they may have little knowledge and experience with agricultural operations. The formation of women groups (KWTs) seems to be mostly driven by the KRPL government program that had been started in 2007. Considering the primary objective of the KRPL program, the urban agricultural practices of women groups are intended to promote food security and family self-resilience. Therefore, the primary motive of women groups engaged in urban agriculture is the distribution of harvests among group members rather than selling them to the market.

By maintaining the small plot of land together as their demonstration plot, each group-respondent agreed that the primary reasons for gardening together are fostering social cohesiveness and enhancing their knowledge and experience. Within the demonstration plot, members will have access to an area for interaction with their neighbours. Urban agriculture offers social benefits such as social inclusion, education, health, and recreation, as noted by Sanyé-Mengual [17]. This research indicated that the level of the group has a substantial relationship to the total flora species diversity. It indicates that the higher level of the group has more understanding of the plants biodiversity. A greater level of the group might be more engaged in urban agricultural activities that increase their knowledge and experience regarding biodiversity and the flora utilisation.

The practice of urban agriculture has also strengthened the members' sense of ownership over the farmed plot. Every group has a timetable for dividing the daily tasks of

caring for the crops among its members. It is relevant to [23] that urban agriculture may provide meaningful activity by offering purpose, challenge, and a sense of achievement; creating emotions of closeness to people and the natural world; and allowing for more autonomy.

The organizational structure of the women group was designed democratically by the members of the group. The election of group boards was predicated on the members' mutual trust. It is pertinent to [24] that the community garden activity can foster trust between members and the leader.

Furthermore, urban agriculture activities conducted by women groups have the potential to contribute to the achievement of SDG 3 (good health & wellbeing) [6]. The engagement of women groups in urban agriculture activities allows women to expand their agricultural skills and contribute to the nutritional intake of their families, which is related to SDGs 5 (gender equality), 2 (zero hunger), and 12 (good health and wellbeing) (sustainable consumption and production). The greatest obstacle that may affect the effect of social sustainability is the duplication of assistance from government sectors to women groups. There is no discernible difference between the women group in urban farming and the PKK group. Consequently, more than one government agency may simultaneously finance a women's organization. It might be difficult since too much assistance from several stakeholders could result in a "dependence mind-set" and diminish the cultural and social worth of the community.

5.2 Environmental Persistence of Urban Agriculture Practice

The majority of the land utilized for demonstration plots by women group was previously empty lands. The transformation of undeveloped land into urban agricultural plots has boosted more plant biodiversity. The statistical research revealed a substantial relationship between the species diversity of flora and the group's level. Veenhuizen [19] remarked that urban and peri-urban farms may also play a significant role in educating urban residents and in the maintenance of the landscape and biodiversity.

This study discovered that urban agriculture practices have positive effects on both the biodiversity of flora and fauna. During the field survey, the endemic frog species *Rhacophorus margaritifer*, also known as *cehai/katak pohon*, was discovered. *Rhacophorus margaritifer* is a Javan endemic frog of least concern (LC) status according to the IUCN red list; however its population trend is declining. According to statistical study, the size of the agriculture plot affected the faunal diversity. It implies that a larger amount of green space may provide home for a variety of species. The relevant statement was provided by Zeeuw and Drechsel [25], Due to the various preferences of urban populations, urban regions often have a greater variety of local herbs species than rural or smaller towns. It has also been linked to the preservation of fruits, vegetables, herbs, and flowers that are quite uncommon on the market. Additionally, it may offer habitat and shelter for several insect and bird species.

However, certain negative environmental issues might be created by urban agricultural activities that are less carefully. During the field visit, it was discovered that one group was still burning organic waste in the garden instead of composting them. Regarding the application of chemicals on the farm, an observation revealed that a group applied

chemical fertiliser without referring to the doze. On the other hand, the result of the interview with the agriculture agency contradicted their claim that the extension service they provided was based on sustainable agriculture practices and an organic approach.

Moreover, the greatest obstacle to environmental sustainability is the availability and accessibility of land. The increase in population heightens competition for settlement, industrial, and agricultural land. All of the sampled women organisations conducted urban agriculture on community and institutional lands. According to the results of the interviews, only KWT Kentagor has an MoU with the landowner regarding use, but the other women farmer organisations do not have a formal agreement with the landowners. It indicates that there is no tenure security since there is no documented agreement for the use of the land. They are permitted to utilise the property as long as the owners do not develop it. This instance is pertinent to prior study undertaken by the World Bank [26] on urban agriculture in four cities. Lack of access to lands is the biggest impediment to the feasibility of urban agriculture. If urban agriculture is practised ethically, it has the potential to contribute to environmental sustainability. Urban agriculture is linked to Sustainable Development Goals 11 (Sustainable Cities and Communities) and 13 (Climate Action) [6].

5.3 Economic Aspects of Urban Agriculture

The analysis of annual cost and benefit from urban agricultural activities revealed that all women groups in the sampling got lost every year. Two groups (KWT Kentagor and KWT HePi) got their loss less than Rp. 500,000,- (USD 35) per year. It was because those groups were able to sell regularly of their horticulture produces/products while other groups use most of their crops for their own consumption.

Satyasari [6] stated that urban agriculture by applying allotment type with so many species of crops in small size land (<1,000 m²), will not gain much food-crops and cash-crops. It can be seen from the cost-benefit of six women groups who conducted allotment garden with land size <1,000 m². This finding is relevant to [27], primary orientation of allotment type is not just for food production but can also be for recreation; therefore the gardeners rarely engage the market.

5.4 Potencies and Challenges to Enhance Horticulture Value Chain of Women Groups

A PESTEC (political, economic, social, technology, environment, and culture) analysis was conducted to identify the potencies and challenges in enhancing horticulture value chain of women groups in Bogor. Table 7 describes some influenced factors that lead to potencies and challenges of the development of the horticulture value chain of women groups.

5.5 The Value Chain: Enhancing the Efficient Practices of Urban Agriculture

A value chain is a special type of supply chain in which the participants know each other well and maintain solid, long-term connections [12]. To construct a robust value

Table 7. PESTEC analysis

Factor	Potency	Challenge
Political	- Several policies support urban agriculture practices and empowerment of women groups.	There is no specific policy about land leasing for conducting urban agriculture/community gardening yet.
	The groups get approval from the local authority	The development of women groups seems too top-down initiation from the government that requires minimum a group in every village.
	Supports from local government is available for women groups	The supports from local agencies are sometimes overlapping.
	Regular extension from agriculture agency to women groups	The extension staffs from agriculture agency are not sufficient in quantity. Also, the capacity building for staff is needed since not all of them have an agricultural educational background.
Economic	Market opportunity on horticulture products is always available in the city	Economically, almost urban agriculture practices that were conducted by women groups gained more cost other than the benefit
		Not every women group is ready to upscale their urban agriculture practices and motives into business
Social	The activities of urban agriculture can have an educational purpose, i.e., improving members' knowledge on plant biodiversity and the function of plants as food and medicine resources	Not every member of women group has a farmer-background.
	The activities of urban agriculture have positive impacts on social inclusion	It is difficult to distinguish between women groups in agriculture (KWTs) and other women groups in Bogor City
Technology	There are some technological innovations to upscale urban agricultural practices	The local agency has introduced hydroponic technology, but most of the introduced-hydroponic method is water & chemical nutrient-based which is less beneficial in very small scale agriculture practice
	The Agriculture Agency links to BPATP (Institute for Agricultural Technology Transfer) regarding agricultural technology dissemination	Not every technology invention is appropriate to upscale urban agriculture practice

(continued)

Table 7. (continued)

Factor	Potency	Challenge
Environment	The practices of urban horticulture have positive impacts on increasing the biodiversity	Land access in the city area becomes a constraint in urban farming practices
	The practices of urban agriculture can be integrated with several environmental issues in Bogor City	Not every women group has implemented waste reduction and recycling yet
	Each site of urban agriculture could have own characteristic and environmental potency which can support the effectiveness and efficiency of resources usage	There is uniformity in delivering extension services and giving support with less considering local environmental potency
Culture	Good social impact of urban agriculture is relevant to Indonesian culture “Gotong Royong” (helping each other) that has been becoming a tradition in several parts of Indonesia	Any supports from the government without cost-benefit/economic cycle analysis may lead the communities to have “dependency mentality” and make them less autonomous.

chain, each actor and supporter in the chain must mutually enhance their efficiency and competitiveness. If women groups desired economic gain, they could not cultivate the horticultural product on a tiny plot of land and depend always on agriculture-input support from government.

Supports from agriculture and food security agencies for women groups tend to be homogenous without referring ecological potencies of each location. To overcome the constraint of land, it is necessary to use certain innovations or technologies that take into account the local environmental potency, such as grey water, manure, home organic waste, and bio-pesticide.

Comparative interviews were performed with the Sekeibun Community and a member of the Bogor Berkeibun Community in order to examine their experience with expanding horticulture value chains. The Sekeibun Community aimed to sell their vegetables or other processed horticultural goods once a month by conducting an open market, despite the small size of their 200-square-meter demonstration garden. Coordinating the members to plant in their own home yards or available area was their strategic. A collective method was used to gather the household’s vegetable harvest. In addition, members were permitted to sell additional horticultural items that they cultivate independently, such as fruits, decorative plants, and medicinal plant products.

One of the Bogor Berkeibun activists who guided a group in the Bogor provided an additional example of best practises. The primary activity of the members of women group were managing vertical garden in their home yard. The group which have about 60 members used to generate an annual revenue of Rp. 80–90 million (USD 5,500–6,500) from the sale of vegetable leaves. Not only were the leaf veggies sold in the neighbourhood, but they were also connected to a vegetarian restaurant in Bogor.



Fig. 3. Value chain scheme for fresh horticulture produces.

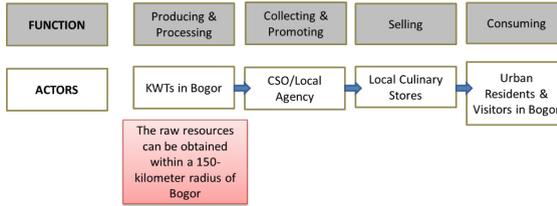


Fig. 4. Value chain scheme for horticulture processed products.

A value chain strategy is required to transform urban agriculture into urban agribusiness. To build the sustainable value chain, local authorities’ assistance should not always necessarily physical or material, but also encourages women organisations to gain autonomy and competitiveness. Support both from governmental and non-governmental sectors should be reflected as investments.

This study recommends the development of a horticulture value chain model with a focus on the local food concept and the short supply chain. There are two kinds of value chain techniques that might be used to the up-scaling of horticulture produces/products of women group. Both models of the value chain approach need a CSO (Civil Society Organisation) with the role of collecting the goods from women organisations and facilitating their distribution to larger customers, such as shops, restaurants, and supermarkets. Figure 3 depicts the value chain for fresh produce, which emphasises short-chain and direct producer-to-consumer marketing.

The second approach is for a value chain of processed horticultural products (Fig. 4). Here, the value chain map provides options for raw material sources. Taking into account the local food chain, the raw materials should be sourced from women group’s fields and from outsides (within a maximum radius of 150 kms from the city centre). Certain horticultural products might not be cultivated in big quantities in the city of Bogor due to limited sizes of land. As a result, raw materials could be sourced from the surrounding city.

6 Conclusion

The activities of urban agriculture carried out by women groups have positive social and environmental effects. Furthermore, urban agricultural activities undertaken by

women groups have the potential to increase social well-being and are important to SDGs achievements, particularly on SDGs-5 (gender equality), –2 (zero hunger), and –12 (sustainable consumption and production). The presence of a variety of flora and wildlife at the urban agriculture location helps to the accomplishment of SDGs-11 (Sustainable Cities and Communities) and –13 (Climate Action). Urban agriculture was less lucrative economically. By referring to the horticulture value chain models based on the local food and short-chain theory, it is possible to optimise urban agricultural techniques for urban agribusiness growth.

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