

Full Length Research Paper

Impact of program-based sustainable urban agricultural intervention on women empowerment in Addis Ababa: Evidence from women empowerment in agriculture index analysis

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Urban agriculture is increasingly recognized in academic research, policy practice, and advocacy as rural land is increasingly shrinking for agricultural production; and is argued as pro-poor urban intervention. This study argued that previous researches focused on: (1) rural agriculture; (2) women's economic empowerment; and (3) positive impacts of urban agricultural interventions on the poor. By observing 10 indicators of women's empowerment in agriculture, the study administered household survey, interviews, and cases of beneficiary women. The study revealed that while 80% of beneficiary women were empowered (to the extent of 0.93 scores), the remaining 20% were not. When the evidence is disaggregated to intersectional differences among the women who claimed to be empowered, unintended impacts were visibly observable. Though urban agriculture contributes to women's empowerment, lack of tailored support and the use of program approach exclude segments of women's beneficiaries. Thus, a right-based approach that considers holistic aspects of women's empowerment is advised to inform interventions, and a feminist gender analysis is required to document the invisible and intersectional barriers to beneficiary targeting.

Key words: Program-based sustainable urban agriculture, women empowerment, rights-based targeting.

INTRODUCTION

Urban agriculture (UA) can enhance the achievement of the 11th Sustainable Development Goals (SDGs) targets, as well as ensure women empowerment (Dea, 2016). UA, as academic field of study, policy practice, and advocacy message has been highly relevant in urban

sustainability, greening, land use, and food security (Dezeeuw et al., 2011). Though urban agriculture is not unanimously understood, it refers to the growing food and non-food farm products close to/in a city, its centre and fringes (Veenhuizen, 2014). Scholarly evidence suggest

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that urban households grow crops and rear livestock to support their incomes and food demands (Debela and Mohammed, 2020), and UA is applied in small plots, on house-tops, and walls (Hovorka, 2019). UA can use inputs such as technology, fertilizers, improved seeds, etc. and can be highly productive; and therefore can be highly useful to achieve holistic women empowerment (social, economic, physical, and psychological) policy goals (Mandal, 2013). Women empowerment considers status or changes in favour of the marginalized, and is often argued as a positive change (Sophia, 2015).

Several researchers were conducted on the contribution of UA to women's empowerment; in the case of both personal engagements and program supports. For instance, Hovorka (2019) argued that UA improved women's economic empowerment (improvements in income and daily food supply of households) in the urban slums of Harare, Zimbabwe. Oliver and Heinecken (2017) argued that UA improved women's social empowerment (improvements in social networking, cohesion, and reciprocal relations of support) (Gallaher et al., 2013) in Urban Slums of Lagos, Nigeria. Gallaher et al. (2013) claimed that UA contributed to women's physical and psychological empowerment. In their findings, UA ensured women providers of households to escape from stress, feeling of trauma, and re-establishing their self-worth, as well as a sense of stability of social networks as crisis unfolds. As government transfers to poor households in urban slums is increasingly important, programmes that focus on the poor needs to consider the right-based and feminist gender gap analysis (Bekana, 2020), and such analysis rarely inform programme interventions in Ethiopia in general and Addis Ababa in particular. At broader level comparison, according to the global gender gap index reports, Ethiopia is in the lowest quartile (the last 25% category) (Dea, 2016). Therefore, this research is timely and relevant to address: (1) the information gaps; (2) the unintended impacts of the intervention; and (3) the analysis of the approach of intervention from gender perspectives.

In Ethiopia, Addis Ababa, Sophia (2015) studied the contribution of program-based UA on women's economic empowerment. Mesay (2010) and Eshetu (2011), for instance, assessed the impact of UA on improving food security in Adama and Bishoftu cities of central Ethiopia, respectively as well as on the impact of UA as alternative food security and coping strategy to income shocks in Addis Ababa. Gonfa (2019) studied about the impact of program-based UA on livelihoods of beneficiaries in Addis Ababa. Dea (2016) assessed the impact of UA on employment in Harar city of Eastern Ethiopia. However, the previous studies: (1) are scanty, only few studies exist about the impact of UA on women's empowerment; (2) focused on women's economic empowerment; (3) and considered positive impacts; and (4) do not address the gender gaps in program intervention, as well as analyse the power of rights-based approach to interventions

focusing on addressing women empowerment at grassroots levels. The study analysed the impact of programme-based UA on women's holistic empowerment from feminist perspectives of gender gap analysis, intervention targeting, and approach. This study is significant to inform: (1) academia (debating program and rights-based approaches) from grassroots evidence; (2) policy (gender analysis of intervention targeting and systems of intersectional exclusion); and (3) challenge the mainstream impact analysis of program results considering unintended results as gender gap in beneficiary targeting.

Based on existing literature, women empowerment is operationalized into five dimensions (social economic, political, physical, and psychological). Women's political empowerment refers to status of conducive institutions for decision-making on issues affecting their lives (Alkire et al., 2013; AWARD, 2019) which can be implemented both at individual and group levels. According to Babington (1999) and Huis (2017), women's political empowerment refers to the ability of individual to be above powers and institutional systems of sex-based domination, exclusion and oppression; and analyse patriarchal systems as the core of women's disempowerment at private and public affairs (Oliver and Heinecken, 2017). Women's economic empowerment refers to access and control over assets, incomes, and employment (Kabeer, 2016), and this improves women's social, physical, and psychological empowerment in building self-confidence, self-esteem, and inclusion in society as individuals and groups (Kabeer, 2015).

Though, there are limitations to quantitative measurement of women's empowerment (UN Women, 2019), studies on women empowerment in agriculture sector employs a specific index – a Women Empowerment in Agriculture Index (AWARD, 2019). Mainstream women empowerment indices include, among others, the status of women's strong movements, the participation of women in public activity, and the involvement of women in national and local decision-making bodies (Alkire et al., 2013). However, the WEAI, as used by UN Women (2019) and AWARD (2019), has five priority domains to inform agricultural interventions. The first domain is the production indices (inputs and autonomy) (Alkire et al., 2013). The second domain is the resource indices which consider access to and decision-making power on inputs (ownership), decision-power (purchase, sale and transfers), and access to and decisions on credit (finance). The third domain is income from food and cash crops, livestock, non-farm activities, wage and salaries work, and farm culture (Bryceson and Potts, 2006). The fourth domain is leadership and membership in social groups and broader institutions that mediate relations, resources, and powers (Babington, 1999). The final domain is time, which refers to its allocation for productive, domestic, and public affairs, as well as stratification with the time available for personal

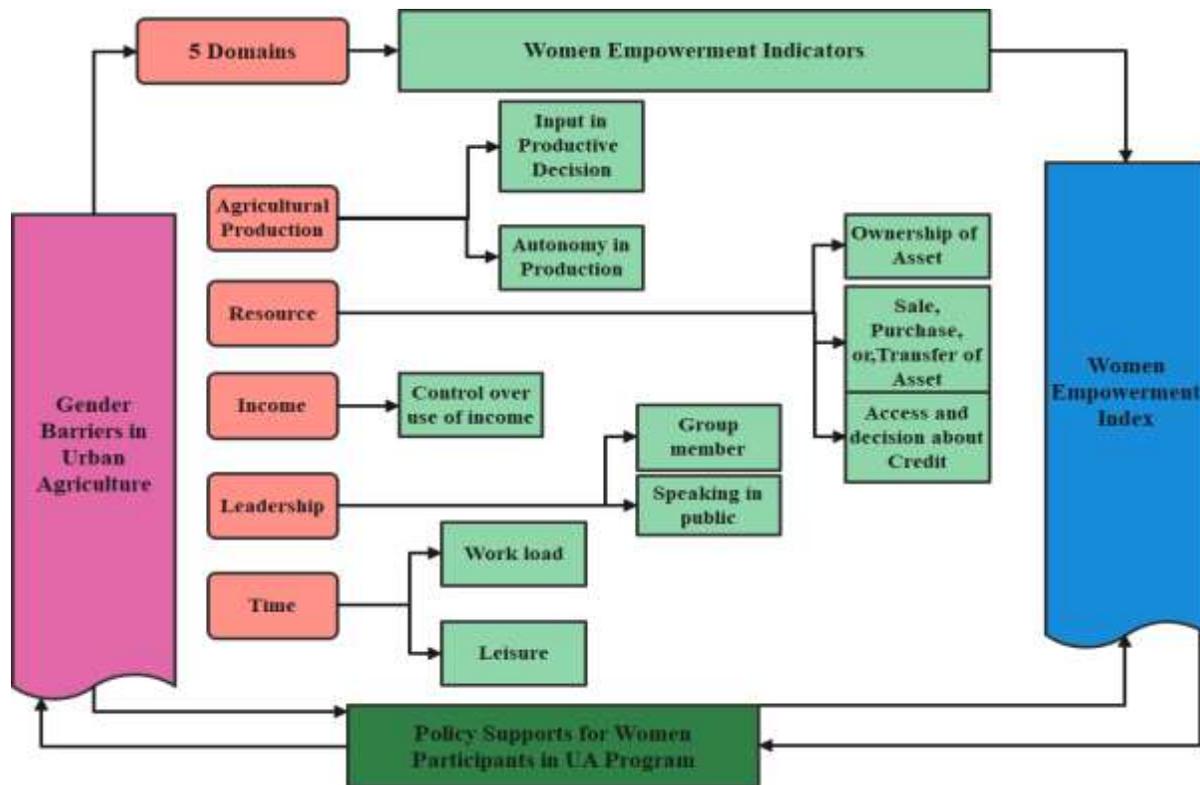


Figure 1. Conceptual framework Adopted from WEAI by AWARD (2019).

leisure (Kabeer, 2015; AWARD, 2019).

Scholarly studies on urban agriculture predict that 70 percent of the world's population will live in cities by 2050 (Gonfa, 2019), and UA is increasingly being conceptualized as a sector of food and non-food production, marketing, and transfers (Mgamhewage et al., 2015). As a result, an increasing number of urban households are engaging in UA, and its policy relevance is increasing (Oliver and Heinecken, 2017), and increasingly disadvantaged urban populations are engaging in UA (Golden, 2013; Smit, 1996; Hovorka, 2019). In this regard, because of women's low economic status and increasing numbers in slums as poor groups, displaced, immigrants, and working in the informal sector, the relevance of UA for female-headed households has become a major academic and policy concern (Simiyu and Foeken, 2014; Cornwall, 2014). Because poor women in urban slums are increasingly engaged in agriculture, and because UA supports household income, community social cohesion, and so on, policymakers have an obligation to support this sector and address gaps in targeting (UN Women., 2019), and thus research, advocacy, and tailored policy support to this sector is an imperative of gender equality action (Venables, 2015; Mpofu, 2013; Orsini et al., 2015). In terms of women's holistic empowerment, UA has environmental (Mpofu, 2013), social and reciprocal, psychological and physical

(Smit, 1996; UN Women, 2019), and economic benefits (Kabeer, 2016; Babington, 1999). Also, UA is not immune from challenges related to grassroots policy support and impact of interventions; shortage of inputs such as land and labour (WEF, 2020), time, tailored technology and credit (UN Women, 2019) are key challenges of promoting UA (Simiyu and Foeken, 2014). The advantages and disadvantages of UA in Ethiopia are also documented (Eshetu, 2011; Sophia, 2015). This study's analytical framework is based on the empirical literature mentioned above (Figure 1).

MATERIALS AND METHODS

The study area is conducted in Addis Ababa, Akaki Kality Sub-city, considering five districts. This sub-city and districts were selected purposively because the area has huge potential for UA due to the availability of water and land; and due to the existence of poor neighbourhoods, slums, and female-headed households compared to other sub cities in Addis Ababa. An exploratory mixed research design was employed, which is suitable for the objective of the study (Creswell, 2014). The mixed design addressed both the descriptive and explanatory variables while a cross-sectional survey was conducted to capture the current and dynamics status of the programme and its beneficiaries. The use of the mixed approach, the quantitative and qualitative methods, data types, and sources served triangulation in this research (Creswell, 2010). A survey questionnaire on the domains of WEAI was conducted with 274 (proportionally sampled from specific type of farm activity and out of

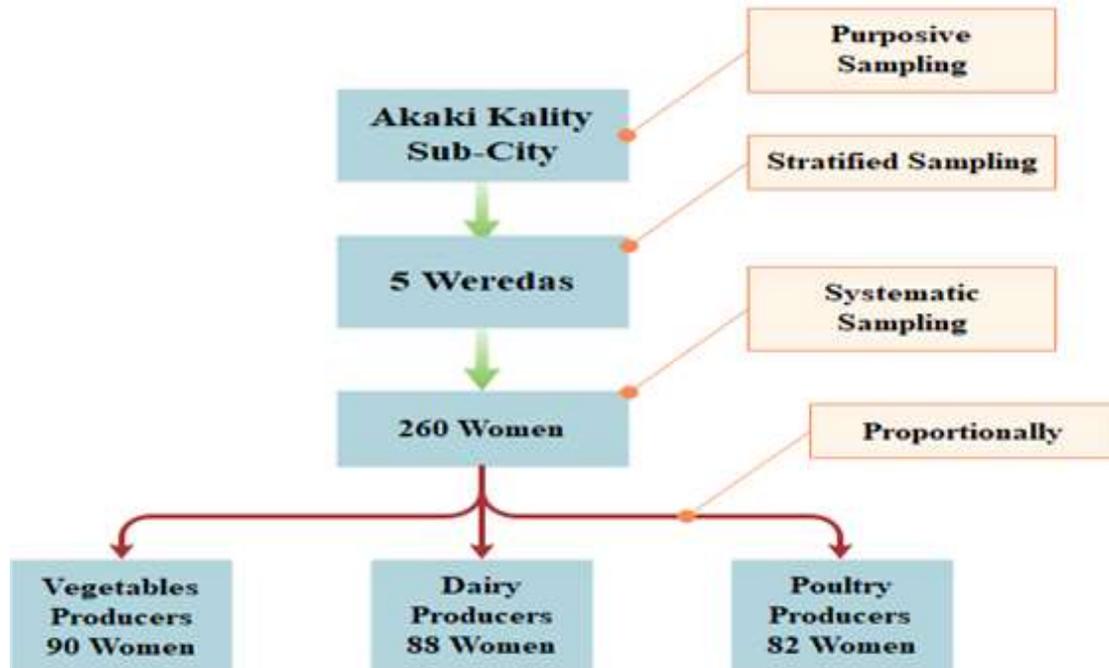


Figure 2. Sampling procedure.

745 programme beneficiaries in five districts) randomly sampled beneficiaries (comparing their status before and after the programme intervention). A case of 15 women participants (1 from each farm activity and three from each district based on type of farms) and 15 key informants from policy-makers and program support experts were observed using observation and interview guides, respectively. Besides the cases of women, the study conducted a transect-walk. According to Kothari (2004) and Creswell (2014), transacting a walk and taking notes on issues observed allows for a better understanding of the situation in program target and non-target districts. By doing so, the contribution of this specific programme on local environment, land use, business, and sectoral benefits can be documented and primary analysis could be made. For the study, the sample size was determined using scientific sample size calculation formula and the procedure is presented in Figure 2. Both quantitative and qualitative approaches of data analysis and interpretation are employed in the framework of WEAI and using SPSS version 21. The descriptive statistics considered mean, frequency distributions, charts and graphs. The inferential statistics used multiple linear regression and ANOVA test results in line with the WEAI and considering the five empowerment domain indices.

A thematic analysis was conducted for qualitative data. The inference on quantitative regression data was made based on pre-specified directions and signs of association; and based on significance test results produced. The explanatory variables identified were age as proxy of active labour and experience (Greene, 2009; UN Women, 2019), dependency ratio, education level (Gonfa, 2019), money saving access to credit (San et al., 2019), land ownership (Mishra and Sam, 2016), type of farming and support (Patalagsa et al., 2015) and off-farm income (Krishinan et al., 2017), as proxy of women's low status of empowerment (Atake and Ali, 2019), and justifications for access to programme. The analysis and interpretation further considered the targeting, suitability of the programme support in line with intersectional demands of women beneficiaries, and the debates on programmatic

impact assessment and rights-based targeting approaches.

DATA RESULTS AND PRESENTATION

From the 745 program participants, 42.1, 29.9, and 28.5% got program support in vegetable, poultry, and dairy farming, respectively. About 274 participants were selected for this study and their socio-demographic profiles were assessed here. First, as shown in Table 1, the average age of the participants was 48.4 7.86 years, and the average family size was 4.562.18 members. The average number of years involved in farming was 9.363.54 years.

Second, as shown in Table 2, the participants' marital status, education level, and type of farming were evaluated. As a result, 71.2 percent are married, while the remaining 29.8 percent are single, divorced, or widowed. The sample households' marital status varies as well. Nearly one-third (31.9%) of the participants do not read or write, and the majority (60.8%) attended primary or secondary school, with the remaining 7.3 percent attending tertiary education. The women chosen for the program worked in vegetable farming (34.6%), dairy farming (33.8%), and poultry farming (31.5%).

According to interviews and case studies of program beneficiary women, the trend in urban agriculture in Akaki Kality is a recent phenomenon that did not exist prior to ten years. The program-based intervention began after the city government established a structure for the agriculture sector and an agricultural extension service

Table 1. Table socio-demographic profile of respondents.

Age, family size and occupation	Mean	Standard deviation
Age	48.4115	7.86885
Family size	4.5654	2.18090
Number of years engaged in farming	9.3654	3.54687
Sector-wise involvement in farming	Frequency	Percentage from total
Vegetable production	314	42.1
Poultry production	219	29.4
Dairy production	212	28.5
Total	745	100%

Source: Survey Compilation, August (2021).

Table 2. Study participant's socio-demographic information of the participants.

Variables	Category	Frequency	Percentage
Marital status	Married	185	71.2
	Single/divorcee/widow	75	29.8
Education level	Do not read and write	83	31.9
	Grade 1-8 and Grade 9-12	158	61.7
	Collage /university	19	7.3
Farming type	Vegetable	90	34.6
	Dairy	88	33.8
	Poultry	82	31.5

Source: Survey Compilation, August (2021).

was identified as a food security strategy for the city's poor (AACA, 2013). Beneficiaries report that experts from the agriculture office occasionally visit and provide assistance; however, participants believe that the experts share little knowledge and that the assistance is not practical. Furthermore, individual experts frequently argue that government institutional and resourcing support was insufficient. For example, financial assistance and customized training were scarce. The government gives emphasis for urban agriculture, after the World Bank Project on Urban Food Security and Agriculture, with the slogan "leave no land uncultivated". The government created a program to help poor female-headed households improve their income and diet. However, due to water scarcity, households use water discharged from industries to reduce water costs; however, this practice is causing health problems.

According to experts in the district agriculture office, " ... focus on the urban agriculture was not satisfactory in the past... but now the focus is from the prime ministers' office..." The urban agriculture has become a component of the 'Green Legacy' of the prime minister of Ethiopia. The urban agricultural green legacy components focus on

improving the environmental use-food-waste balance in the country. The Addis Ababa urban agriculture commission commissioner explained that the practice of urban agriculture was established in 1960's in Ethiopia but the sector in urban areas never supported by policy and institutional support. Thus, the mission of UA in Addis Ababa is to renew the livelihoods of displaced farmers; and expand and modernize the urban agricultural practices (AACA, 2013). In the selected districts, according to my observations, from interview of experts and women participants, animal husbandry and vegetable farming are important choices of the participants. Specifically, dairy production, poultry, cattle fattening, beekeeping and pig breeding from the animal husbandry; and mushroom production, vegetable production and nursery for apple, avocado and prime were widely practiced. The agricultural activities supported are based on suitability and interests of the participants. However, its effects on health are identified by beneficiaries and extension agents as key challenges of urban agriculture in Addis Ababa.

In addition to food security, income and consumption aims of the UA program in the city, the sector has been



Figure 3. Demonstration of UA at District 07 Office Premises.
Source: Researcher's Field Photograph, August (2021).

identified as key for employment and the surplus for the traditional market places in Addis Ababa. Therefore, the district government allocated 18,000 ha land in 2020, with 70% going for organized and unemployed youth. In this regard, the sector, and the program support created 1206 jobs (beneficiaries) in 24 registered enterprises, demonstrating the potential of UA in Addis Ababa City. These findings were confirmed by Sophia (2015) in Addis Ababa City and Gonfa (2019) in Adama City. As evident from the program beneficiary list and the actual farming practice observed on the ground, mostly, women engage in UA and men tend to work in industries, government service providing institutions, and the private sector. The interview and case study data results show that women engage in employments that are close to home (even, from the survey results, 70% of women are engaging in UA); this was for the reason that women have care and domestic provision roles and to accomplish these, women often stay around home and children (to provide meal, protection, etc.). The reasons for women's engagement in farming around homesteads are: (1) women lack time due to domestic burdens and do not move to farm places to work in order to care for their children; (2) the UA activities require less capital, small working space and employees with low skills, market information and knowledge. According to the cases of women participants in the study, most of the time women are participating in vegetable production because vegetables and chicken need closer oversight as child; and thus, 75 and 65% of beneficiaries engage in these activities respectively. Also, with women groups and associations, as collective agents in changing poverty context in the city, the women share experiences and engage in farming activities that are highly productive and has program support by the city government, the World bank and other development actors in the city (Figure 3).

In addition, UA agriculture demands small plots, the practice encourages recycling of environmental hazards such as plastics. Respondents agree that "... since land is scarce, UA demands small space, house walls, house tops and protected lands such as in water courses and corridors of buildings ...". UA is technology intensive and expands innovative farm practices at on hand and high

productivity per unit area on the other hand. Urban agriculture can be practiced using dilapidated materials like car tyers. The above field photo, in Figure 3, indicates how UA can be practiced in one's office/living house compound, using old plastic material and tyers, and in lands that are not in use, such as by draining swamps caused by urban water waste. After analysis of the socio-demographic profiles, farming involvement and program support by the beneficiary women selected for this study, the level of women's holistic empowerment using the 5DE indices, were assessed. In the 5DE indices, 10 measures were observed and the corresponding weights of the indices in each empowerment domain was analysed. The analysis in this category aimed to generate evidence on the impact of program-based UA on female-headed households in the selected districts. To measure the level of impact, the ten indices that were developed and used for studies related to women empowerment in the agriculture sector were used. The model's five domains are production, resource, income, leadership, and leisure, as shown in Table 3.

Out of the five domains, the first one is the urban agriculture production domain (AWARD, 2019). This domain measures women's empowerment, as indicated in Table 4, using input and autonomy indices. As a result, the average agricultural production score was 3.09 ± 0.32 . Specifically, 39.6% of women make all decisions on productive inputs, while 37.7% have a high degree of autonomy in household life. Most (76.4%) had confidence that their agricultural production will not be in trouble and 45.8% of the women believe that that people around them do not judge them negatively whatever they produce and do. Only 4.3% of women responded they do whatever they believe is right without any kind of fear and 49% responded that they somewhat fear. The second domain is the access to and control over productive resources. The study revealed that all women beneficiaries of the intervention have assets. However, in terms of asset decision-making, approximately 36.2% of survey participants were involved in decision-making on selling, buying, and transferring household assets, and 72.3% in obtaining and using credits, savings, and changing to other assets.

Table 3. The domain indicators and weights using the WEAI.

Domain	Indicator	Score	Weight
Production	Input in productive decisions	0.9885	1/10
	Autonomy in production	0.8769	1/10
Resource	Ownership of assets	0.9808	1/15
	Purchase, sale, or transfer of asset	0.9885	1/15
	Access to and decisions about credit	0.2154	1/15
Income	Control over use of income	0.9038	1/5
Leadership	Lead Women Group/Community Committee	0.9846	1/10
	Speaking in public	0.9923	1/10
Time	Workload	0.9923	1/10
	Leisure	0.9269	1/10

Source: Survey Compilation, August (2021).

Table 4. Data Results on Production and Resource WEAI Domains.

Input access and autonomy	Frequency and Score	Percentage and Score
Decisions on inputs	103	39.6
Extent of Decision on Inputs	3.6732	0.54402
Average autonomy score	2.6943	0.34850
Access to and control over resources	Frequency	Percentage
Asset Ownership (Yes)	260	100%
Decision over all Assets and Income (Yes)	94	36.2
Decision over Access to Credit and Utilization (No)	188	72.3
Average resource access and control score		4.021±1.609

Source: Survey Compilation, August (2021).

Regarding decisions over the use of income generated from farming activities, 50.1% of women had a decision-making role in the household. About 98.5% of women involved in women/community and association level leadership positions. This research revealed more women involvement political empowerment. These associations encompass a wide range of social and economic interests and arrangements; a more disaggregated data about women participants of the diverse social groups is needed. According to the data in Table 5, approximately 0.8% are uncomfortable speaking in public, 70.8% speak with difficulty, and 28.4% speak fairly comfortably. The average score of speaking in public is 82.1%, but the level of confidence greatly varied. According to a detailed 24-hour time allocation, 99.2% of women work more than 10.5 hours on farm activity. Here the domestic workload becomes invisible; except the key informant interview results, after completion of farm activity, women work on domestic chores and family provision activities. From the Table 5, about 78.3% of women do not have leisure time. The data results confirm the existing evidence that: (1) women work for more hours than men; (2) women's lack

leisure time and women's workload is invisible to document as evidence using the existing measures; and (3) policy-makers need gender statistics and gender-sensitive analysis tools, evidence and intervention priorities.

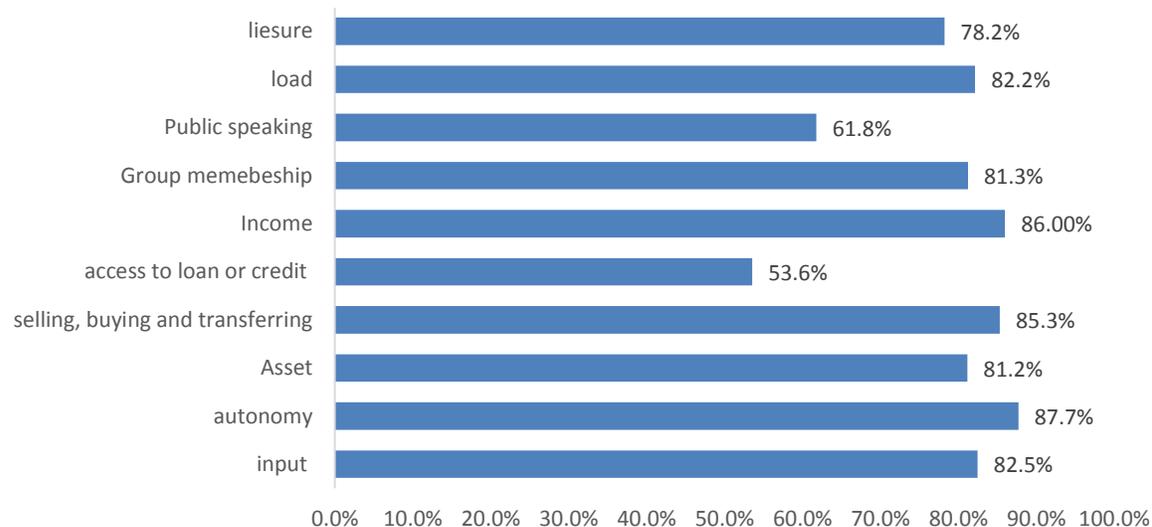
After step-by-step presentation of the data results on the WEAI domains and indices, the impact of the programme-based intervention on women's holistic empowerment in all ten indices were observed. As indicated in Figure 4, control over autonomy in production (87.7%), control over income (86%), and decision on purchase, sale, or transfer of assets (85%) were the three top impact of the intervention on women's empowerment. However, access to loan/credit (53.6%) was low. A consistent finding was reported from a study in Guatemala by Hovorka (2019). The variable "autonomy" showed significant level of empowerment due to the intervention. A study result from Uganda showed that UA improves "autonomy" of poor female-headed households and enhance women's empowerment in 3DE's ten indices AWARD (2019).

After the overall presentation of the impact of the

Table 5. Data Results on Leadership, Time and Leisure WEAI Domains.

Involve at Women/Community Level Leadership	Frequency	Percentage
No	4	1.5
Yes	256	98.5
Speak at community and public meetings	Frequency and score	Percentage and score
No, not comfortable	2	0.8
Yes, but with difficulty	184	70.8
Yes, fairly comfortable	74	28.4
Average resource score		0.821
Time (in farm activity)	Frequency	Percentage
>10.5 h	2	0.8
< 10.5 h	258	99.2
Time (Leisure)	Frequency	Percentage
Do not have leisure time (not satisfied)	199	78.3
Have Leisure time (occasionally satisfied)	55	21.6

Source: Survey Compilation, August (2021).

**Figure 4.** Impact of 5DE Indices on Women's Empowerment.

Source: Survey Compilation, August (2021).

intervention on women's empowerment, an inadequacy cut-off point was defined for 5DE domains and its indices. The 5DE conveys the percentage of women who are empowered and the level of disempowerment. An individual woman beneficiary who has achieved 'adequacy' in 80% or more of the weighted indicators was considered empowered. The inadequacy score is computed for beneficiaries based on the inadequacies across all indicators. Each person's inadequacy score is calculated by summing the weighted inadequacies experienced so that the inadequacy score for each

person lies between 0 and 1. The score increases as the number of inadequacies of the person increases and reaches its maximum of 1 when the person experiences inadequacy on all 10 indicators. Therefore, average adequacy score of the women in this study was 0.77 ± 0.11 and 208 (80%) of the women had adequacy of cut off of 0.8 and above. According to the evidence from this study, only 20% of the beneficiary women are not empowered, with a total average inadequacy score of less than 0.8. And the average percentage (score) of dimensions in which disempowered people achieve

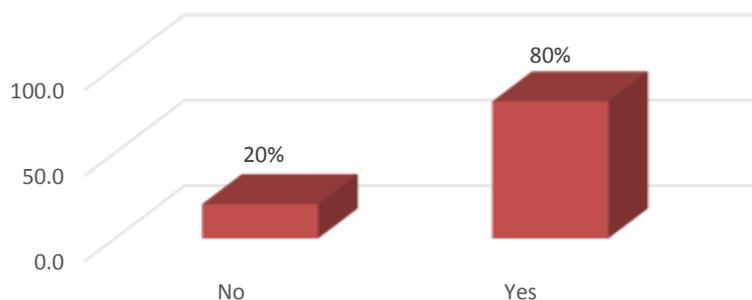


Figure 5. Overall Impact of the Intervention on Beneficiary Women.
Source: Survey Compilation, August (2021).

adequately was 69.1% (0.691). Thus, most of the disempowered women had adequacy in three of five domains (Figure 5).

To estimate the 5DE empowerment index score, the formula used by Alkire et al. (2013) was employed: $5DE = He + (Hn \times Ae)$, where: He is % of women who are empowered, Hn is % of women who are not empowered ($1 - He$), and Ae is the % of dimensions in which disempowered women beneficiaries have adequate achievement.

Considering the estimate provided above, that is $He = 0.8$, $Hn = 0.2$, and $Ae = 0.691$, the 5DE score in this study is $0.8 + (0.2 \times 0.691) = 0.938$. This finding is higher than scores presented in other studies conducted in Ethiopia. For instance, Abebe et al. (2016) reported 73% and Bekana (2020) 71.3%. A study outside Ethiopia reported an average inadequacy score on overall 5DE indices, for example, by Agnes et al. (2013) is: (1) 0.634 for Bangladesh; (2) 0.759 for Malawi, and (3) 0.760 for Nepal. A study from Uganda revealed three times lower empowerment percentage compared to the findings in this study (37.3% of women engaging in UA and policy support were empowered while the rest 64.7% were not; and the overall 5DE score is 0.812).

Regarding the factors that affect women's empowerment, in the case of programme-based UA beneficiaries in the study area, the multiple linear regressions show the 5DE indices results as follows. Before fitting into a regression model, essential assumptions such as multicollinearity, model good of fitness, independence of error, and the residual normality were evaluated. To test for the presence of multicollinearity, all variance inflation factor (VIF) values were assessed and they were less than 10. This suggests that the multicollinearity concern among independent variables is acceptable. The overall goodness of fit of the models is tested using an ANOVA table and an F value was located. The F-value is ($df(12)=4.500$, $p0.001$), indicating that the model is well-fitting. The Durbin Watson test of independence was used to evaluate error independence. The test statistic can vary between 0 and 4 with a value of 2, meaning that

the residuals are uncorrelated. In this study, the assumption was fulfilled since Durbin Watson test result was 2.011. The value shows no significant influence on the estimate.

Based on the multiple regression result, saving money would raise the women empowerment index due the woman's engagement in urban agriculture (5DE) by 2.8% ($\beta=0.028$; 95% CI: 0.010, 0.046). A one-year increase of staying in farming activity increases a woman's empowerment index by 3.3% ($\beta=0.033$; 95% CI: 0.005, 0.803). Thus, money saving money and empowerment are positively linked; and this result confirms the findings of Hovorka (2019). Thus, the more women have experience in farming, women adopt the challenges and strategies and become more productive. Previous studies did not include this variable.

The higher a woman's level of education, the higher her empowerment index. Women completed high school (9-12) grade has 2% higher empowerment index ($\beta=0.020$; 95% CI: 0.001, 0.039) and going up to college and university would raise the index by 4.9% ($\beta=0.049$; 95% CI: 0.017, 0.081) after controlling for other factors. A similar finding was reported from a USAID supporting women engaging in urban agriculture. About 35% of women with less than a primary-school education is empowered and 45% of those who have completed secondary school are more empowered (Abebe et al., 2016). In Ethiopia, as girls grow older, academic participation becomes increasingly difficult as their labour is essential for income-generating activities and supporting in domestic works. This finding confirms a study in Guatemala (Mgamhewage et al., 2015). Because education level has a significant influence on women empowerment, as shown in Table 6, access by girls and beneficiary women to education reduce early marriage, enhance independence, and individual well-being. As their independence grows, so does their participation in the community and decision-making on issues that affect their lives.

The ANOVA test was conducted to assess the significance on the impact of UA on women's holistic empowerment; in the case of the programme

Table 6. Multiple linear regression results on 5DE empowerment indices.

Variables	Unstandardized		Standardized β	t	P-value	Collinearity Statistics	
	B	SE of β				Tolerance	VIF
Vegetable	0.016	0.017	0.119	1.746	0.082	0.705	1.418
Poultry	0.004	0.009	0.026	0.379	0.705	0.700	1.429
Age	0.000	0.009	0.022	0.373	0.709	0.965	1.036
Saving money	0.028	0.018	0.205	30.053	0.003	0.735	1.361
Off-farm income	0.004	0.009	0.028	0.483	0.629	0.969	1.032
Land ownership	0.005	0.007	0.037	0.538	0.591	0.706	1.416
Farm experience	0.033	0.009	0.146	2.280	0.023	0.803	1.246
Family size	0.000	0.001	-0.015	-0.250	0.803	0.966	1.035
Primary school (1-8)	0.005	0.002	0.037	0.542	0.588	0.706	1.416
High school (9-12)	0.020	0.009	0.142	2.103	0.036	0.720	1.389
Tertiary School	0.049	0.009	0.200	2.983	0.003	0.732	1.366
Constant	0.856	0.031		27.821	0.000		

Source: Survey Compilation, August (2021).

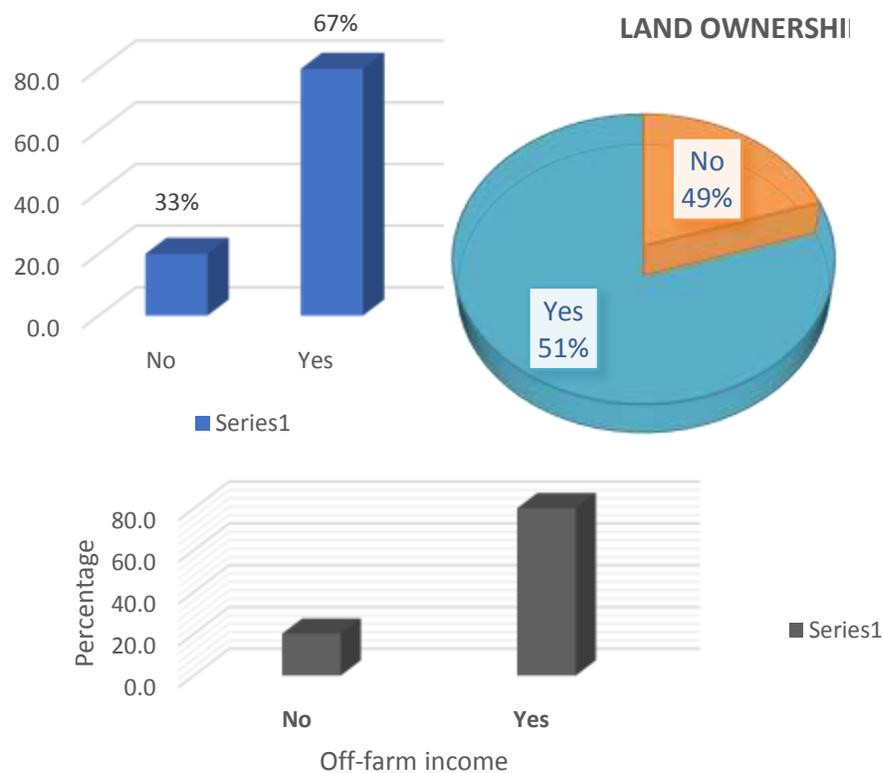


Figure 6. Saving habit, land ownership and off-farm income sources of the participants.
Source: (Survey Compilation, August 2021).

beneficiaries. This research revealed that the mean 5DE is significantly different for at least one of the levels of the educational group ($F_{3, 259} = 4.519, p=0.004$). And based on the mean plot below, women who have tertiary education were a higher 5DE index (Table 7).

Regarding the saving habit, land ownership and off-

farm income sources, among the total study participants women, most (67.3%) did not have a saving habit and almost half (51%) was lack of land ownership. Half of the women in this study had no other sources of income (Figure 6). As the survey, the result indicated the saving experience of the respondents is very poor among the

Table 7. One-way ANOVA test results (education and 5DE Indices).

Program Beneficiary Women	Sum of squares	Df	Mean square	F	Sig.
Between groups	0.053	3	0.018	4.519	0.004
Within groups	0.992	256	0.004		
Total	1.044	259			

Source: (Survey Compilation, August 2021).

total respondent 67.3% of them are they did not save capital currently only 32.7% of the respondents are saved money by involving in different means of saving institution. They explained the reason most of them are practicing urban agriculture for the source of food for their family not to sell the market. Regarding land ownership majority of women farmer in this study they do not have their land among the total respondent 51% have no land and the rest 49% have practice urban agriculture in their home within the small plot area. According to the data, 51% of the women farmers in the study area have another source of income in addition to urban agriculture. In addition, their employment situation varies; some are civil servants, others are crop merchants, and some practice urban agriculture in their spare time.

DISCUSSION

Regarding the benefits of UA for women empowerment, based on the in-depth interviewee, and key informant urban agriculture has benefited them in and contribute to their economic, political, social, and psychological empowerment. It creates a means of ensuring food security, income-generating activities, creating social cohesion or social bond, and ways of building self-confidence. First, participation in UA programmes by female-headed households improve their food security statuses. Urban agriculture has much importance the major one is food security benefit and the participant informed that their family consumes more urban agriculture product after they engaged in urban agricultural activities and their food consumption is improved in quality and quantity. In addition to this, their engagement in urban agriculture is minimized their cost which is spent on food items. In line with this, one study in Cape Town on urban agriculture benefits for women showed that it reduces expenses for fresh produce, thereby freeing up some of the household budgets for buying staple foods, such as vegetables, milk, eggs, and meat (Oliver and Heinecken, 2017). The in-depth interview results also confirm this finding of Olivier and Heinecken (2017) who claimed that urban agriculture is viewed as a culturally relevant food source for women throughout Africa, and is particularly important for women in Cape Town (Oliver and Heinecken, 2017) and Nairobi (AWARD, 2019) who have limited income.

Similarly, the studies in Adama city on the role of food security in urban agriculture revealed a similar finding from the current research. Urban agriculture is playing a crucial in achieving food security for urban households. The majority of the surveyed sample households received the majority of their dietary energy from urban farms alone (Mulugeta, 2018). Urban agriculture's positive contribution to alleviating food insecurity is also found in Akaki Kality sub-city (Sophia, 2015). A similar study confirms our finding that urban agriculture has contributed to food and nutrition security is probably its main strength since agricultural production in cities provides the poorest with greater access to food and filling an essential share of nutritional needs (Orsini and Kahane, 2013). Participants explained urban agricultural activities are beneficial.

Also, UA has economic benefits for female-headed households. Women in the study area are economically benefited from urban agriculture as the in-depth interviewees disclosed that Urban agriculture is in many cases especially effective and efficient for married women with children, or women heads-of-households, because it is often (but not always) performed close to the home and combines well with their household responsibilities. Urban agriculture requires little cash, given that it can be undertaken with relatively low capital, technology, and inputs. It is thus attainable and affordable for women with limited education and resources, and often stimulates the use of indigenous practices. It is not unusual to find women in urban households earning more from food production than their husbands earn from formal jobs. The ownership of animals and/or independent cash income may strengthen a woman's social position within the household and the community. Animal rearing can also fulfil an important role as an economic safety net, and plays an important part in certain socio-cultural practices. Urban agriculture not only allows women to secure their daily household needs but provides a potential stepping stone for increased independence, confidence, and opportunity to improve their quality of life.

UA is promoted in several ways as an economic development tool. Women tend to be responsible for food provision in many cultures. Women use UA as their primary strategy in cases like this to maintain livelihoods and safeguard household incomes through subsistence production. The primary goal for urban women farmers in

such circumstances is to produce food for household consumption. In addition to avoiding hunger, this eliminates the need to purchase food (Gonfa, 2019). Similarly, this research found that women urban farmers in the study area are generating income from urban agriculture to produce food for household consumption to fulfil other needs of their family beyond food, and also women spent money for other social associations.

Urban agriculture is considered a strategy to alleviate poverty. As the data from the key informant interviews informed that as a general in Ethiopia and Addis Ababa urban agriculture can be an important source of income, jobs, and freshest food for this rapidly growing population and urban poor as the strategy indicated, the country is in deep poverty, rapid population growth and environmental degradation, urban agriculture is a means of a source of employment, household incomes and food source (Orsini and Kahane, 2013; Gonfa, 2019). Urban agriculture by its nature is very easy to practice because it doesn't require high education level most of the time low-income people engaged in urban agriculture activities and also other segments of the society like civil servants are involving. The special quality of this sector is anybody can do this in their free time. The other aspect is many products are coming from other countries by foreign currency this affects the economy of our country and also it may affect the health of society. Studies in Zambia confirming this finding that urban agriculture can be practiced side by side with other professions (Mupeta et al., 2020). Producing and consuming urban agriculture products at home are very important in a different dimension. In addition to this, the initial capital for practicing urban agriculture is less when compared with other sectors like the manufacturing industry, it also helps the community to buy fresh and healthy products in their locality. Similarly, Mandefro (2009) and Sophia (2015) claimed that urban agriculture is important for the community not only for the producers. Urban agriculture has the potential to create job opportunities for unemployed youth and women. Similarly, several of these food justice projects are located in neighbourhoods where unemployment is high, where they serve as viable employment opportunities and catalysts for entrepreneurship (Golden, 2013). The USDA's Community Food Projects in Iran have generated an estimated 2,300 jobs and incubated more than 3,600 microbusinesses, supporting this idea (Mohammadi, 2019).

Participation in UA improves social status of female-headed households. The social importance of urban agriculture is many for instance; farms and community gardens in urban areas provide safe recreational and environmental spaces for residents. Gardening and farming beautified neighbourhoods and employed residents to make communities prouder and more attached to their surroundings (Golden, 2013).

The most observed impact of urban agriculture was its effect on communities and the lives of residents and

participants. The same finding in Kibera revealed that in addition to food production, urban agriculture also catalyses positive community change, which is what makes it so valuable. In particular, community gardens provided an important space for socializing and gathering (Debela and Mohammed, 2020). Similarly, Farmers in Kibera reported that sack gardening had strengthened friendships and cooperation between them. Some farmers found gardening beneficial because they were able to share their vegetables with their friends. Others, however, worked together with others by giving them extra seedlings, helping one another carry soil or build sacks, or by pooling money to buy fertilizer and pesticide. Having a sack gardening program has inspired people to talk more with their neighbours, making for a stronger sense of community (Gallaher et al., 2013).

Participation in UA improves the health and psychological status of female-headed households. According to the women participating in this study, their participation in urban agricultural activities is helping them to improve their mental and physical health. Additionally, it also contributes to good psychological wellbeing. The psychological benefits of green space, and specifically gardens, should not be underestimated in discussions of urban ecology. Green space enhances the aesthetics of the urban landscape and improves the quality of life in the city. It is obvious that working with the land is therapeutic, and gardens especially provide a space for meditation and community gathering (Gonfa, 2019). This study found that women participation in urban agriculture helps women to empower them in decision-making ability and make them a leader in different position as the key informant interviewee noted.

The following are the UA challenges in the study area. Even though agricultural activities benefit women, there are numerous challenges. According to the women interviewee and the key informant's responses, there are many challenges because urban agriculture is a recent practice in Ethiopia, and the sector facing challenges related to this practice. Lack of market linkage, limited access to improved seed, insufficient water access, lack of farm credit, limited technical support, limited access, and expensive production inputs, and inadequate farmland are the major challenges the study found that women are suffering. Women in the study area face severe constraints in accessing, using, and/or controlling land in cities, compared with their male counterparts. Men tend to have the first choice of any available vacant land, leaving women with low-quality or less secure plots of land, often located at a considerable distance from home. Even within households with adequate land resources, wives may be at a disadvantage in terms of access to these plots. Distance is a related challenge: women are often left to travel extensive distances to marginal lands, their journeys requiring considerable time, physical effort, and financial expense for transportation.

As the data from interviewees and key informants

indicated, women also face constraints in terms of urban agriculture production itself. They often lack inputs and working capital, as well as access to knowledge and information on the use of modern inputs and technologies. The latter is partly due to women's limited exposure to commercial urban agriculture or to their limited access to training courses offered by institutions or non-government organizations. Women are less likely to benefit from research or extension services that fail to consider gender-specific differences. Women farmers in the study area disclosed that lack of adequate workplace a major problem and challenges they are facing. Lack of space is also the challenge of women who engaged in poultry and vegetable farming activity.

Similar studies are found in Ghana urban farmers, as the study revealed, the main problems in urban agriculture as mentioned by the producers are land both in terms of access and tenure security (Armar-Klemesu and Maxwell, 1992). Women are facing a problem regarding access to finance to improve farming activities. As poultry producer in district 03 explained "*The big challenge we are facing is lack of access to credit if we have finance, we want to extend the farm*" The lack of financial institutions is the most significant of these challenges, as they rarely provide credit to urban agricultural participants. Furthermore, the raw materials required for urban agriculture are very expensive and difficult to obtain. Another study discovered the same result (Gonfa, 2019). Waste disposal or landfill is a critical issue, particularly for dairy producers.

CONCLUSIONS AND REFLECTIONS FOR FURTHER STUDY

Above all male domination has become critical challenges in the sense that the husbands discourage wives' involvement in the program-based farm activity. Also, husbands do not recognize the benefits of their participation in the program-based urban agriculture; including the food and income supply of the family. From both cases, husbands discourage wives' access to credit, loan and extension support to expanding beyond the home-steads. Finally, the data results and the discussion above showed both the positive and negative aspects of the intervention impact. The study argued and substantiated with evidence that: (1) gender-insensitive targeting and program prioritization further expands inequality and invisible systems of exclusion; and (2) holistic indices of women empowerment is needed to assess program impacts, evaluate pro-poor policies and systems of targeting beneficiaries. Therefore, the study concluded with the recommendation that a right-based approach that considers holistic aspects of women's empowerment is advised to inform academic research, policy interventions and advocacy. Also, a feminist gender analysis is required to document the invisible and intersectional barriers to beneficiary targeting and impacts

of interventions

Ethical clearance

The research is approved by the center for regional and local development studies, and the district administration of Akaki Kaliti Sub City of Addis Ababa. All the research process, items, and implementation strategies are duly reviewed and approved for issues related to diversity, language, and cultural sensitivity. During the ethical clearance process in district administration, consensus was reached between the researchers and the program department that since the program is ongoing, no part of data, in whatsoever form, will be shared to third party. We therefore agreed that the data items, in tables, graphs and pictures, were presented clearly in the body of the text. The researchers and the district program office agreed to conduct a follow-up study at the program's conclusion and publish the data for third parties.

In addition to the study's institutional approval, all respondents and participants in this study were asked for informed consent, and their privacy and the confidentiality of their responses were protected by disaggregating data presentation.

Finally, the authors guarantee that this study is unique and that no part of it was created without proper recognition and citation. As a result, there is no way that the authors violate any type of ethical misconduct, and the ethical clearance measures are strictly followed.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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