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Urban Agriculture Practices and Households' Livelihoods in Ondo State, Nigeria

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Abstract
The study examined the effects of urban agriculture on households' livelihoods in Ondo State, Nigeria. A multistage sampling procedure was employed in selecting 150 respondents. Data were obtained through the use of interview schedule and analysed using percentage, charts, and mean statistic. Results revealed that the major crop and livestock kept were leafy vegetables (100.0%) and broilers chicken (57.0%), respectively. The majority (82.0%) of the respondents that practised urban agriculture had no contact with extension agent. The practice of urban agriculture had significant effects on respondents' livelihood in term of improvement in standard of living from 85.0% to 98.0%, and improvement in saving pattern from 66.7% to 100.0%. The practice of urban agriculture had also led to an improved knowledge of the respondents. The extension services of Ondo State Agricultural Development Programme should be extended to those practicing urban agriculture. This will go a long way in improving and sustaining households' livelihoods.

Keywords: urban agriculture, effects; livelihoods, extension services.

Introduction
Global urban populations are projected to increase by 2.5 billion over the next 30 years (Mahtta *et.al.,* 2022). All over the world, a growing proportion of the population lives in cities. It is generally higher in the developed than in the developing world (United Nations Conference on Trade and Development {UNCTAD}, 2021). Every year, tens of thousands of Africans migrate from rural to major cities in search of a better life.

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This will affect the ability to meet the demand for nutritious food and ensuring food security particularly in the developing countries.

Urban agriculture has been proposed as an important urban element to deal with the challenges of food insecurity and environmental deterioration (Yan, *et.al.,* 2022). It is defined as the small areas (such as vacant plots, gardens, balconies, containers) within the city for growing crops and raising small livestock for own consumption or sale. It serves as source of food and income for urban dwellers. Urban agriculture occupies a special economic niche and offers food and livelihood opportunities for a section of urban population especially urban poor. Importantly, it helps in ensuring urban food security and attainment of the sustainable development goals (Kuusaana *et.al.,* 2022).

It also offers many promises including timely access to fresh food, neighbourhood food availability, better health outcomes for city-dwellers and local economic development. Urban agriculture could contribute to feeding city dwellers as well as improving metropolitan environments by providing more green space (Sarker *et al.,* 2019). The economic aspects of urban agriculture are important component of a city's economy. If a household is able to acquire and cultivate a piece of land as urban agriculture, it could serve as income generating activities thereby improving the income and socio-economic status of the household hence, changing an individual's livelihood.

A livelihood comprises the capabilities, assets and activities required for a means of living (Karki, 2021). There are various components of livelihood. It includes tangible and intangible assets. Asset can be human capital (skills, knowledge and ability to work), social capital (informal networks and membership of groups and other similar relationships that facilitate cooperation and economic opportunities), natural capital (land, soil, forest, water and fisheries), physical capital (basic infrastructure such as roads, water and sanitation, schools, markets and producer goods) and financial capital (savings, credits, income from employment and trade).

Cultivation of crops in urban areas has both positive and negative effects. Mbina and Bassey (2019) noted that visual untidiness, soil erosion, destruction of vegetation, siltation and depletion of water bodies and pollution of resources (air, soil and water) were associated with urban agriculture. Mupeta, et al. (2020) in their findings indicated that urban agriculture has a significant positive effect on household income. Among the outcome variables most frequently used as noted by Ilieva *et.al.(*2022) to examine the value of urban agriculture for building stronger communities were community cohesion (people in a society feeling and being connected to each other) and community engagement (collaboration between institutions or individuals for the mutually beneficial exchange of knowledge and resources in a context of partnership and reciprocity).

Urban agriculture is a dynamic concept that comprises a variety of livelihood systems ranging from subsistence production and processing at the household level to more

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commercialized agriculture. Households adopt many livelihood strategies to improve their standard of living, income and to be more food secure. Urban agriculture has been advocated as one of the livelihood strategies. These livelihood resources include the social, financial, human and natural capital (Yang, et al., 2021). Urban dwellers keep livestock and produce crops around their homes using free and unoccupied plots of land. Examining these practices and their effect on households' livelihoods in Ondo State, Nigeria is paramount; hence, the need for this study.

Objective of the study
The study examined the effects of urban agriculture practices on households' livelihoods in Ondo State, Nigeria. Specifically, the study ascertained the socio-economic characteristics of urban farmers; identify the type of urban agriculture practiced; and determined the effects of practising urban agriculture on households' livelihoods.

Methodology
The study was conducted in Ondo State, Nigeria. It lies between latitude 5^{o}45' and 7^{o}52'N and longitudes 4^{o}20' and 6^{o}05'E. Ondo state has three senatorial districts (Ondo South, Ondo North and Ondo Central) and eighteen local government areas (LGAs).

All households involved in urban agriculture for a minimum of four years constituted the population of the study. A multistage sampling procedure was used to select respondents. At the first stage, one major town, namely Owo, Okitipupa and Akure were purposively selected from each of the three senatorial districts based on their classification as urban. At the second stage, five areas within the urban zone usually known for agricultural practices were purposively selected because of the involvement of the people in the area in urban agriculture. The last stage involved a purposive selection of respondents. Out of the number of those practicing urban agriculture in the identified urban zones, ten urban dwellers practicing agriculture in and around their residences from each of the identified zones were purposively selected. A total sample size of one hundred and fifty (150) urban dwellers involved in urban agriculture was purposively selected across the three major cities.

Primary data were collected from the respondents through the use of structured interview schedules that contained open and close ended questions on the various areas of the study. The instrument was subjected to content validity. A group of 5 experts in the field of agricultural extension and rural sociology were consulted to critically examine the instrument independent of one another. Necessary corrections were made on the instrument based on their comments. To identify the type of crops grown and livestock kept, the respondents were provided with a list containing different types of crops and livestock to tick from, as it applied to them, on a multiple option basis. To identify the extension services received, the respondents were asked to indicate whether or not extension agents visited them for information dissemination relating to urban agriculture.

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Three main components of livelihoods (social capital, human capital and financial capital) were used to measure livelihoods. The variables included in the livelihood components include: social group belonging to, perceived knowledge on urban agriculture, standard of living, and saving pattern. Data were analysed using percentage, charts, mean and t-test statistic.

Results and Discussion

Socio-Economic Characteristics

The results in Table 1 reveal that 32.7% of the respondents own the land they used for urban agriculture, while 31.1% asserted that the land used for urban agriculture belong to the family/relatives. Since the land used by most of the respondents belongs to them and their family/relatives, they can engage in any type of urban agriculture, though the practiced is on a subsistence level. This result is in agreement with the findings of Omodara, et al. (2019) that 57.1% of those that practiced backyard farming for crop production in peri-urban in Osun State, purchased their land. Also, as noted by Ibrahim, Haruna and Shaibu (2020), participation in urban agriculture is positively influenced when households have easy access to farm land. Again, it could be deduced from the study that, those involved in the practice of urban agriculture in the study areas did not limit themselves to personal plots alone but also accessed other unused plots from friends while some plots were on lease.

The average years of farming experience for urban farmers was 7.7 years. This implies that the respondents had practiced urban agriculture for some reasonable years; hence, they are expected to be knowledgeable in the practice of urban agriculture. This considerable experience might translate to right attitude towards improved and better farming practices. The average plot size used by the respondents for urban agriculture was 2 plots. This is dominated by small farm holder since most of these plots are pieces of land designated for building houses. A plot of land is about 60 by 120 meters. This result is in agreement with the findings of Omodara, et al. (2019) that the average farm size used for backyard farming in peri-urban areas of Osun State was equivalent to 2.3 plots of land.

Table 1: Socio-economic characteristics

Variable	Percentage (n=150)	Mean
Land Ownership		
Self	32.7	
Lease	26.7	
Family/relatives	31.3	
Friends	9.3	
Experience in urban agriculture (years)		
4-10	87.3	
11-20	11.3	7.7 years
21-30	1.4	
Farm Size (plots)		
1-2	83.4	
3-4	15.3	2 plots
5-6	1.3	

Source: Filed data

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Primary Occupation

The majority (81.3%) of the respondents did not practice urban agriculture on full time (Figure 1). Out of the 81.3% of the respondents that did not practice urban agriculture as their full-time occupation (figure 2), 41% were traders, 25.4% were civil servants and 31.1% were artisans (tailors, bricklayers). This finding also collaborated the findings of Tokula (2018) that most of the farming activities in the urban areas were carried out on part time basis by people engaged in other occupations. Their involvement in urban agriculture was to augment household food and income. It could be deduced from the result that, most of those that practiced farming activities in the urban areas were carried out on part-time basis who were engaged in other occupations like trading, teaching, tailoring, bricklaying (Omodara *et.al.*, 2019).

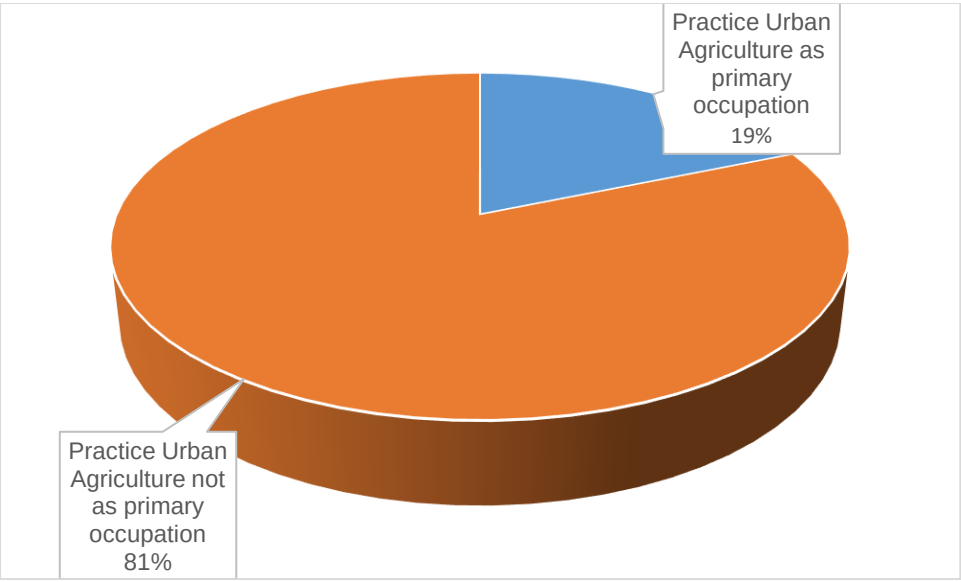

Figure 1: Primary occupation
Source: **Filed data**

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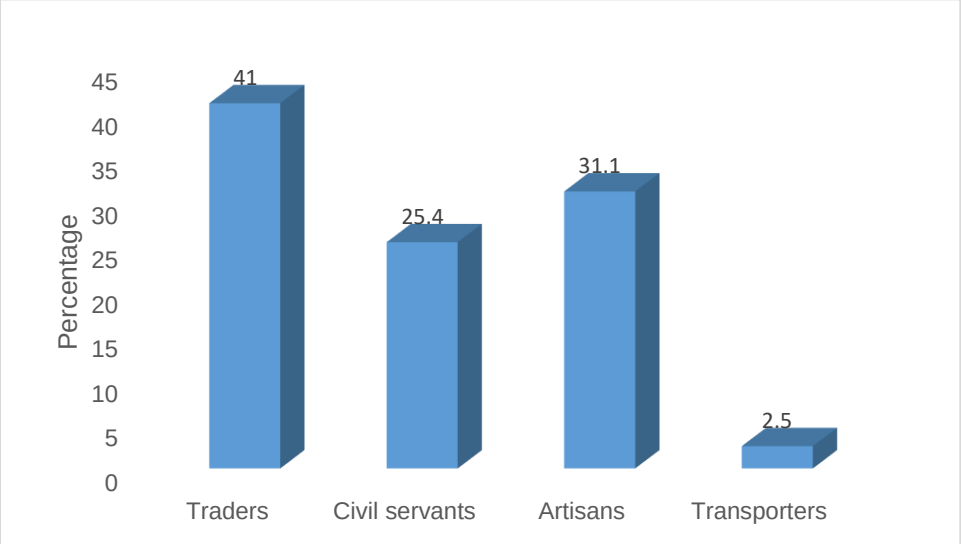

Figure 2: Proportion who took urban agriculture as secondary occupation

Types of Crops and Livestock Produced

Results in Table 2 show the distribution of the respondents according to the type of crops cultivated and livestock kept. All (100.0%) of the respondents interviewed cultivated leafy vegetables (like amaranthus, fluted pumpkin). This revealed that indigenous/local vegetables were grown in the area. Most of the respondents reported that they preferred local vegetables because of the taste and easy access to the seeds for planting. *Amaranthus viridis* are simply called green in Nigeria; it is called *Efo Tete* in Yoruba and *Inine* in Igbo, *Alefo* in Ghana while the Jamaicans call it *callaloo*. This vegetable is important because of their leaves, succulent stem and cereal-like grains.

Fluted pumpkin (*Telfairia occidentalis*), is among the numerous important crops cultivated mainly for its leaves and fruits. It is the most preferred, widely cultivated leafy vegetable in Nigeria (Lawal, et al., 2021). They are edible when boiled or cooked with foods; they can also be taken as a vegetable salad or juice when mashed as fresh leaves and the juice extracted. It is called *Ugu* in Igboland, *Iroko* in Yorubaland and *Umeke* in Edo, *kabewa* in Hausa, and *Ikong-Ubong* in Efik. Other crops cultivated by majority of the respondents (97.3%), include maize, followed by cassava (94.6%), yam (61.2%), plantain (43.5%), pepper (38.1%), cocoyam (32.7%), banana (19.7%), melon (15%) and 10.9% planted fruits like tomato, mango, pawpaw. This implies that most of the respondents practiced mixed cropping (planting of more than one crops on a piece of land) in their plots. From the results, it is evident that the dominant crops grown by the respondents in the urban areas, is the production of short-duration crops.

The major livestock kept by the respondents were broiler production (57.0%) and goat rearing (50.0%). Broiler birds are those kept and reared for meat production from day-old to about eight weeks of age for good quality tender meat as source of protein in human diet. About 36% and 31% of the respondents were involved in cockerel, and layers production respectively. Also, 28.1% and 19.3% were involved in fish farming

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and sheep rearing respectively. The multiple responses show that the respondents kept more than one type of livestock with broiler production being the most prominent and engaged by more than half (57.0%) of the respondents. This is in agreement with the findings of Olumba, et al. (2021) who found poultry as the prominent livestock raised by urban farmers in Southeast Nigeria. Again, the higher proportion in broiler production could be related to the significant socio-cultural role of poultry in the African societies. Poultry meats are mostly consumed by an average household in urban and are generally used as gift during festive periods to relatives and well-wishers. From the result, it could be deduced that the respondents were engaged in more than one enterprise (planting of crops and keeping of livestock); thus, indicating enterprise diversification. This diversification could enhance as well as guarantee farm income security (Sen et al.,2017).

Table 2: Type of crop grown and livestock kept

Types of urban agriculture practiced	Percentage (n=150)
Crops *	
Leafy vegetables (*Amaranthus, fluted pumpkin*)	100.0
Maize	97.3
Cassava	94.6
Yam	61.2
Banana	19.7
Fruits (tomato, mango, pawpaw)	10.9
Mushroom	0.7
Melon	15.0
Plantain	43.5
Cocoyam	32.7
Pepper	38.1
Livestock	
Goat rearing	50.0
Broilers	57.0
Layers	30.7
Cockerel	36.0
Turkey	15.8
Sheep	19.3
Pig rearing	6.1
Fish farming	28.1
Rabbit keeping	14.0

Source: Filed data *multiple responses

Contact with Extension Agents

The majority (82%) of the respondents have not had contact with an extension agent while only 18% of the respondents had contact with an extension agent (Figure 3). Table 3 reveals that, for those that had contact with extension agents, 55.6% were visited by private extension workers of the Justice, Development and Peace

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Commission (JDPC), while the remaining 44.4% were visited by the extension agents of the Ondo State Agricultural Development Programme (ODSADP). The Justice, Development and Peace Commission is a faith based and non-profit organization of the Catholic Church, established as its social organ to promote sustainable and integral human development. They are involved in agricultural extension services in Nigeria. ODSADP is a government parastatal within the Ministry of Agriculture established to formulate and implement programmes relating to Agriculture as well as providing extension services to farmers.

For the respondents that were visited by extension workers of JDPC, 50% were visited once in six months while the remaining 50% were visited once a year. For the respondents that were visited by ODSADP, 87.5% of the respondents were visited by extension agent once in a year, while 12.5% were visited once in every six months. This is considered too low. This finding is in support of Sennuga, et al. (2020) finding that there is poor farmers' extension ratio in Nigeria. The extension agent is responsible for providing the knowledge and information that will enable a farmer to understand and make a decision about a particular innovation, and then for communicating that knowledge to the farmers.

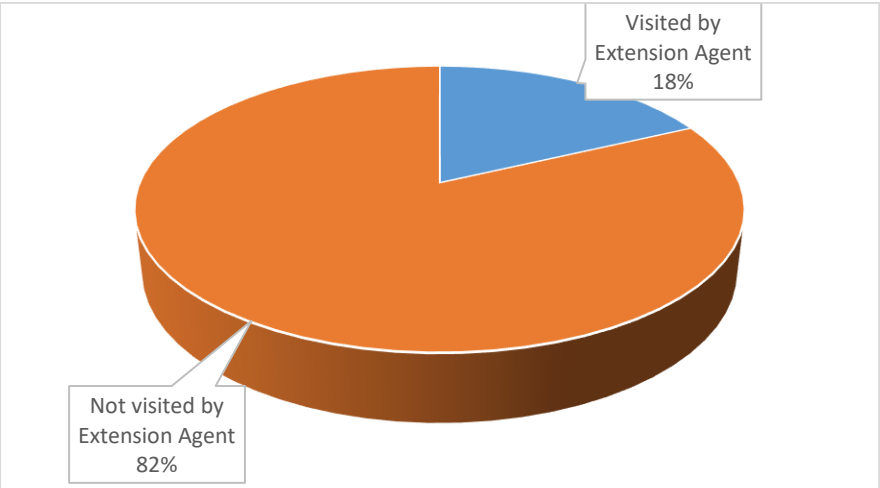

Figure 3: Contact with extension agent

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Table 3: Frequency of contact with extension agent

Source	Yes %	Frequency of visit		
		Once in 3 months %	Once in 6 months %	Once in a year (%)
Extension agent of ODSADP	44.4	-	12.5	87.5
Extension worker of JDPC	55.6	-	50.0	50.0

Source: Filed data

Type of Extension Services Received

Table 4 shows that, those visited by extension agent, all (100%) had training on weed control, 77.8% were linked on how to access input, and 72.2% had training on improving family health and nutrition. Also, 50% had training on pest control while 27.8% were educated on how to access credit facility. Access to input and credit has proven to be a powerful instrument against poverty reduction and development in rural area. Farmers are in need of credits facility because of the seasonal pattern of their farming activities and the uncertainty the farmers are facing. Access to input and credit enhances productivity and promotes standard of living of small scale farmers. Wulandari, et al. (2021) findings indicated that, agricultural extension assists urban farmers in Yogyakarta City, Indonesia to obtain agricultural inputs and also encourage and motivate group urban farmers to attend training with the aim of gaining experience in terms of skills and approach to develop the use of urban farms. They further asserted that agricultural extension workers' have great roles to play in the development of urban agriculture as a motivator, facilitator, educator and communicator.

Table 4: Type of extension services received

Service type	Percentage (n=150)*
Facilitated access to input	77.7
Facilitated access to credit facility	27.7
Facilitated access to market	-
Training on improved water management	-
Training on weed control	100.0
Training on pest control	50.0
Training on diseases control	-
Training on improving family health and nutrition	72.2
Training on home income diversification	94.4

Source: Filed data *Multiple responses

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Effects of Urban Agriculture on Household livelihood
Three components of livelihoods (social, human, and financial capital) were measured to ascertain the effects of urban agriculture practises on households' livelihoods.

Social Capital
Social capital is one of the livelihood components. Membership in social group is one of the key indicators of the social capital. For social capital, practicing urban agriculture enables people to have interaction with more people. This widens their social circle and makes social benefits available to them. These benefits may not have been accessible to them if they do not belong to these social groups. The result shows that about 31% of the respondents belonged to a social group before engaging in urban agriculture but after engaging in urban agriculture, 51.4% of the respondents were members of a social group (Figure 4). According to Ilieva *et.al.(*2022), through the practice of urban agriculture, people are being connected to each other thereby helping individuals to exchange knowledge and resources in a context of partnership.

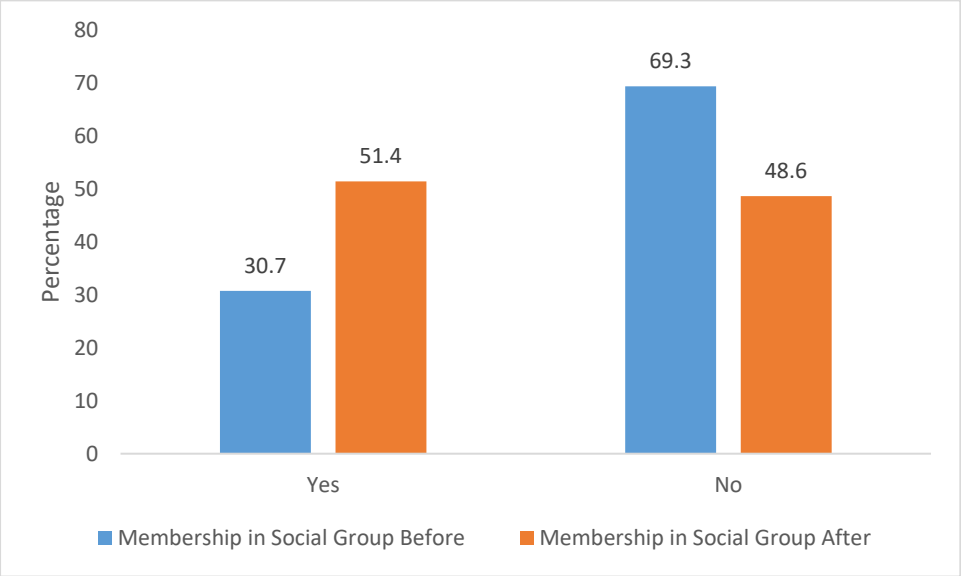

Figure 4: Membership in social group before and after practicing urban agriculture

Human Capital
Human capital is one of the components of livelihood. The term human capital refers to the economic value of a worker's experience and skills. It includes assets like education, training, intelligence, skills and health. In this study, human capital is measured by perceived respondents' knowledge in urban agriculture as indicated in Table 6 and standard of living before and after involving in urban agriculture as depicted in Table 7.

Perceived knowledge in practicing urban agriculture
The result in Table 6 revealed that, majority (83.3%) of the respondents perceived that they had fair knowledge before practicing urban agriculture, but after practicing urban

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agriculture, 86.7% perceived they had an adequate knowledge of urban agriculture. This implies that the practice of urban agriculture over the years has improved the respondents' knowledge. The practice of urban agriculture over the years has improved the respondents' knowledge since majority of the respondents perceived that they had an adequate knowledge of urban agriculture after practicing urban agriculture. This finding is in support of Wadumestrige, et al. (2021) that, urban agriculture provides opportunities to learn about gardening, food, nature, and develop skills and knowledge of urban citizens.

Table 6: Perceived knowledge in practicing urban agriculture

	Poor Knowledge %	Fair Knowledge %	Adequate Knowledge %
Before practicing Urban Agriculture	12.7	83.3	4.0
After practicing Urban Agriculture	-	13.3	86.7

Source: Filed data

Perceived standard of living

In Table 7, about 85% of the respondents considered their standard of living to be as good as others before practicing urban agriculture. After practicing urban agriculture, 97% of the respondents considered their standard of living to be as good as others. This result means that irrespective of the standard of living of the respondents before engaging in urban agriculture, they considered their standard of living to have been better than others after engaging in urban agriculture. Mupeta et. al. (2020) findings indicated that the income of households that practiced urban agriculture increased from 13.7% to 19.1%. It implies that urban agriculture has the potential to improve household standard of living through enhanced income.

Table 7: Perceived standard of living before and after practicing urban agriculture

	Worse than others %	As good as others %	Better than others %
Before practicing urban agriculture	11.3	88.0	0.7
After practicing urban agriculture	-	97.0	2.6

Source: Filed data

Financial Capital

Financial capital is one of the components of livelihood. This was measured using the respondents' saving pattern. The saving pattern of the respondents, as shown in Figure 5, revealed that 66.7% of them had a saving pattern before engaging in urban agriculture. After practicing urban agriculture, all (100%) of the respondents had a

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saving pattern. This implies that the saving pattern of the respondents has increased. This could either be directly through the sales of farm produce or indirectly through saving of money that could have otherwise been used to purchase food items. This is in agreement with Mupeta, et. al. (2020). Urban agriculture has also contributed to the financial assets of the respondents directly through the sales of farm produce and indirectly through saving of the money that could have otherwise been used to purchase food items. This had contributed to the saving culture of the respondents. Most of the respondents obtained finance for urban agriculture through their personal savings.

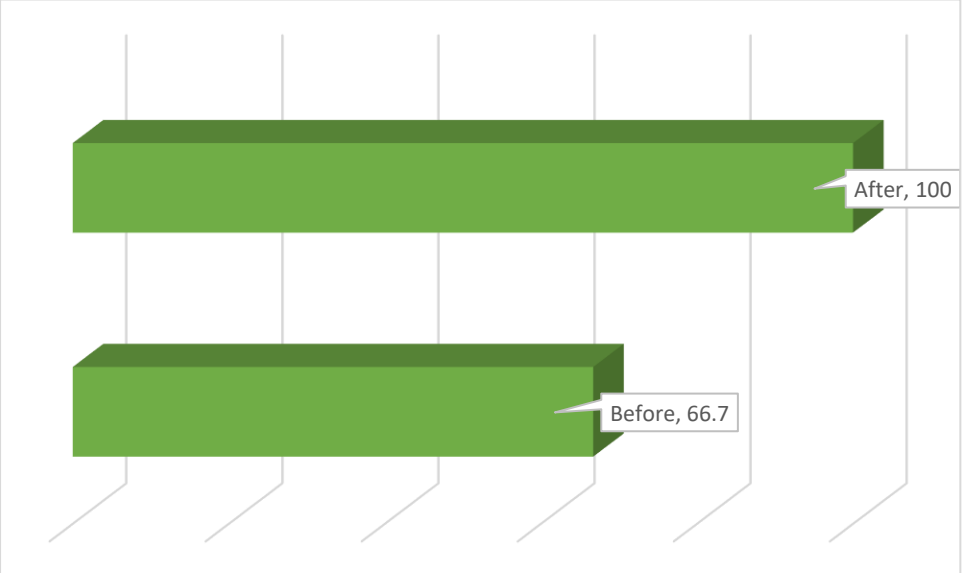

Figure 5: Saving pattern
Source: Filed data

Conclusion and Recommendations

Urban agriculture is a viable strategy to support the food demands of the increasing urban population and serves as an alternative source of income and makes fresh foods available to the households. It had significant positive effects on respondents' livelihood in terms of interaction with people, improvement in standard of living and improvement in saving pattern. The extension services of Ondo State Agricultural Development Programme should be extended to those practicing urban agriculture. This will go a long way in improving and sustaining households' livelihoods.

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Conflict of interest:
The authors hereby declared that there is no conflict of interest

Author contribution:
AOM.: Conception/design, development of data collection instrument, analysis, interpretation of data, revised manuscript (60%)
OEI: Conception/design, data collection, interpretation of data and first draft (40%)

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