

Understanding the Demand and Practices of Urban Agriculture in Nigeria Mega City

Ubani Princewill¹, John Baris Dekor², Naabura Macwillian Kingdom³

¹Department of Urban and Regional Planning, Ken SaroWiwa Polytechnic Bori, Nigeria

²Department of Urban and Regional Planning Ken Saro - Wiwa Polytechnic Bori, Nigeria

³Department of Estate Management Ken Saro - Wiwa Polytechnic Bori, Nigeria

Corresponding Author: Ubani, Princewill.

Abstract: This research surveyed the relationship between resident's socio-economic characteristics and the available spaces considered suitable for urban agriculture practices in Port-Harcourt urban. However, two precise objectives that guided the research were; to identify the vacant spaces available for urban agriculture in Port Harcourt urban and examine the relationship between urban agriculture and socio-economic characteristics of residents in Port Harcourt urban. A questionnaire was prepared for the study to produce response from the urbanites while the analysis was conducted via standardized coefficient (beta) regression analysis, spearman correlation coefficient and mathematical percentage. The investigation revealed that undeveloped lands (23%), urban uncompleted buildings (15%), neighbourhood/playground (11%), schoolyard (10%), hospital (05%) parking spaces (05%) and conserved area (05%) are among the 16 available convenient spaces identified for urban agricultural practices in Port Harcourt urban. The examination added that a relationship exist between urban agriculture and socio economic characteristics of residents ($R^2 = 0.977$; $p > 0.01$). The study also established that there was a fair relationship between urban agricultural practices and food bills ($r = .150$) and balanced dietary ($r = .152$) in Port Harcourt urban.

Keywords: Agriculture, Urban, Examination, Demand and food security

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I. Introduction

Urban agriculture is the temporary or permanent conversion of any available urban space to production of food crops and rearing of animals (private or public urban land). The agricultural practices metamorphosis from rural agriculture because of its capacity to manage spaces, incubate soil, embraces food security, high economic profitability, greenery and aesthetics environment, poverty reduction, employment generation and eradication of spread fallow lands in urban locations. However, the green urban architecture stabilized the residency of the urban pitiable since the practices and demand encompasses all the income groups (Researcher's brainchild 2019).

Urban settlement suggests an area with various effective land use activities and higher populace. The land use activities of the urban location entices human population from different hinterlands who searches for white cola jobs, consumes urban spaces and food without production. Equally, the higher the concentration of various land use activities in an urban areas, the higher the job opportunities, human population, unemployment and insecurity of food. Urban agriculture and food security will be encouraged in urban locations only when the government perceived it as a panacea for food security, poverty alleviation and planned environmental management tool. The datum that land is not accessible for urban farming, and technological inputs is not available to differentiate it from rural farming especially in this computer age such practices are crucial, further compound the condition. This has becomes the condition of urban agriculture in Nigeria for many decades which persisted disaster as population increases, the consumption of the urban food and lands also increase. The determination of this problem, the disunity in the middle of urban population and food security has become a task to planners, approach initiators, food vendors, horticulturist and agriculturist (Researchers brainchild2019).

In most of the mega and metropolitan cities of developing world, all land use activities are competing for space to the extent that many urban areas lack spaces for urban agricultural practices. The available fallow municipal, communal or private lands are characterised by uncompromised prices and has encouraged the encroachment of urban farmers on planned open green spaces and lands earmarked for other uses.

The statutory ideology that the use of urban land must yield economic rent and the notion that putting any urban land into agriculture could be economically and ecologically insignificant, portrays uncountable worries to urban agriculturist and encouraged shortage of food, unemployment, increase urban food bill, decline urban farm population and stagnated the use of urban fallow lands in all the neighbourhoods for agricultural

purposes. Due to government refusal to pay accelerated attention to urban agrarians practices and make it part and parcel of urban administration. The utmost theme of this research therefore emerges in view of the consequences of urban agriculture and connected urban agricultural practices in Port Harcourt Metropolis.

Customarily, the level of understanding of the growing reality of agricultural practices in purely designated urban locations is incomplete. Based on the ancient recognition that agricultural practices are known as the major means of livelihood for rural dwellers and do not yield high ecological and economic rent, made it insignificant in urban settings. Thus the present government preferred putting urban lands to uses that reward instant and high economic benefits and gratifications but declined the inclusion of agriculture in urban areas of Nigeria and indeed Port Harcourt urban. Also there have not been adequate researches in Nigeria to offer energetic clarification for representation and police development. Definitely this research will;

1. Identify the vacant spaces available for urban agriculture in Port Harcourt urban.
2. Examine the relationship between urban agriculture and socio- economic characteristics of residents in Port Harcourt urban.

Statement of Hypotheses

To achieve the research objectives; some hypothesis was formulated and tested.

H₀: There is no relationship between urban agricultural practices and socio- economic characteristics of residents in Port Harcourt urban (Population, income, household size, employment and education).

H₀: There is no relationship between urban agricultural practices and food security (food bills and balanced dietary) in Port Harcourt urban.

II. Empirical Review

The research of urban agriculture could be perceived as an addition to economic, social and environmental welfares of the urbanites. Vehemently, Golnaz, Mad and Zainalabidin(2016) proved positive statistical relationships that exist between procurement of a sufficient quantity of food and adequate diet through urban agriculture engagement in Malaysian. Their investigation explained that food security can be obtained from urban farming since it enhanced adequate measures of food, suitable nutrition, cost-effective food supplies and reduction in food bills. The authors demonstrated that the question of food security was a necessity for the Malaysian urban planning agencies to give more attention and contribute to city residents and encourage them to involve on the practices of urban agriculture.

Similarly, Carolyn, Lydia and Andy (2016) Applied primary data method obtained from 2012 urban farmers from national survey to determine urban farms in USA. The exploration analysis was done via multinomial logistic model while their discoveries revealed that food production remains the essential component of the mission for all urban farms. That many farms have social assignments as the examination analysis related to food security, education, and community building. They maintained that all the urban farms are small and face related challenges in terms of providing the primary farmers with a living. But concluded that both farmers with explicit social missions and strict market orientation, provides a greater portion of food from their farms and owned a little portion of farmland while urban farms of lower moderate income have social goals for community building or improving security food security.

In bologna city of italy, Esther, Kathrin, Thomas, Caterina, Giuseppina, Francesco and Giorgio(2018) evaluated the social acceptance and the perceived ecosystem services of urban agriculture. Apart from that, their work also shed light on preferences for urban land uses for different typologies of urban agriculture practices and the output, the perceived provision of ecosystem services and the willingness to engage in new initiatives. The result stressed that urban agriculture is generally acknowledged by the populations of bologna with respect to vegetable production. Whereas the concentrated agricultural methods were the least preferred forms to be implemented in bologna as people decidedly recognized a large variety of urban agriculture goods, with fondness for those gained from plants as against the animal products. The authors later demonstrated that willingness-to purchase urban food products was prominently the same as for conventional ones, but the contributors recognised the social values, proximity and quality of the former. The study concluded that socio-cultural ecosystem services were alleged as more valuable than environmental ones.

Alana, Jennifer and Charisma (2018) investigated the role of city planning, food policy, and civic engagement in creating spaces for green urban architecture in cities across the United States, and whether (and how) these spaces promote food justice and food security. The study disclosed that despite the fact that there was strong focuses on clarifying the numerous benefits of urban agriculture, some research that also measure vigorously the impact of urban farms on improving food security in low-income communities. According to them, some of these studies were theoretical, but focused on the production potential of urban agriculture as some work on literature background were theoretical and demanded understanding to overcome some barriers to enhance availability and distribution among communities in need. A recent research by Elizabeth, Becca, Jablonski, Carolan, Arathi, Brown, Saki, Erin, L.M., and Meagan, S.(2018) Stressed that Urban agriculture can

relate to socioeconomic, health systems, support education and societal engagement, and also contribute to a range of conservation goals, as well as nutrient recycling and biodiversity conservation. The researchers further demonstrate that urban agriculture remains a spatially dispersed and small scale, generating chances to readdress underutilized land, water, and nutrient resources. That urban agriculture decreases water and carbon tracks when it substitutes lawns. Labour and time requirements, potential for environmental and nutrient pollution, and scarce water resources are challenges that UA must tackle. However, their examination initiated and questioned if urban agriculture provides economic or nutritional benefits to urbanites as case studies proved that urban agriculture may afford certain benefits when swapping other urban land uses.

As such, Steve, Lori, and Emily (2016) viewed township farming as a provider of substantial capacities of food and long significant component of food systems across the global South and north. Their study reflected historic and terrestrial viewpoints of urban cultivation and similarly deliberated on urban agriculture in relations of the effects on environmental, economic, and social sustainability. Added that urban agriculture and communal greens may ensure both positive and negative environmental effects by either reducing or increasing energy consumption, improve water infiltration, beautify neighborhoods, and create odours and polluted water. According to the authors, the supreme crucial environmental matter of urban agriculture is food safety as many populaces understand urban farms as a sector that can provide economic and social benefits. Bellows, Brown and Smit (2008) averred that the benefits of urban agriculture include: nutrition, food security, and exercise, and mental health, social and physical urban environments. Practically, they recommended for health professionals to provide and increase the positive benefits of urban agriculture. The evaluation also lead to that of credence Megan, Nathan, and Lesli (2017) noted that the probable social benefits of urban farming are: improved access to food, positive health effects, skill building, community development, and connections to broader social change efforts. Accordingly, submits that urban agriculture might support and extend group discriminations by profiting improved resourced organizations and the propertied class and contributing to the displacement of lower-income households.

Rogerson (1993) analysed the contemporary situation of urban agriculture in Southern Africa together with its prospect for poverty mitigation. The author explained that the weighbridge of agriculture practices in South Africa was moderately little when equated to other African nations. He maintained that the major clarification for the less developed urban farming sector were the higher outcome to land and labour which could be received from garden sheds and alternative informal income chances in the city. The study concluded that urban informal farming practices are primarily a means of livelihood position of the most side-lined and supreme vulnerable class in urban areas.

The research of Heather and Knizhnik (2012), applied a multi-pronged method of statistics to investigate the environmental benefits of urban agriculture connected to unused, vacant real estate or rooftops compared to the substitute of abandoning the land or space in its fallow situation. Their findings stressed that air and water quality issues, lack of sufficient green space, excess heat capture, polluted storm water runoff and lack of ecological biodiversity are key environmental challenges of urban agriculture. They maintained that urban agriculture grants exceptional prospect to covert vacant, fallow or idle land and rooftops across cities for the creation of healthy and pesticide-free food. The researchers finalised that green areas to a neighborhood, as well as community gardens and urban farms afford quantity of social, health, economic and environmental benefits. Martellozzo, Landry, Plouffe, Seufert, Rowhani and Ramankutty (2014) found that urban agriculture may need approximately one third of the total global urban area to meet the global vegetable consumption of urban residents. They stressed that rough assessment could not consider how much urban area may truly be appropriate and available for urban agriculture that varies significantly around the world and affording to the type of urban agricultural practices. Their report also publicized that urban farming has been gathering much attention currently for many more explanations: (a) almost the entire world population have become urban dweller; as the ecological benefit of agriculture centred on food insecurity, exclusively the availability of food, remains a major challenge (b) township farming has often been suggested as a resolution to some of these issues (ie the creation of food in high density areas, decreasing transportation charges, linking urban residents rightly to food systems and using urban areas or spaces well). Pablo, Alfonso, Gerardo and Sergio (2017) look at the prime components of a planning process that promotes the development of agrarian production regions in Xochimilco-Tlahuac, Mexico City. Their finding recorded that promoting the idea that it is serious to support urban agriculture by district or metropolitan authorities so that numerous matters on the city's development agenda and expansion could be addressed from the perception of considered planning and the practice of their implementation. Their research also settled that it is also essential to re-investigate the facet of socio-territorial arrangement in the evaluation zone, so that assimilated, liveable and ecological city agricultural practices could be achieved within rural settings of Mexico City.

In another research, Hunold, Sorunmu, Lindy, Spatari, and Gurian (2017) look at the economic earnings of urban agriculture in Philadelphia and Pennsylvania using information acquired from urban farmers integrated in market farming. Their result publicised urban agriculture as an income generating venture for

farmers and agrarian workers. The authors maintained that Philadelphia stands to be a suitable location for financial sustainability via urban agriculture. Also, Rabiul, I. Siwar, C.(2012) analysed urban agriculture development in Malaysia and found absence of suitable land use planning for urban agriculture and weak support to urban farmers. They added that Malaysian urban agricultural practice was guarded by deficiency of incorporated development method termed to be the key challenges observed within adequate space, unavailable incomes and education perceptions.

The World Bank report (2013) proved that social and economic effects of city farming practices on the urban pitiable. The institution’s information on age, education and migration demonstrated that urban farming offers a steady livelihood and profits strategy for the defenceless group of the inhabitants that have a tendency to be older, not educated, and steady in urban areas previously than non-producers. The study concluded that urban crop growing by and large to affords livelihood and income for households that migrated to cities earlier than non- producers. However, Susan, Emmanuel and Dimitri (2010) maintained that urban agriculture in low income households has promptly developed a substantial basis of new harvest but shortage of agricultural resources, critical environmental health risks and policy gaps continued to be dominant difficulties to understand the full potential of urban agricultural development. Their work further revealed that vigorous involvement in urban agricultural activities is conducted primarily by women. That urban agriculture enhanced household food adequacy and contact but its possibility in terms of food consumption, dietary diversity and poverty alleviation ought not to be overstressed.

III. Method and Procedures

The core source of data for this study was only the primary sources. A questionnaire was prepared for the study to produce response from the urban residents and to cover topics on urban agricultural practices and socio- economic characteristics of residents in Port Harcourt metropolis. The neighbourhoods of the region were stratified based on population after which six different neighbourhoods of mixed land use activities were selected for the study. The total estimated population of land use activities in the six selected neighbourhoods is 29,283. Applying the know population of 29,283 of land uses in the neighbourhoods, the sample size of 1,050 representing 92 per cent was determined in Port Harcourt urban. Residential land use activities had the highest number of questionnaire with 500 representing (50. %), commercial consumed 200 questionnaire representing (20. %), institutional 150 questionnaire representing (10. %), industrial took 92 questionnaires (8%) agriculture 88 questionnaire representing (7%) and recreational land 70(5%) of the sample size.

Table 1: sampled land uses and population

S/N	Land uses	Projected population	Land use population	Sample size	Percentage
1	Residential	96,200	18,734	500	50%
2	commercial	33,295	10, 549	200	20%
3	Institutional	878	413	150	10%
4	Industrial	5,725	155	92	8%
5	Agricultural	1, 233	91	88	7%
6	Recreational	507	37	70	5%
		137,808	29,283	1050	100%

Data Presentation and analysis

Data were categorical and accessible in tables with mathematical percentage value, Spearman rho correlation and standardized coefficient regression analysis. Similar variables were determined and applied while the vacant spaces that accommodate urban agriculture and enhance urban food security were completely unveiled.

Available Spaces for Urban Agriculture and Food Security in Port Harcourt

The sixteen different spaces that increase urban agricultural practices and enhanced food security were unveiled from the appraisal. The identified spaces stood rated on a 5 point likert scale of significance stretching from 1 to 5, as 1 was the minimum score and 5 the maximum score. The percentage score (%) originated from the division of the cumulative response for each of the spaces by the highest mark gotten (100%).The percentage of each variable is 04% Thus, in this investigation the 05%value of any variable was considered suitable for urban agricultural farm by the researcher. The percentage value(%) of the available spaces for contemporary urban agriculture was hierarchical in order of importance(ie 1st to 16th). The sixteen vacant spaces that embrace commercial agriculture and increase urban food security or urban agriculture were determined.

IV. Results

The analytical values attained in the research conducted, validates the 16 spaces for technological methods of improving urban agriculture practice outside the government earmarked or approved lands for such purposes. However, the result revealed in table 2, opines that the respondents marked undeveloped lands as the common spaces available for technological or manual urban agricultural practices in Port Harcourt metropolis with the mathematical percentage value of (23%). Others are urban uncompleted building(15%), neighbourhood/playground(11%), schoolyard (10%), hospital(05%) parking spaces(05%) and conserved area (05%).This implies that the urban populace must not wait to acquire, compete and hunt for a parcel of urban land before engaging their households in urban agrarian. But can utilize these spaces to embrace urban agricultural practices as found in some parts of the agricultural developed economy or region like Thailand to defeat high cost of food bill, malnutrition, unemployment, urban poverty and food insecurity in the cities. See table 2 below.

Table 2: Availability of Urban Technological Farming Spaces in Port Harcourt Metropolis

S/n	Variable	% of Spaces Availability	Metropolitan Ranking
1	Balcony	04%	8 th
2	Parking spaces	05%	6 th
3	Rooftop	01%	15 th
4	Courtyard	02%	8 th
6	Corridor	02%	14 th
7	Parks	05%	10 th
8	Undeveloped land	23%	1 st
9	Conservation area	05%	6 th
10	Roadside	01%	10 th
12	Stream	05%	10 th
12	Along railways	01%	15 th
13	Schoolyard	10%	4 th
14	Neig/playground	11%	3 rd
15	Hospital	08%	5 th
16	Uncompleted bld	15%	2 nd
TOTAL		100%	

Researchers survey 2019

Hypothesis

H0: There is no strong relationship between urban agricultural practices and socio- economic characteristics of residents in Port Harcourt metropolis. In high opinion of this hypothesis, four examinations were held using income, household size, employment and education. The analysis was piloted through the application of standardized coefficient (beta) regression analysis ($R^2 = 0.977$, significant at 0.01) explaining 97.7% socio economic significant of urban agriculture. Then Adjusted $R^2 = 0.975$, indicates 97.5% confidence expectation of urban agriculture relationship on socioeconomic characteristics of residents(population, employment, income, household size and education).

Population: responds positively and significantly to the urban demand and practices in port Harcourt urban [$\beta = 1.042$; $t = 7.642$; $\rho = 0.000$ (< 0.01 significant level)]. This suggests that as the urban agricultural innovation increases, the urban agriculturist population also increases. It indicates that 1.042 or (2%) increase in development of urban agriculture will also result to 1.042singleincreases of the practitioners. This demonstration predicts that the higher the development or awareness of urban agriculture, the more the practitioners or population increases.

Income: The analysis on the relationship between urban agriculture and residents income furnished a correlation coefficient of [$\beta = 1.031$; $t = 2.978$; $\rho = 0.000$ (< 0.01 significant level)] in Port Harcourt urban. This suggests that as the practice of urban agricultural increases, the household's income must alsoincrease whereas poverty and hunger among the urban population decline. It also indicates that the participation of the urban populace on agrarian practices (1.031), suggests that 2% in urban developmental agriculture will result to 1.031increases in household income as well as urban economy.

Education: The accounts between urban agriculture and education positively and significantly gave a correlation coefficient of [$\beta = 0.111$; $t = 2.926$; $\rho = 0.006$ (< 0.01 significant level)]. This submits that an increase in urban agricultural practices increases the number of tutoring on agro, allied and extension services, crop species, identification and characteristics of arable land, poultry and re-rearing/ livestock farming increases. It indicates that one per cent population involvement in urban farming enhanced (0.111) agricultural educational development of urban farmers. Implying that the widespread of urban agriculture practice will helps

to attract seminars, conference and trainees/beginner education in urban agricultural facets in all land uses of Port-Harcourt urban.

Employment: The interpretation on the affiliation of urban agricultural practice and creation of employment opportunities retained the coefficient of [$\beta = 0.132$; $t = 2.298$; $p = 0.028$ (< 0.05 significant level)] in Port Harcourt urban. This suggests that 1% increase in urban agricultural practices increases is equal to (0.132) increase in urban farms and farmers as well as (0.132) employment increase of the urban residents. The positive association maintained or predicted that whenever 1% of the urban land uses or communities embraces the contemporary farming system, more farms (crops or animal farms) are launched, the timing youths gains employment while the higher rate of unemployment and poverty reduces in all the cities of developing countries.

Household size: the clarifications on the friendship between urban agrarian practices and size of household proved confident and significant to the relationship in Port Harcourt urban with the measurement of [$\beta = 0.121$; $t = 2.978$; $p = 0.005$ (< 0.01 significant level)]. This suggests that some of the households that practices urban farming maintains the average occupancy ratio of 5 – 7 persons who serves as a source of family full or part time labour know to be a crucial effort and encouragement in urban agricultural practices which enriches food security in a household and consistently, source of income and household poverty eradication. Additionally, the analysis suggests that (0.121)increase in urban farming; will also lead to increase in household size.

Table 3: urban agriculture relationship and socio economic characteristics

$R^2 = 0.977$ F – cal = 354.356
Adjusted $R^2 = 0.975$ P = 0.000
Standard error = 4500.34355 α significant = 0.01

Source: SPSS Scrutiny 2019

Table 4: urban agriculture and socio economic variables

Variable	Std coefficient(β)	T	P	α Sign	comment
Population (X1)	1.042	7.642	.000	< 0.01	significant
Income (X2)	1.031	2.978	.005	< 0.01	significant
Education (X3)	.111	2.926.006		< 0.006	significant
Employment(X4)	.132	2.298	.028	<0.0028	significant
Household size (X5)	.121	2.978	.005	< 0.005	significant

Source: SPSS Scrutiny, 2019

H0: There is no significant relationship between urban agricultural practices and food security (food bills and balanced dietary) in Port Harcourt urban. For the importance of this hypothesis, a particular test was carried out by means of the food bills and balanced dietary of the respondents while the analysis was completed by the use of Spearman’s rho correlation coefficient.

Food bills: The analysis on the rapport of food bills and urban agriculture realised a correlation coefficient of ($r = .150$, $p < .05$). This advocates that a fair connection occur between urban agriculture and food bill in Port Harcourt urban. The less the involvement of the urbanites in agro and allied practices, the higher the food bill, rate of urban poverty, food insecurity and inability of urban dwellers to access adequate nutritious, harmless, satisfactory and cost-effective food. This established that the strength of the association is not very strong. The coefficient of determination is 3.93% which specifies 4.0per cent shared variance inferring that, the food bills aids to clarify only about 4.0% of the current urban agricultural practices in Port-Urban. That is to say that food bills are not low but fluctuates on daily basis .See Table 5 for details.

Balanced dietary: The exploration on the relationship between urban agriculture and the urbanites balanced dietary had a correlation coefficient of ($r = .152$, $p < .05$) which submitted that the connexion between urban agriculture and urbanites balanced dietary in Port Harcourt urban is not very strong. This indicates that the coefficient of willpower is 4.25% which entails that the urbanites balanced dietary support describe only 4.5% of the urban agriculture in Port-Harcourt urban. This implies that only the households that practice urban agriculture and high income class in the region balanced their dietary permanently. See Table 5 for details.

Food security	Spearman’s rho statistic	Sign level	Number
Food bill	.150***	.000	1050
Balanced dietary	.152***	.000	1050

V. Conclusion

The initiation and practices of urban agriculture continues to be one of the contemporary and critical facets for social, economic and environmental development in most of the less technological advancement nations like Nigeria. Accordingly, this paper researched urban agriculture in Port Harcourt metropolis of Nigeria. The two null hypotheses formulated by the research were; there is no relationship between urban agricultural practices and socio- economic characteristics of residents in Port Harcourt urban (Population, income, household size, employment and education) and there is no relationship between urban agricultural practices and food security (food bills and balanced dietary) in Port Harcourt urban. 16 available spaces namely: undeveloped lands, uncompleted building, neighbourhood/playground, schoolyard, hospital, parking lots, conserved area, along the rivers etc in all the land uses of the city were identified and considered suitable for urban agriculture whereas result for the relationship between urban agriculture practices and socio economic characteristics of the urbanites revealed positive. However, the relationship between urban agriculture and food security accounted fair at Port Harcourt urban.

VI. Recommendation

1. To discard insecurity of food in Nigeria urban areas, urban lands perceived unfertile or unsuitable for growing of crops and enhancement of urban food security should be subjected to bio organic soil adaptive vitamins such as transform sup and black swan that incubate the soil to address the issue of infertility and seasonal crop production as well as encourage crop rotation together with food security.

2 since urban agriculture improves housing and environmental quality via greenery, Nigeria government should encourage the system of farming practices common in parts of the developed world like Thailand via the importation and application bio Nano organic crop vitamins and pesticide that expel insects, reptiles, birds and wild animals so that urban available spaces such as balconies, parking spaces, stores, roof top, constructed follower port ,corridor, buckets and bagged sand can be adopted as farms to enable the urban poor embrace subsistence agriculture without have a plot or parcel land in the city.

3. To improve food security, government should enact a law to compel the entire private fallow lands owner to convert or lease their lands for urban agriculture practices pending their readiness to carryout the original purpose of the land purchase. Other spaces that welcome technological agriculture should also be made available to the urban residents for the increase of food security through conferences, seminars and other capacity building programs on urban agriculture.

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