

Urban Horticulture and Community Economic Development of Lagging Regions

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1. Introduction

One of the global challenges of this era is climate change, arising from global warming and depletion of ozone layer; originally caused by reduction of green spaces on the earth surface. This is because only 18% of earth surface is cultivable or capable of growing plants (Omisore and Abegunde, 2000). The rest is occupied by seas, mountains and ice (Encarta, 2005). The little area capable of growing plants (agriculture, landscaping, horticulture and green conservation) is highly competed for by housing, industrial and road constructions and incessant environmental disasters like bush burning, flooding, deforestation and settlement expansion due to urbanization. In other dimension, promoting green space development in the new millennium calls for special concerns from professionals in environmental sciences. The global need for increasing green areas have and may not be easily met in lagging regions of the world where war, famine, environmental pestilence and low income and inadequate infrastructure are on the increase. (Frey, 2000; Amati, 2008). In another dimension, these have made residents living in regions where basic needs of life are not met to care less for their environment (Food and Agricultural Organisation of the United Nations, 2010). In other words, lagging regions of the world are saddled with green challenge and economic depression. Until there is a pro-poor means of green revolution, many people in the third world nations may be least interested in contributing significantly in the face of poverty and famine that are limiting their growth and development (Food and Agricultural organization {FAO}, 2010).

The practice of urban horticultural garden in third world cities to boost food and ornamental plants production, provide job opportunity and promote green space development may bridge these gaps. This is because, urban horticulture (UH) make use of available pieces of land in cities to raise gardens that can be economically productive while contributing to environmental greening. This is why Moustier (1999) perceived it as an intensive production of a range of vegetables; aromatic, medicinal, flowering and ornamental plants grown mainly in the city or at its close periphery where there is competition among land uses. Adejumo (2003), Ward (1992) and Moss-Eccordt (1973) also opined that horticulture provides a physical green condition with appealing outlook that promotes good health and enhances the economic and other social values of communities, particularly when such plants are grown for commercial purpose.

Paradoxically, the art of practicing urban horticulture in developing nations is an unpopular path towards meeting ecological challenge of community greening, economic problem of famine and poverty and poor urban aesthetics. This study is an empirical expression of these concerns, citing Lagos, Nigeria as an example. The chosen city fits such study in a number of ways. First, it is considered as one of the Africa's fastest growing cities and commercial nerve centre for its country (Aluko, 2010). The general structure of land use distribution in the study area shows that only 520 hectares (2.8%) of the total land area is given to open space. These include all urban land for recreation, parks and gardens, urban agricultural land, commercial and individual horticultural gardens and unused spaces (Oduwaye, 2006). This is far below the 8-10% of land area expected to be made available for green space in a residential setting. Lagos, an area with limited land due to its closeness to the Atlantic Ocean, is also choked with housing development, heavy industries and automobiles. Despite all these limitations, little attention has been given to spatial distribution of green space by government in the city (Abegunde *et al*, 2009).

There is the need to understand the economic implication of urban horticultural development in the study area and beyond. The conduct of this kind of study at the start of a new decade in the twenty-first century is imperative when urban agriculture is receiving its popularity as means of restoring productive green belts and economic revival to world cities. In other words, the aesthetics of urban horticulture that serves as a source of agricultural production in a poor economy is of concern to urban community development planners. The aim of the study is therefore to critically examine the spatial extent and practice of urban horticulture towards economic development of cities in lagging regions of the world, citing Lagos, Nigeria as an example. This is with a view to establishing the contributions of such practice to the social and economic development of the residents and the built environment and by this develop a framework that could be of importance to simultaneously further community greening and economic development of other lagging regions of the world.

2. The literature

2.1 The concept of urban horticulture (UH)

Horticulture is the art of gardening or plant growing; in contrast to agronomy - the cultivation of field crops such as cereals and animal fodder, forestry - cultivation of trees and products related to them, or agriculture - the practice of farming. Urban horticulture (UH) can also be seen as intensive production of a range of vegetables; aromatic, medicinal, flowering and ornamental plants grown mainly in the city or at its close periphery where there is competition among land uses (Moustier, 1999). The origin of horticulture lies in the transition of human communities from nomadic hunter-gatherers to sedentary or semi-sedentary horticultural communities, cultivating a variety of crops on a small scale around dwellings. (Von-Hagen, 1957; McGee and Kruse, 1986). A characteristic of horticultural communities is that useful trees are often planted around the built environment or specially retained from the natural ecosystem. The significance of this in promoting healthy environment is found in the works of Ebenezer Howard (1902) and further explained by Moss-Eccordt (1973) and Ademola, (2002). Thus, the practice of horticulture plays a role in the development of healthy communities in three distinct ways. First, it provides a physical condition with appealing outlook. Second, it promotes good health as carbon related gasses generated in cities are utilised during plants'

photosynthesis while oxygen that is useful for man is released as by product. Third, plants generally enhance the economic and social values of the community (Ward, 1992; Adejumo, 2003). This chapter is more inclined to the latter importance, though not disassociated with the former. This is because many urban horticulturists contribute their quota to vegetable production. The sales of these vegetables and ornamental plants provide markets for both horticulturists and middlemen and women in the business. This is why it has been argued that solutions to poverty in cities of developing countries has multiple faces, of which horticultural practice is one (Weinberger and Lumpkin, 2007).

2.2 Economy, green space challenge and horticultural practice in third world nations

Early socio-economic problems of the third world nations have been linked with poverty (Madzingira, 1997). That could be why Khan (2001) noted that most of the one-fifth of the world's populations afflicted by abject poverty, earning less than one Dollar a day live in lagging regions. Although, poverty have reduced over the past 40 years, particularly in China, India, South East Asia and South Africa, with little or no progress recorded in sub-Saharan Africa {Department for International Development (DFID), 2004}.

Specifically, between 1981 and 2001, the percentage of the number of people living on less than a dollar per day globally fell from 40.4% to 21.1% despite the 1.5 billion people that were added to the world populations within the same period. Of interest here is the inverse relationship between agricultural production and poverty in the world. For instance, Warr (2001) noted that growth in agriculture in a number of South East Asian countries significantly reduced poverty. This is just as Gallup *et al* (1997) had earlier observed that every 1% growth in per capita agricultural Gross Domestic Product (GDP) led to 1.61% growth in the incomes of the poorest 20% of the population – much greater than the impact of similar increases in the manufacturing or service sectors. In other words, agricultural related activities, of which urban horticulture is a part; are generally central to world poverty reduction. As argued by Weinberger and Lumpkin (2007) that horticultural products are facing increasing domestic and international demand, widening market access and helping residents in lagging regions of the world who engaged in such to escape poverty through production and exchange of non-staple crops.

In the past, the development policymakers having observed the role of agriculture in poverty reduction, focusing on staple grains, especially rice and wheat production across the globe. Recent observations by the Consultative Group on International Agricultural Research (CGIAR) has expressed more interest in horticulture and research on high value crops as priorities (CGIAR, 2004), though investments in horticultural research and products remain inadequate. Despite this inadequacy, on a global scale, the value of all fruits and vegetables traded as horticultural products is more than double the value of all cereals traded as farm products (FAO, 2005). In addition, farmers in other regions of the world have also found it profitable to expand production of horticultural produce at the expense of the cereal area (Weinberger and Lumpkin (2007). This is not unconnected with the ease of practicing horticulture where land seems to be inadequate for extensive cropping. For instance, some residents engage in indoor and street horticulture, enclosed gardening, potted plants to mention but few. Of interest here are the multiple economic opportunities in horticultural practice in modern cities. This is despite its contribution to community greening in the global warming era.

As observed by Food and Agricultural Organisation (FAO), (2010), most rapidly growing cities in the world are located in developing countries of Asia and Africa, where rapid urbanisation is at variance with green space development (Thanh, 2007) and the practice of urban agriculture is at high demand. Thus, in such cities, horticultural gardening bridges the gap between poverty, environmental pollution arising from urbanization and reduction in green area (Abegunde, 2011). In other words, three out of the four targets of millennium development goal (poverty eradication, reduction in global warming, health and education for all) can be achieved through support of urban horticulture. Hence, researchers currently are unveiling the self-help pro-poor and environmental opportunities endowed in the practice {Moustier, 1999; Food and Agricultural organization (FAO), 2010}.

The concerns in this chapter are that horticulture is an easy to practice arm of agriculture that intensively utilizes little space of land, even in core areas of the built environment (Abegunde *et al*, 2009). Its ability to combine aesthetics through landscaping with production of food crops at a reasonable and manageable scale makes it a welcome practice both to the poor and the elites in combating poverty and enhances environmental beautification (Digkistra and Magori, 1995; Chweya, *et al*, 1995; Weinberger and Lumpkin, 2007). It is seen as one of the easy ways of increasing urban green space and by this, promotes good health (Abegunde, 2011). In another dimension, horticulture is an appropriate approach towards environmental friendly pro-poor development in the global warming era. The premise of this chapter is that though the practice of urban horticulture in developing nations is an unpopular path (towards meeting ecological challenge of community greening, poverty alleviation and urban aesthetics), it can contribute towards solving part of the environ-economic problems of the world.

2.3 Green economy theory

In recent years, poverty and environmental issues have been attracting significant attentions in development studies (Nyasha, 1997; Frey, 2000). First, the causes and consequences of poverty have been explored and theoretical models have been developed to explain hitherto obscure causalities. Along this line, scholars who are environmentally oriented have been attempting to create a meeting point for these two concerns, developed environmentally oriented theories that are pro-poor in approaches (Amati, 2008).

Among such theories is green economy model which focused on improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities. It is a new theory built on the platform of pro-growth model developed lately to justify the need for the type of development that is low income friendly and poverty eradicating. Origin of this can be traced to the work of Simon Kuznets, who in 1955 found an inverted-U pattern between per capita income and inequality based on a cross-section of countries. According to him, as per capita income rises, inequality first worsens and then improves. The major driving force was presumed to be structural change that occurred because of labor shifts from a poor and less productive traditional sector to a more productive and differentiated modern sector (Kakwani, Khandker and Son, 2004). This was latter supported by Kravis (1960), Oshima (1962), Adelman and Morris (1971), Paukert (1973), Ahluwalia (1974, 1976), Robinson (1976), and Ram (1988). Recent writings on this can also be found in the works of Anand and Kanbur (1984), Fields (1989), Oshima (1994), Deininger and Squire (1996) and Ravallion (2001). The common arguments in their works

are that there is a strong and complex relation between growth and poverty and these are determined by the level and changes in inequality.

Pro-poor growth is therefore concerned with the interrelationship between these three elements: growth, poverty, and inequality. In addition, it is the kind of growth that benefits the poor and provides them with opportunities to improve their economic situations (UN 2000, OECD 2001). Linking this to green economy model, green pro-poor economy of growth is one whose growth in income and employment is driven by public and private investments in green related programmes that reduce carbon emissions and pollution, enhance energy and resource efficiency, and prevent the loss of biodiversity and ecosystem services. This development path should maintain, enhance and, where necessary, rebuild natural capital as a critical economic asset and source of public benefits, especially for poor people whose livelihoods and security depend strongly on nature.

In relation to this study, green economy is an attempt at accomplishing social, ecological and economic development of lagging regions through low carbon, resource efficiency and social inclusion. A green economy as a new paradigm is the one that believes that sustainability can be achieved through recognition of the cardinal roles and combine efforts of green aspect of the environment and community economy that alleviates poverty and improves green areas, turning lagging regions to prosperous ones. It is a new model of growth that is much less intensive in natural resources and that can lead to social well-being and poverty reduction in Africa and beyond. It opines that the simple pathway towards sustainable development is to balance and coordinate different interests: between economic growth/job creation and environmental integrity, between the rich and the poor, and between the present and the future generations.

As a new model in the green environment, it aims at achieving millennium development goals through pro-growth, pro-jobs and pro-poor techniques of turning environmental imperatives into viable economic activities, helps reconcile the need for economic growth and the need to ensure the environmental basis for continued growth into the future. It recognizes the role of green industry in economic transformation. Green industry here refers to but not limited to businesses involved in production, distribution and services associated with ornamental plants, landscape and garden supplies and equipment. Segments of the industry also include wholesale nursery, greenhouse and sod growers, landscape architects, contractors and maintenance firms on green issues, retail garden centres, home centers and mass merchandisers with lawn and garden departments, and marketing intermediaries such as brokers, horticultural distribution centres, and re-wholesalers. In addition to these are commercial sectors, many state and local governments' institutions that are related to urban forestry operations for management of parks, botanic gardens, and right-of-ways. The Green Industry is linked to urban forestry, by providing quality plant material and professional personnel with specialized expertise for growing, maintaining, and managing city trees. Horticulture as mentioned under the green industry is the science and art involved in the cultivation, propagation, processing and marketing of ornamental plants, flowers, turf, vegetables, fruits, and nuts. Within the horticultural sector, the environmental horticulture industry, often referred to as the "Green Industry", is one of the fastest growing sectors of agriculture in the US (Palma and Hall, 2009). This chapter therefore sees green economy model as pro-poor theory of sustainability through involvement in horticultural practice to improve residents' income and boost national economic development while paying attention to community greening, urban aesthetics, and ecological balance in global warming era.

3. Research methodology adopted

This study focused on Lagos, Nigeria and used information generated from structured questionnaire administered on residents who engaged in outdoor commercial horticultural practice along major streets in Eti-Osa Local Government Area of the city. Reconnaissance survey revealed that urban commercial horticulture in Lagos city was practiced by private individuals and most of their gardens were not formally planned or located in government designated places. The study purposively selected all (100%) the existing seventy-five (75) gardens and targeted their owners (managers) during questionnaire administration. The study administered questionnaire on all the identified practitioners of urban commercial horticulture in the area. Sixty-three (63) of them were eventually interviewed, as the managers (owners) of the remaining 12 gardens were not available for questionnaire administration. Analysis in this study was based on these 63 respondents. Questions asked the respondents centred on their economic background, amount invested in the horticultural gardens, cost of production and profit realized annually, number of workers engaged in the practice and amount of money paid to them annually. Others are the horticulturists' social and economic contributions to the development of their community among others. Data for the study were analysed using descriptive and inferential statistics. Specifically, the study employed frequency tables to analyse data collected on area of land available for the practice, the economic characteristic of the horticulturists. Regression model was employed to confirm the significance of variables used to measure the economic contributions of the urban horticulture and profit realized by the managers in Lagos, Nigeria.

4. Results and discussion

4.1 Economic background of commercial horticulturists in Lagos, Nigeria

Table 1 reflects the economic characteristics of commercial horticulturists in the study area. It shows that more than two-third (63.6%) of them earned above N29,999 (Nigeria currency) per month (about 6.25 US Dollars per day). Specifically, one-quarter (25%) and less than one-sixth of them earned above N49,999 (10 US Dollars) and below N20,000 (4 US Dollars) monthly as profit realized from horticultural practice respectively. This is a clear indication that residents who were into commercial horticulture in Lagos, Nigeria were well living above the poverty line of income below 1.25 US Dollars per day (Lustig and McLeod, 1997; Kubelková, 2007). This is significant in an economy of a developing nation like that of Nigeria.

Income (in Nigeria Naira)	Frequency	Percentage
Below 20,000	10	15.9
20,000-29,999	13	20.4
30,000-39,999	16	25.4
40,000-49,999	09	14.3
50,000-59,999	06	9.6
Above 60,000	09	14.4
Total	63	100

Source: Author's field survey data, 2009.

Table 1. Monthly Income of Urban Commercial Horticulturists in Lagos, Nigeria

4.2 Economic contribution of urban horticulture in Lagos, Nigeria, through employment and community greening

A regression analysis of the significance of the urban commercial horticulture through profits realized by the managers on other independent variables shows that four out of the tested five variables in Table 2 were significant with $R^2 = 50.5\%$, $F_{4,58} = 16.813$ at $p < 0.005$. These predictor variables are number of staff employed in horticultural practice ($p=0.001$), money paid to workers engaged in the practice annually ($p=0.000$), money spent on trees planted in the community for public benefit ($p=0.000$) and money given out for community development in Lagos ($p=0.000$). Only money paid annually to government purse as tax was not significant in the test (0.145). The latter may indicate that the horticulturists were not committed to their payment of government tax in the study area. In the contrary, the former might have also indicated that commercial horticultural practice in Lagos, Nigeria, though an informal sector; have contributed significantly to the economy in a measure by providing job for some workers and paying their wages/salaries. In addition, there are indications that their economic contributions to the community development programmes through donation of cash and expending money in planting trees for public use in the study area were significant due to profit realized from the practice.

Predictor	Beta	P
Number of staff employed in horticultural practice	-1.203	.001
Money paid to workers engaged in the practice annually	1.628	.000
Money paid annually to government purse as tax	0.188	.145
Money spent on trees planted in the community for public benefit	0.228	.003
Money given out for community development	0.157	.000

(Only Money paid annually to government purse as tax was not significant in the analysis)
The adjusted $R^2 = 50.5\%$, $F_{4,58} = 16.813$, $p < 0.005$.

Table 2. Regression Analysis between Profits realized through Urban Commercial Horticultural Practice and other Predictor (Economic) Variables in Lagos State, Nigeria.

Further examination of the socio-economic impact of the studied horticulturists was revealed in their contributions through greening of their community. Regression tests conducted on this, using predicting variables on horticultural community greening through planting of trees ($p=0.000$), flowering plants ($p=0.003$) and fruit trees ($p=0.379$) for public consumption revealed that the former two were statistically significant (at $p < 0.005$) among the tested variables. This is an indication that urban horticulture in the study area contributed to the social development of their community. This is because tree planting improves aesthetics and reduces carbon content in the atmospheric air of the environment. This is imperative in the global warming era. The inability of the urban horticulture in the area to contribute significantly to planting fruit trees might have been due to lack of adequate space for the practice, as reconnaissance survey revealed that most of them utilized road setbacks for the practice as seen in Plate 1.

Predicting Variables on plants planted by Horticulturists in public places	Beta	P
*Number of trees nursed and panted in public places for community benefit	0.545	.000
*Number of flowering plants and hedges nursed and panted in public places for community's benefit	0.438	.003
Number of fruit trees/crop plants planted for public consumption	-0.358	.379

(Only fruit/crop trees planted for public use was not significant in the test)

*Significant variables at $p < 0.005$. The adjusted $R^2 = 32.20\%$, $F_{2,60} = 6.891$

Table 3. Regression Analysis predicting Relationships between Socio-economic Impact of Commercial Horticultural Practice and other Independent Variables in Lagos State, Nigeria.



Plate 1. One of the Commercial Horticulture Gardens, together with Trees planted for Public use along the Street in Eti-Osa Local Government Area, Lagos State, Nigeria.

4.3 Land area covered by urban commercial horticultural gardens in Lagos, Nigeria

Land area used for urban commercial horticulture for this study was obtained from data collected through physical measurement of each plot of land used for the practice and information obtained from secondary source on total area covered by land and water bodies in the study area. Below is a simple mathematical calculation of the land area used for horticultural gardening in the study area:

Total area of land (and water bodies) in Eti-Osa Local Government {y} = **3060175 m²**

(As documented in Abegunde, 2011)

Total area covered by water bodies {b} = **758903 m²**

(As documented in Abegunde, 2011)

Total land area (excluding area used for street horticultural gardens in the study area) {c}; where 'c' is to be computed.

Total land area devoted to street horticultural gardens {a}; where 'a' is to be computed.

If $a = (g_1 + g_2 + g_3 + g_4 + \dots + g_{63})$ as documented in Abegunde (2011), and validated through physical measurement of each area of land in the sampled horticultural gardens in the study area during reconnaissance survey.

Where g = plot size of each street horticultural garden (m²)

And $(g_1 + g_2 + g_3 + g_4 + \dots + g_{63})$ = all the sixty-three (63) existing and sampled horticultural gardens in the study area

a = total land area devoted to street horticultural gardens (m²)

$a = (120 + 128 + 159 + 168 + 168 + 170 + 180 + 190 + 202 + 210 + 210 + 240 + 310 + 338 + 344 + 350 + 350 + 355 + 363 + 386 + 396 + 400 + 431 + 445 + 471 + 483 + 487 + 495 + 496 + 498 + 500 + 503 + 510 + 518 + 520 + 528 + 530 + 538 + 539 + 554 + 555 + 560 + 562 + 577 + 584 + 590 + 602 + 612 + 612 + 635 + 640 + 668 + 678 + 798 + 820 + 837 + 842 + 870 + 871 + 899 + 900 + 980 + 1200)m^2 = 31675$. Then, $a = 31675 m^2$.

If $y = a + b + c$,

$y - (a+b) = c$

$3060175 - (31675 + 758903) = c$

$3060175 - 790578 = c$

$C = 2269588 m^2$ or 560.83 Acres {Total land area in Eti-osa Local Government (excluding areas used for street horticultural gardens)}

% of land use for commercial horticulture garden

$$= \frac{a}{c} \times \frac{100}{1} = \frac{31675}{2269588} \times \frac{100}{1} = 1.4\%$$

The study shows that the total area used for commercial horticultural gardens alone, which contributed to urban green space is 1.4% of the entire study area. Although this percentage may exclude the area formally planned for green space in Eti-osa Local Government, Lagos, Nigeria because most of them were practiced on road setbacks. However, they have added to community greening of the environment.

5. Concluding remarks

The study revealed that urban horticulture can contribute to economic development of residents in developing nations and beyond. This is evident in the daily earnings accrued to those engaged in the practice. In addition to this are their contributions to the community's economy through employment of staff and payment of their wages/salaries, economic contribution to community development and planting of trees and flowering plants for public use in the environment. Although the area of land used for urban commercial horticultural practice in Lagos, Nigeria seemed to be less than 1.5% of the total land area, its economic advantage is a justification that there is the need to look inward on commercial horticulture in urban areas of lagging regions of the world to cope with global economic recession.

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7. References

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This book is about the novel aspects and future trends of the horticulture. The topics covered by this book are the effect of the climate and soil characteristics on the nitrogen balance, influence of fertilizers with prolongation effect, diversity in grapevine gene pools, growth and nutrient uptake for tomato plants, post-harvest quality, chemical composition and antioxidant activity, local botanical knowledge and agrobiodiversity, urban horticulture, use of the humectant agents in protected horticulture as well as post-harvest technologies of fresh horticulture produce. This book is a general reference work for students, professional horticulturalists and readers with interest in the subject.

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