

Full Length Research Paper

Built-up agriculture and urban land use planning: Need for a blend in metropolitan Lagos, Nigeria

Temeka J. Aboro* and Sibiu, K.O

Department of Geography and Regional Planning, Olabisi Onabanjo University P. M. B. 2002, Ago Iwoye, Ogun State, Nigeria.

Accepted 16 February, 2014

The role of agriculture in an agrarian economy like Nigeria as a pathfinder to understanding the sustainability of the environment cannot be over emphasized, rapid, largely unchecked, urbanization is common in many urban centres such as the Lagos metropolis. Associated with these are the key problems of urban poverty and food security, urban land market, and issues related to sustainable urban development. Urban agriculture (UA) is in reality and in many cases a response to crisis and a coping strategy of the urban poor UA can contribute to food security in several ways. It increases the amount of food available and enhances the freshness of perishable foods reaching urban consumers. UA can also play a role in environmental conservation. However, UA production systems can pose risks to public health and the environment. These arise from the inappropriate or excessive use of agricultural inputs- including pesticides, nitrogen, and raw organic matter containing heavy metal residues. Urban land use planners should endeavour to promote multifunctional land use, and greater community participation in the management of urban open spaces as a way of integrating UA as a key concept in urban development programmes.

Key words: Urban agriculture, urban land use planning, sustainable land management practices, metropolitan Lagos.

INTRODUCTION

Agriculture has been subject to considerable state interest and intervention over the past half-century in many parts of the world. Perhaps more than any other economic sector (Robinson, 1989; Gardner, 1990). While it is possible to overestimate the influence of policies in farmer decision making (Winter, 2000), there is increasing recognition that the provision of public support in the form of guaranteed output prices, input subsidies, deficiency payments, cheap credit, or disaster relief has encouraged and facilitated massive investment by farmers in production capacity expansion.

The role of agriculture in an agrarian economy like Nigeria as a pathfinder to understanding the sustainability of the environment cannot be overemphasized. Therefore, the most pressing challenge of Nigerian agriculture in the new millennium, is how it can meet the

food need of an ever-bourgeoning population. This is in the face of the myriads of social, cultural and economic problems that negate sustainable land management (World Bank, 1993; Akinbile, 1997; Chambers and Jiggins, 2000; Fakoya et al., 2007).

Agriculture has developed and undergone series of changes throughout its long history as knowledge progressed. Though progress may not have been at the same rate all over the world, the same factors are operating in both developed and less developed parts. The most important factor operating to change agriculture is the sheer need to increase crop yields in order to support the growing population of the world and to supply the higher standards of living which people now demand. This puts pressure on the land which is seen in shortening of fallow periods and more intensive cropping (Richard, 1991; Aldington, 1997).

Cities continue to grow in the western world and in other parts of the world. Even though urban populations are barely reproducing themselves and migration from the countryside to the town has slowed to a trickle, the

*Corresponding author. E-mail: hakeemdare122@yahoo.co.uk.
Tel.: +2348055414347.

demand for more living space shows no sign of abating as cities continue to expand their borders through suburban sprawl (Batty, 2003). Cities around the world have always shown their own dynamic of development and in many cases such dynamism has resulted in teeming, ill-ventilated, unplanned, unwieldy, unhealthy cities. Rapid, largely unchecked, urbanization is common in major cities like Lagos, Ibadan, Kano and Enugu in Nigeria. Like many urban centres in developing countries of the world. Lagos metropolis is the ever expanding economic centre of Nigeria. It is the most populous state in the country, with a 9,013, 534 in 2006 about 6.44% of Nigeria's total population (NPC, 2007), despite being the smallest in size (3577 km²) that constituted just 0.4% of the total landmass of the country. Lagos is the world 6th largest Megacity, however, it is the least in terms of urban living standard among the 28 Megacities in 1991 (Linden, 1996; Oduwaye, 2005).

Associated with these are the key problems of urban poverty and food security, urban land market and issues related to sustainable urban development (Richard, 1991; Drescher and laquinta, 1999; Drescher, 1999). Many of the residents lives in slums that are either occupying the land in leasehold with expiry title date or just squatting, hence no incentive to improve their environment (Soyibo et al., 2001). Urban planners and decision makers are being faced with the problems of recognising the importance of urban agricultural (UA) production to the sustainability of cities and surrounding areas. Equally important is that fact that interest in urban and peri-urban agricultural production is generally low among planners and politicians (Drescher and laquinta, 1999), thus, a consistent approach to UA is rarely found (FAO, 2000).

Urban agriculture (UA) is found both in the developing and in the industrialized countries (Gbadegesin, 1991; Mlozi, 1997). To some planner, the term "agriculture" and "urban planning" are relatively mismatched. As such UA is often informal, and tends to be shifted to outskirts of cities, far away from markets and infrastructure without analysing the economic, environmental and interrelation with other sectors. For these reasons and others, urban planners have the propensity to exclude the urban farming sector from planning activities. Indifferent to the necessity of providing open spaces, parks, and gardens as well as greenery within the urbanised area. Such neglect, however, creates several problems in many growing cities in developing countries of the world. The problem of physical disorder and its attendant issues of unsustainable urban growth and environmental inadequacies are a clear manifestation of the failure of land use planning and planners to recognize and incorporate certain aspects of urban complex into the land use allocation process, and device specific tools of administering or managing them (Jelili and Adedibu, 2006).

Many Asian and African cities are likely to double their populations within a decade. In particular, the number of low-income urban consumers will increase. Their food se-

curity will depend upon the level and stability of the cost of food access as well as on the variety and quality of food available to them. A very effective way of enhancing urban consumers' food security is to improve the efficiency of all activities that bring food into cities and distribute it within urban areas-assembling, handling, sorting, packaging, storing, transporting, processing, wholesaling, retailing and cooking for sale as street food. City and local authorities can do a great deal to enhance the food security of low-income urban consumers by supporting the development of efficient private-sector food marketing systems. However, their actions face a number of constraints.

UA is in reality and in many cases a response to crisis and a coping strategy of the urban poor (Jacobi et al., 2000). UA is a practice widely used in the past, and is still in common use in many urban areas around the globe. In cities like Lagos, Ibadan, Kano, Enugu, and even Abuja, the capital of Nigeria, the best and high productive soil have gradually become built-up areas, thereby losing the potentials for food production forever (Pujol and Beguler, 2000). Often, larger urban centres have conspicuous inner and outer zones where cultivation of food crops and market gardening are being pursued vigorously (Swindell, 1988). System of land acquisition is affected by non payment of compensation which encourages squatter settlements. Urban management in the 21st century should aim to put urban land resources into efficient and sustainable use (FAO, 2000). It therefore requires that urban planners to recognise the prevailing problems and acceptance of urban livelihood strategies including urban farming.

Given the varying relations and interconnectedness of urban agriculture to urban development, Smit et al. (1996) gave an all embracing definition of UA as "an industry located within (intra -urban) or on the fringe (peri-urban) of a town, a city or a metropolis, which grows or raises, processes and distributes a diversity of food and non-food products, using largely human and material resources, products and services found in and around that urban area, and in turn supplying human and material resources, products and services largely to that urban area".

Population pressure not only directly increases the demand for food, but also indirectly reduces its supply through building development, environmental degradation and marginalization of food production. While, there is an increasing amount of literature on this topic, studies of urban and peri-urban farming systems in West Africa are scattered and scanty. A wide spectrum of production systems can be found ranging from household subsistence to large-scale commercial farming. In general, there is a tendency toward more intensive production systems that better satisfy the increasing urban demand.

This paper is a synthesis of the dimension in UA and urban land use planning in Lagos metropolis, SW; it also examines the existing conditions, and seeks for proper integration of UA into the overall land use planning in

Table 1. Types of areas for urban agriculture, population, size and density in Lagos State.

LGAs	Population	Size (km ²)	%	Population density
Agege	651,322	20.00	0.70	32,566
Alimosho	430,890	140.00	4.36	3077
Apapa	98,167	28.5	1.0	3444
Badagry	119,267	366.00	12.79	326
Epe	101,464	644.00	22.50	158
Eti-Osa	175,900	187.00	5.48	941
Ikorodu	184,674	203.00	7.09	909
Ibeju/Leki	24,937	646.00	22.57	38.6
Mushin	538,783	17.05	0.60	31,600
Ojo	1,035,221	166.00	5.80	6236

Source: Author's field survey, 2006.

Lagos Nigeria.

Conceptual underpinning

Urban agriculture (UA) is one of the most exciting concepts of sustainable development since it addresses almost all areas of sustainability. It promises self-reliance, community, and local economy while reducing many environmentally harmful practices from modern agriculture practices (Hsin, 1996). Drescher (1999) stressed that the UA concept need to evolve out of our need to codify and refine our perceptual experience with a rather new world phenomenon, so as to ensure that it remains or becomes more useful to us where we will need it.

It is worth mentioning that UA has undergone different definitions over the years and these have led authors to make distinctions between agriculture "in the peri-urban zone" and "peri-urban" agriculture (Stevenson et al., 1996; Mougeot, 1998, 1999), and even "rural agriculture". The more common conceptual building blocks of UA as identified from existing literatures are: types of economic activities, food/non-food categories of products and sub-categories, intra-urban and peri-urban characteristics of location, types of areas where it is practised, types of production systems, product destination and production scale. Some 200 million people worldwide are involved in urban agriculture. They provide food and income to more than three times that number. Asian cities are leading the way in urban agriculture. Farming in cities helps the urban poor the most because food is so expensive to buy (Mlozi, 1998).

The connection between urban agriculture and the urban ecosystem has also been emphasized. Smit (1996) briefly discuss the connection of UA with urban nutrient cycle and with the urban food system. UA has a lot of direct and indirect influences on the sustainability of the urban ecosystem and this should be of major interest to urban land use planners in planning strategies for sus-

tainable urban development.

MATERIALS AND METHODS

Study site

Lagos State is an African megacity which is located in south western Nigeria on the West Coast of Africa, within latitudes 6°23' N and 6° 41' N and longitudes 2° 42' E and 3°42' (Figure 1). Although Lagos state is the smallest state in Nigeria, with an area of 356,861 hectares of which 75,755 hectares are wetlands, yet it has the highest population, which is over 5% of the national estimate. Although, a parallel population count by the Lagos State government put the population at about 17 million, the state's population according to the 2006 census was 9,013,534 out of a national estimate of 140 million (National Population Commission, 2007). Of this population, Metropolitan Lagos, an area covering 37% of the land area of Lagos State is home to over 85% of the state population. The rate of population growth is about 275, 000 persons per annum with a population density of 2,594 persons per square km. In a UN study of 1999, the city of Lagos was expected to hit the 24.5 million population mark by the year 2015 and thus be among the ten most populous cities in the world (Lagos State Government, 2006).

Most part of Lagos State has an elevation of less than 15 m above sea level making these areas susceptible to flooding (about 12% of the total landmass. In fact, over 40% of the total area is covered by water and wetlands. Lagos consists of two main regions, namely; Lagos Island and Mainland (Iwugo et al., 2003). The original city (Isale Eko) and Ikoyi, Victoria Island and Lekki corridor areas are referred to as Lagos Island, while Mainland encompasses the other parts of the state. The rapid growth of the urban population and urban expansion in all directions has led to the merger of the Mainland with distant areas such as Ikorodu, Epe and Badagry. The more developed Mainland and Lagos Island make up what is referred to as Metropolitan Lagos, which is inhabited by over 80% of the population of Lagos State.

Ten Local Government Areas (LGAs) were selected for this study (Table 1). The criterion for the selection of these LGAs was based on size and urban population. Ojo LGA for instance has the largest population among the selected LGAs and in Lagos state as a whole, with landmass of about 166 sqkm. Ibeju-Lekki LGA on the other hand has the lowest population but is the largest in terms of the size. Most of the lands in the area are made of wetlands which have not been fully utilized.

RESULTS AND DISCUSSION

UA is often done in the core areas, wedge areas and corridors out of the Lagos metropolis, as well as the outskirts (e.g. Ojo, Ikotun and Epe). Part of the reason for the growth in UA is its adaptability and mobility compared with rural agriculture. The majority of the areas used for UA are unauthorized plots within or outside the city (Table 2). These unauthorized farms can be found in many parts of the Lagos metropolis, especially along the many wetland areas that are typical of Lagos. These sites are cultivated mostly for perishable goods especially vegetables (Spinach, lettuce, Cabbage, Carrot etc.) often by Hausa or migrant farmers who cannot secure alternative jobs within the city (Table 2). However, in parts of the highbrow areas of Ikoyi and Lekki, people use home-plots to cultivate vegetable and some others have poultrys to raise turkey, chicken and ducks.

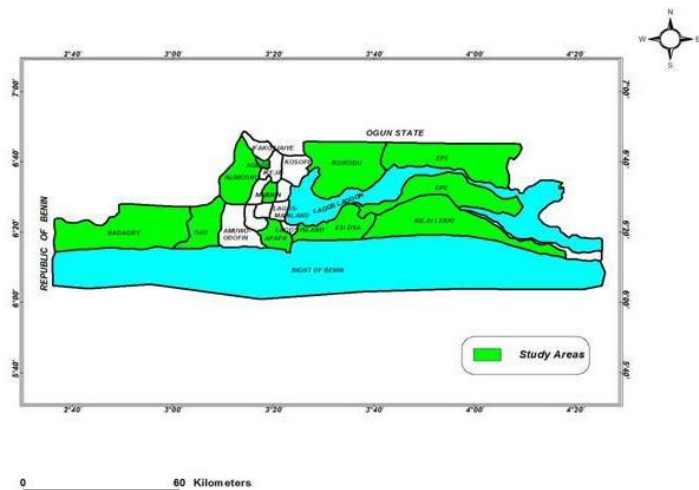


Figure 1. Map of Lagos State showing the study areas.

Table 2. Types of areas where Urban Agriculture (UA) is practiced in major parts of Lagos.

Areas of UA	Type of area
Agege, Alimosho, Epe, Official Ojo,	Official
Badagry, Alimosho, Eti-Osa	Residential
Ikorodu, Apapa , Eti-Osa	Commercial
Ikorodu , Ojo	Institutional
Ibeju/Lekki	Others
Eti-Osa, Mushin, Alimosho, unofficial Epe, Ojo,	Unauthorized sites
Agege, Alimosho, Epe, Ojo, Ibeju/Lekki	Personal agreements

Source: Author's field survey, 2006.

Table 3. Types of products of urban agriculture (UA in major parts of Lagos.

Location	Type of products
Agege	Vegetables, Flowers, Poultrys
Alimosho	Vegetables, Flowers, Poultrys
Apapa	Vegetables ,Flowers, Poultrys
Badagry	Vegetables, Flowers, Poultrys
Epe	Vegetables, Flowers, Poultrys
Eti-Osa	Vegetables, Flowers, Poultrys
Ikorodu	Vegetables, Flowers, Poultrys
Ibeju/Lekki	Vegetables, Flowers, Poultrys
Mushin	Vegetables, Flowers, Poultrys
Ojo	Vegetables, Flowers, Poultrys

Source: Author's field survey, 2006.

city in many of the areas mentioned earlier. The broad diversity of horticultural crop species grown in many areas allows year-round production, employment and income.

Pattern and distribution of urban farms in Lagos, Nigeria

Most horticulturists practice intensive horticulture on small plots, making efficient use of limited water and land resources readily available in most parts of the city. Horticultural species have considerable yield potential also due to their short production cycle as they provide a quick response to emergency food needs (several species can be harvested 60 to 90 days after planting). Leafy vegetables provide a quick return that helps families meet their daily cash requirements for purchasing food.

Some horticulturists take advantage of open and abandoned plots along major roads like the Ikorodu road, Agege motor road, Lagos-Ibadan expressway to plant flowers and other ornamental species for sale. Efforts of some of these horticulturists have helped in turning once abandoned refuse dump and urban jungles into attractive places of relaxation for the city dwellers. Table 3 below shows the types of areas where UA is practiced in major parts of Lagos.

UA in Lagos, Nigeria is on the small scale and is found to be targeted to varying degree by producers or households interviewed in this study (Table 4). Although the level of production is not substantial for export, the farmers take advantage of the overwhelming urban population of the metropolis and the demand for fresh vegetables by individuals (including foreigners in the country), light industries (e.g. various fast food joints, local food processors) in the city. Urban farmers use different spaces in and around the city over a period of time and may move due to forced eviction or conversion of the land to other uses. There are several stream -side vegetable farms cultivated mostly in the short dry season in the area. The farmers depend on the stream water and effluents from the stream which are rich in essential nutrients but may also contain toxic elements harmful to man and other living organisms that consume such vegetables. Urban farmers have comparative advantage over the rural farmers in the supply of these products within short time because of their proximity to the various locations for consumptions.

Generally, most of the urban farms are owned by individuals, while some are practiced on small scale in major parts of the metropolitan Lagos (Table 4). In Ikorodu area efforts are being made by individuals to come together as cooperatives to produce on a medium scale level. Micro scale UA can also be found in areas like Ibeju/Lekki, Eti-Osa and Apapa where micro-credit facilities are provided by some banks and government agencies to the farmers. Corporate outsourcing which is common in Asian cities is not found in the areas studied.

Vegetable production has expanded in and around the

Table 4. Types of areas, production systems, product destination and production scale of Urban Agriculture (UA) in selected parts of Lagos, Nigeria.

Areas	Production systems /Scale	Destination/markets
Agege	Individual scale	/Micro Agege/ Ikeja
Alimosho	Individual scale	/ Small- Oshodi Market
Apapa	Individual scale	/Micro Obalende/ Ikoyi
Badagry	Individual scale	/Small- Mile 2 Market
Epe	Individual /Small-scale	Micro Obalende/ Ikoyi
Eti-Osa	Individual scale	/Micro Obalende/ Ikoyi
Ikorodu	Individual /Medium scale	Micro Ikorodu/ Mile 12
Ibeju/Lekki	Individual scale	/Micro Lekki/Obalende
Mushin	Individual scale	/Small- Surulere
Ojo	Individual /Small-scale	Micro Festac Town

Source: Author's field survey, 2006.

Potential benefits of urban agriculture

The world's poorest urban households spend between 50 to 90% of their income on food (Kerry, 2004). For them, urban agriculture offers an opportunity for a better diet and a chance to shift household spending toward other needs, such as health care and housing (Rabinovitch and Schmetzer, 1997). Urban agriculture being an individual household micro level strategy directly influences the financial empowerment of urban poor positively. However, the benefit of urban farming is hinged on availability of productive land and water resources for this economic group. In Lagos, the land ownership system makes it rather cumbersome for poor urban farmers to access land. The benefits of urban agriculture extend beyond better nutrition, poverty reduction and jobs for the poor. Agricultural methods make the most out of scarce land, water and other natural resources, and often make use of wastes and industrial by-products as well. UA can contribute to food security in several ways. It increases the amount of food available and enhances the freshness the freshness of perishable foods reaching urban consumers. Case studies have shown differences in nutrition, especially among children, when poor urban families farm (IFPRI, 2002). It also offers opportunities for productive employment in a sector with low barriers to entry. The

intensive horticultural and livestock production that thrives in peri-urban areas employs workers and produces high value-added products that can yield reasonable income and returns. Urban agriculture compliments rural agriculture and also increases the efficiency of the national food supply. It can be a substitute for food imports intended for urban consumption and thus save on foreign exchange. It can also make available good rural agricultural land for export-oriented production (Binns and Lynch, 1998; Ali and Porciuncula, 1999).

In addition, there are direct benefits to produce food locally which can contribute to improved nutritional status, food security, and income. Indirect economic benefits include waste-management (avoided costs of waste disposal), use of under-used resources (rooftops, roadsides, and water bodies), economic diversity/stability, changes in economic value of the land, and possible multiplier effects (business attracted by UA, such as input services or restaurants).

UA can also play a role in environmental conservation, since energy can be saved by shortening the distance between the points of production and consumption and by reducing savings in storage and transport. UA also contributes directly to improve the urban environment (or city ecology) by improving the micro-climate, CO₂ balance and biodiversity within cities, by preventing erosion and flooding through planting bare lands and steep slopes (disaster mitigation) and by using urban (organic) wastes (solid waste and waste water) as a productive resource (that is fertilizer and biogas production). Because of its proximity to concentrations of human population, UA does, however, require higher technological and organisational precision than rural agriculture. Risks are technically manageable and depend on cities making better use of prevention and mitigating measures.

Urban producers also achieve real efficiencies by making productive use of under-utilized resources, such as vacant land, treated wastewater and recycled waste, and unemployed labour. Productivity can be as much as 15 times the output per hectare of rural agriculture, although yields often suffer from inferior or insufficient inputs, use of poorly adapted varieties, poor water management, and lack of farming knowledge (Stevenson, 1996).

Challenges and risk of urban agriculture

One major challenge to the viability of UA is land availability. Looming over many urban farmers, both men and women, is the constant threat of losing access to their plot and being forced to stop production. In many areas, non-farming households' inability to access land in the city is the major reason given for not farming. The urban farmers often encounter harassment by officials and policemen. Fear for eviction makes that most of these farmers tend to grow only quick-yielding seasonal crops and avoid investments in soil quality, tree and shrub components, erosion prevention, water harvesting measures, etc.

Land redistribution is contentious and politically complex. A major complication is that there are often different systems of legislation relating to land, and different forms of tenure, co-existing in the same city, or between an urban area and its surroundings. Often there are a large number of institutional actors, varying in size and legal status, that is sometimes overlapping jurisdiction over urban land, that further

UA production systems can pose risks to public health and the environment. These arise from the inappropriate or excessive use of agricultural inputs including pesticides, nitrogen, and raw organic matter containing heavy metal residues which may leach or runoff into drinking water sources, microbial contamination of soil and water, and air pollution. In particular, leafy vegetables can be contaminated through overuse of chemical sprays, while zoonotic diseases and veterinary public health problems can arise from intensive livestock production (Ayanwale et al., 1982). Since soils often exist closely to one another in any given area, it is understandable that if the best soils are protected, development would be pushed onto the soils immediately around them.

The most viable source of water for UA is recycled treated wastewater. The Food and Agricultural Organization (FAO) has estimated that typical wastewater effluent from domestic sources, when appropriately treated for agricultural reuse, could supply all of the nitrogen and much of the phosphorus and potassium that are normally required for agricultural crop production. Unprocessed liquid waste (e.g. pig slurry, flush waters) or semi-processed waste is sometimes used for fertilization, and raw chicken and cattle manure enhance soil fertility and structure. These practices carry some health risk, but when properly managed, this risk is minimized (Flynn, 1999).

The major danger in utilizing waste waters is food contamination by pathogenic micro-organisms and outbreaks of water-borne diseases. High health risks associated with the use of untreated or improperly treated sewage water in irrigation include infection from helminths, while medium to low risk is associated with enteric bacteria and viruses. In general, evidence suggests that negative health effects are a problem only when raw or poorly treated wastewater is used for irrigation. Another water quality issue arises in intensive aquaculture in peri-urban areas. Intensification implies heavier use of water for recirculation, commercial feed and drugs (antibiotics and bacteriostatics). Excess nutrients and organic matter enhance the proliferation of micro-organisms that lead to eutrophication by depleting dissolved oxygen in the water systems.

Synthesizing UA and urban land use planning

An increasing number of local governments recognise the potential of UA as an effective strategy to reduce urban poverty and enhance food security, health and nutrition of disadvantaged groups. FAO (1996) integrated UA in its

regular programme and created an interdisciplinary working group "Food for the Cities" in order to stimulate the integration of UA in national and local poverty reduction and food security programmes. The WHO published the "Action plan on urban food production and consumption" as part of their strategy to stimulate the local production and consumption of fresh nutritious food and to improve nutrition and health of disadvantaged urban groups. The Urban Management Programme (UNDP-UNHabitat) is studying and facilitating UA as part of their efforts to enhance community participation in sustainable urban land management.

The goal of "New Urbanism" is to reverse the trend of "Urban Sprawl" by learning from traditional urban development patterns and thereby preserving open spaces for natural habitat, active recreation, and productive agriculture (McLaughlin, 1997). Therefore UA must be integrated into the city master plan and a thorough revision of the urban regulation must be carried out to include UA as an official part of urban land use. In order for agriculture in the Lagos metropolis to become more urban in character and also integrated into the larger urban land use planning, this must be innovated to cope effectively with city constraints and tap no less effectively on urban assets and flows found and generated by the city. Several studies exemplified the principle of integration through comparisons between intra-urban, peri-urban and rural activities. Urban land use planners should endeavour to promote multifunctional land use, and greater community participation in the management of urban open spaces as a way of integrating UA as a key concept in urban development programmes. And also facilitate dialogue between different stakeholders so as to build consensus on UA.

The urban planners must identify the entry point for UA and determine whether it is for household consumption to increase nutrition levels or the market. There is also the need to take into account urban diet patterns and the gendered nature of labour and crops. Measures like the sale of urban land at its agricultural value provided the land remains in cultivation, as well as the further provision of land in and around the farmers' working places, could improve their access to land for extended farming. The linkages between urban and rural farmers, processors, and sellers (both formal and informal sectors) must be identified so as to facilitate direct marketing schemes to bring local producers and consumers together. There is an urgent need to review the land-use planning and zoning decisions and adopting more flexible regulations to help the urban poor develop urban agriculture rather than prohibiting it.

Conclusion, planning implications and recommendations

It is believed that in any given city and over a period of time, during urbanization, agriculture of an urban nature

will grow as a percentage of all the agriculture found in that city. Some policy options emerge from this study of which the net result would be to establish UA as a legitimate and viable economic activity in cities. Ideally, this would mean that over time urban households would look upon agriculture as one among many choices of economic activities that could supplement income from formal jobs, or provide informal market income or enhance household food supply. Under such conditions, the activity of urban farming would require certain kinds of investments and skills. Here, what is important is the commercial aspect to improve the earnings derived from outputs. More research has to be done on feasibility studies to identify market and competition. This scenario, however, presupposes a positive policy environment that minimises uncertainties faced by the farmers and the industries they supply and provides the means to manage risks, including credit and insurance. Beyond the household and sub-sectoral level, policies should also address urban agriculture holistically, as part of the entire urban food system. This includes rural-urban supply linkages and food trade. Also influencing the urban food system at a macro level are underlying trends in demographics, economic cycles affecting land development in cities.

A network that has to involve all stakeholders of UA in a participatory way, because the challenges are complex and a holistic approach should be established. The network should include governmental and non-governmental institutions, and those farmer associations involved in city planning, UA, waste generation, sanitation and health. Of similar importance are those areas within the private sector that are interested in waste processing, agro-business, and public welfare. It is quite imperative for urban land use planners to promote multifunctional land use, and greater community participation in the management of urban open spaces as a way of integrating UA as a key concept in urban development programmes as well as facilitating dialogue between different stakeholders so as to build consensus on UA.

REFERENCES

- Akinbile LA (1997). Measurement of Indigenous knowledge of crop farmers in two agroecological zones of Oyo state. Unpublished Ph.D. Thesis in the Department of Agricultural Extension Services, University of Ibadan, pp. 65-70.
- Aldington T (1997). Urban and peri-urban agriculture: some thoughts on the issue. *Land Reform, Land Settlement and Co-operatives* 2:43-44.
- Ali M, Porciuncula P (1999). How can urban agriculture benefit the urban poor of Metro Manila, Philippines. Paper presented at DSE/GTZ/SIDA/ACPA International Workshop Growing Cities Growing Food, Havana, Cuba.
- Ayanwale FO, Dipeolu OO, Esuruoso GO (1982). The incidence of *Echinococcus* infection in dog, sheep and goats slaughtered in Ibadan, Nigeria. *Int. J. Zoonoses*. 9: 65-67.
- Batty M, Besussi E, Chin N (2003). Traffic, Urban Growth and Suburban Sprawl. UCL Working Papers Series. Paper 70 Centre for Advanced Spatial Analysis, University College London.
- Binns T, Lynch K (1998). Feeding Africa's growing cities into the 21st century: the potential of urban agriculture. *J. Int. Dev.* 10: 777- 793.
- Chambers R, Jiggins J (2000). Political aspects of ecological sustainable development. *Environ. Conserv.* 23: 61-74.
- Drescher A (1999). The integration of urban agriculture into urban planning: an analysis of the current studies and constraints. *Land Use Planning*. 22: 555 -574.
- Drescher A, Iaquinta D (1999). Urban and peri-urban agriculture: A new challenge for the UN Food and Agriculture Organisation (FAO). FAO-Internal report, Rome.
- Fakoya EO, Agbonlahor MU, Dipeolu AO (2007). Attitude of Women Farmers Towards Sustainable Land Management Practices in South-Western Nigeria. *World. J. Agric. Sci.* 3(4): 536-542.
- FAO (1996). Urban agriculture: an oxymoron? In: *The state of food and agriculture 1996* (Rome: FAO). pp. 43-57.
- FAO (2000). Urban and Peri-urban Agriculture and Urban Planning. Discussion paper for FAO-ETC/RUAF electronic conference "Urban and peri -urban agriculture". August 21-September 30, 2000. Prepared by Drescher A.
- Flynch K (1999). Urban agriculture and public health: risk assessment and prevention for contamination and zoonoses. Cities Feeding People Programme Initiative. Ottawa, IDRC (draft).
- Gardner BL (1990). *The economics of agricultural policies*. Toronto, McGraw-Hill.
- Gbadegesin A (1991). Farming in the urban environment of a developing nation - A case study from Ibadan metropolis in Nigeria. *The Environmentalist*. 11(2): 105-111.
- Hsin R (1996). Guidelines and Principles of Sustainable Community Design. A study of sustainable design and planning strategies in North America from an urban design perspective. Faculty of the School of Architecture at Florida Agricultural and Mechanical University. Thesis. <http://sustainable.state.fl.us/fdi/edesign/news/9607/thesis.htm>
- IFPRI (2002). Sustainable Food Security for all by 2000. International Food Policy Research Institute. 2033K Street New Washington DC, p. 281.
- Jelili MO, Adedibu AA (2006). Land Use Classification and Informal Sector Question in Ogbomosho, Nigeria. *J. Hum. Ecol.* 20(4): 283-287.
- Kerry A (2004). Natural Resource Management and Human Health: the forgotten link? Social Development Adviser, Natural Resource International Ltd. Bradborne Lane, UK.
- Lagos State Government (2006). THE AUTHENTIC CENSUS: Lagos State Social Security Exercise and Population Figure.
- Linden E (1996). The exploding cities of the developing world, *Foreign Affairs* 74(1), January/February 1996, p. 53.
- McLaughlin R (1997). <http://www.mnapa.com/lexicon2A> New Urbanist Lexicon. Minnesota, Chapter. American Planning Association.
- Mlozi MRS (1998). Urban vegetable production in low-density areas of Dar es Salaam. Consultancy Report. Urban Vegetable Production Project, Ministry of Agriculture and Cooperatives, GTZ, Dar es Salaam, pp. 67.
- Mlozi MRS (1997). Urban agriculture: Ethnicity, cattle raising and some environmental implications in the city of Dar es Salaam, Tanzania. *African Studies Review* 40(3): 1-28.
- Mougeot IJA (1998). Farming inside and around cities. *The Urban Ages* 5(3): 18-21.
- Mougeot IJA (1999). Urban agriculture research in Africa: reviewing and enhancing project impacts. *Cities Feeding People Report* 29 Ottawa, IDRC.
- NPC (2007). Advertorial- National Population Commission: Lagos State claim on the provisional result of the 2006 census is unfounded. NPC, Feb 8th 2007.
- Oduwaye L (2005). Residential land values and their determinants in high density neighbourhoods of Metropolitan Lagos. *Res. Rev.* 21(2): 37-53.
- Pujol D, Beguler M (2000). Paris' near urban agriculture.
- Rabinovitch J, Schmetzer H (1997). Urban agriculture: Foods, jobs, and sustainable cities. *Agriculture and Rural Development*, 4(2): 44-45.
- Richard MJ (1991). Opportunity and conflict in the peri-urban areas of Gaborone, Botswana. 19 p. Department of Anthropology. State University of New York. Binghamton USA.
- Robinson KL (1989). *Farm and food policies and their consequences*. Englewood Cliffs, Prentice Hall.
- Smit J (1996). Urban agriculture: progress and prospect: 1975-2005. *Cities Feeding People Report* 18 Ottawa, IDRC.

- Soyibo A, Alayande B, Olayiwola K (2001). Poverty Alteration Strategies in Nigeria. In: Abumere, SI and Soyibo, A. Development Policy and Analysis. Development Policy Centre. Ibadan.
- Stevenson A, Xavery P, Wendeline A (1996). Market production and vegetables in peri-urban area of Dar es salaam, Tanzania. Dar es Salaam: UVPP, Ministry of Agriculture and Co-operatives/GTZ.
- Swindell K (1988). Agrarian change and peri-urban fringes in tropical Africa. In: Rimmer, D., ed. Rural transformation in tropical Africa, Belhaven Press, London, England.
- Winter M (2000). Strong policy or weak policy? The environmental impact of the 1992 reforms to the CAP arable regime in Great Britain. *J. Rural. Stud.* (16): 47-59.
- World Bank (1993). World Development Report, and Rural Development, 1993: Investment in health. Oxford University Press, pp. 38-54.