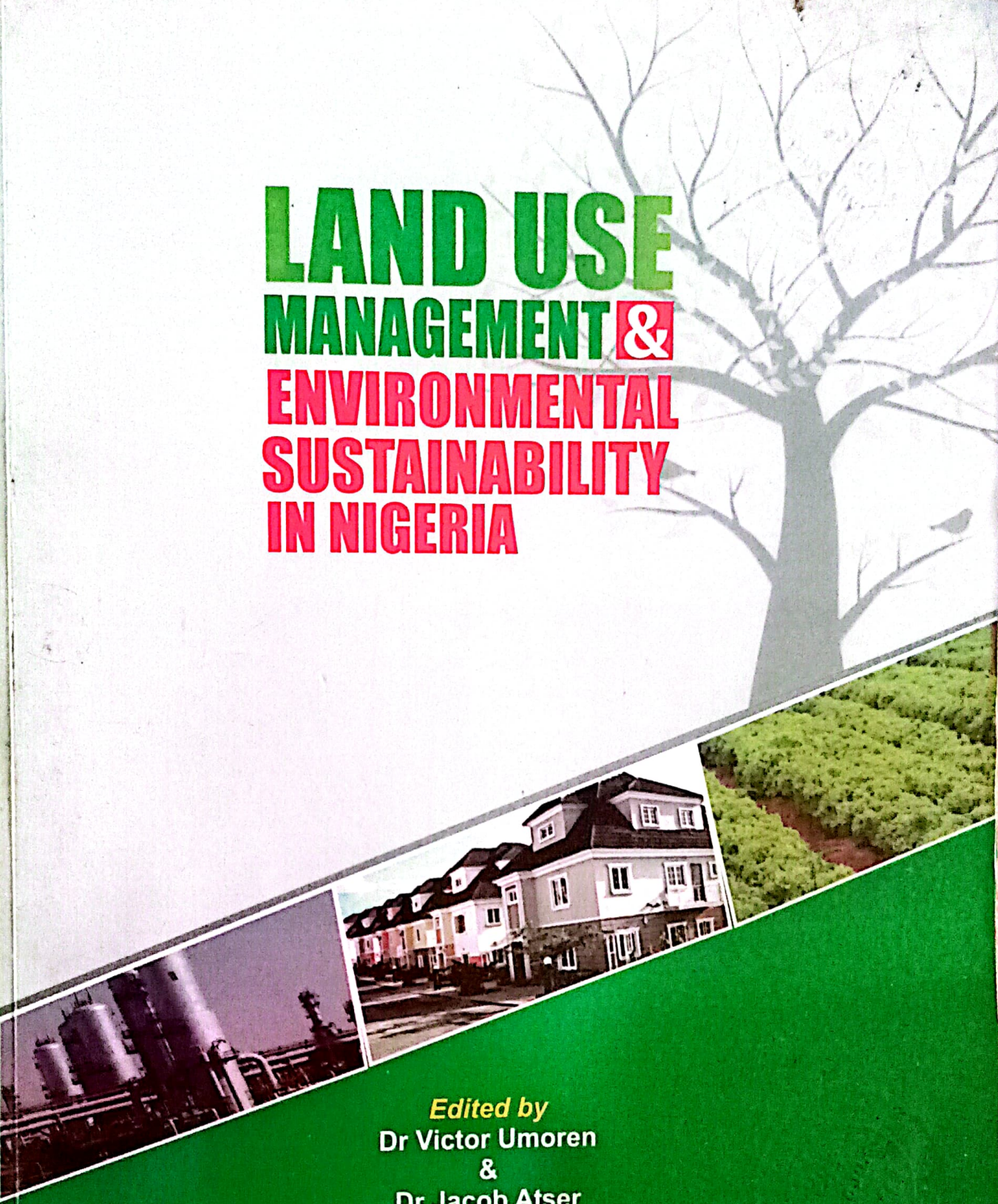




LAND USE MANAGEMENT & ENVIRONMENTAL SUSTAINABILITY IN NIGERIA

Edited by
**Dr Victor Umoren
&
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Preface by
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A BOOK OF READINGS
*In Memory of Late Professor Joseph Uyanga
Professor of Environmental Planning, University of Uyo, Nigeria*

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CHAPTER THIRTY FOUR

MORPHOLOGICAL TRANSFORMATION OF URBAN AGRICULTURE: A PANACEA TO THE INEVITABLE TRINITY OF POVERTY, HUNGER AND FOOD INSECURITY

O. T. B. Aduloju & A. I. Bako

Introduction

Urban agriculture (UA), defined as growing of crops in cities, is increasing in popularity and importance globally due to its swift and sustainable response to the menace and preponderance of poverty, hunger and food insecurity. However, the blistering future the menace of poverty, hunger and food insecurity pose is attributed to the sporadic and unsustainable urban growth. Sanchez (2013) estimates the earth population will increase by 40%, exceeding 9 billion people by 2050. Furthermore, these estimates assume that 1.2 billion people are chronically hungry and undernourished and/or intermittently food insecure, that means one in seven people are hungry. World Bank Group (2015) believe that to permanently end poverty, hunger and food insecurity, the world needs a food system that can feed every person, every day, everywhere and that can raise real incomes of the poorest people. Food security and income generation, in the context of current and prospective increased urbanisation, are some of the positive outcomes related to the widespread practice of urban agriculture as a poverty alleviation strategy.

UA is perceived as a form of natural capital for growing food and other crops within cities (van Veenhuizen & Danso, 2007; Clinton, et al., 2018). By definition, Mougeot (2000) labels 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, re- 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. In the same vein, Ogunbameru, Gwary, and Idrisa (2004) labels UA concisely as the practice of farming in a city environment. More conceptually, from the viewpoints of Taylor (2010), UA is a food system component suitable to embrace sustainable concepts, tackle food insecurity and assist to reach healthy habits and nutritional standards among citizens. From all these descriptions, one decently notices that UA embraces the cultivation of crops, rearing of livestock, harvesting, processing, storage, marketing and distribution of agricultural products and by-products. Nonetheless, UA pursues Sustainable Development Goals (SDGs) and seeks to achieve SDG goal Nos.1 and 2 (eradicate poverty and hunger).

There have been lots of predictions that UA represents the future. From a clear review of studies and theories from Malthus (1798); Brown (2009) on demography, one can adduce that everything else can wait; but certainly not agriculture. Furthermore, from keen observation of the trend of how urban planning is responding to food crises, it's crystal clear that UA will be the dominant land use in urban centres in the next 25 years. This reason is not farfetched because of the lots of benefits UA encapsulates: UA offers potential to ameliorate a host of urban environmental problems by increasing vegetation cover and therefore contributing to a decrease in the Urban Heat Island Effect (UHIE) intensity (Susca, Gaffin, & Dell'Osso, 2011), improving the liveability of cities (Frumkin, 2003) and promoting poverty alleviation as unemployed and partially employed persons, youth, home-bound mothers, and elderly persons can supplement family food and income through small-scale farming. More acceptingly, UA provides an enhanced food security to over half of Earth's population (De Bon, Parrot, & Moustier, 2010; Pearson & Hodgkin, 2011). UA connects multiple metabolic pathways of urban ecosystem services including food provisioning (Zezza & Tasciotti, 2008). World Bank (2013) estimated that 15 to 20 percent of the world's food is produced in urban areas and Clinton, et al. (2018) argue clearly that regulation of local microclimate and hydrology is also an ecological function attributed to UA.

The need for UA to respond to the scourge of intertwined relationship that poverty, hunger and food insecurity presents, has gone beyond debates. The increasing urban poverty goes hand-in-hand with growing food insecurity, hunger and malnutrition in cities. UA is historically and traditionally associated with times of economic crisis. In the global South, UA represents a necessary activity for poor people in the cities (Smit, et al., 1996). In the same vein, food insecurity indicates some form of vulnerability one suffers regarding rights to food entitlement. It is an expression of poverty – poverty is the main cause of food insecurity (Beerlandt & Huysman, 1999). Food insecurity has been labelled as a limited ability to access, secure and consume adequate and nutritious food (Olufemi, 2017). Paradoxically, food insecurity and poverty manifest itself in form of hunger, malnutrition, under nutrition and malnourishment, not getting adequate nutrients from food consumed and lacking common access to basic human needs. In the face of poverty and its adversaries which remain deep-rooted in world population today, the *idée fixe* of many scholars in urban literature is to make sure UA in many cities play a critical role in sustaining the integrity of the environment and contributes significantly to the attainment of food self-reliance by improvement of livelihoods of the urban poor. Furthermore, this obsession is being met with a challenge by urban planners and policy makers which find it difficult integrating UA into strategic land use planning in order to create some ameliorating strategies for poverty, hunger and food insecurity. It is however, against these incendiary threats of poverty, hunger and food insecurity that this paper provides different definitions of UA, explanations of urbanisation and poverty, Nigeria nutrition profile, UA as a livelihood strategy, key elements and approaches embedded in UA as a panacea to the inevitable trinity of poverty, hunger and food insecurity as well as how the new urban planning agenda is shaping cities and accommodating new discourses in planning.

Urbanisation and Poverty

The foreword of World Bank (2013) report has it that urbanisation remains one of the phenomena of the 21st century. It is more than a debate that cities now have high affinity for people more than ever before in history. The quest for this beckons on the fact that cities of today enable economic progress, promote innovation and social cohesion, and improve access for millions of people to healthcare, education, potable water and electricity, in addition to promoting diversity and cultural activities, such as theatre, music, and art (World Bank, 2013). In short and on the positive, cities are the crucibles of improved standards of living, in economic, social and cultural terms. However, with all these positive qualifications of urbanisation, there exists a wanton clog of managing urban growth which has become one of the most significant challenges of the 21st century and is critical to the planning of sustainable cities. The report of Brown (2015) has it that between 2014 and 2050, the global population is expected to increase from 7.2 billion to 9.6 billion, and the urban population from 3.9 billion to 6.3 billion – amongst these estimates there exists 1.2 billion people today who are chronically hungry and undernourished (Brown, 2009). Furthermore, Brown's (2015) report maintains that over 90% of world growth will take place in cities and towns of the global South. However, notable scholars like Mougeot (2000); De Bon, Parrot, & Moustier (2010); Ogunbameru, Gwary, & Idrisa (2004); Akinbamiyo (2007); Smith, Nasr, Ratta (2010); (World Bank (2013) have sounded note of caution in many urban literatures that if present growth trends continue, poverty and its adversaries (hunger, food insecurity...) will be on the increase and many countries (many in sub-Saharan African region) may be incapable of feeding their population through their existing agriculture system in the coming years. Many others will be capable, but only at a significant cost to the environment. Smith, Ratta, Bernstein (1996) argue clearly that to address both concerns, a greater focus on UA can help counter these trends.

As cities expand due to urbanisation, so do the food needs of urban families; on the other hand, urban poverty is an inescapable truth of today in every country whether developed or not. According to Baker (2008), one third of all urban residents are poor, which represents one quarter of the world's overall poor population. She also argues that the number of urban poor will continue to rise along with food insecurity and hunger (Sirakaya, 2016). By description, poverty means absolute or relative, relating to security, empowerment or lack of opportunities and can also mean multiple forms of deprivation (Olufemi, 2017). More succinctly, Corbett (2008) labels poverty as condition of having insufficient resources or income. In its most extreme form, poverty is a lack of basic human needs, such as adequate and nutritious food, clothing, housing, clean water, and health services. Conceptually, Bako, *et al* (2018) identify poverty to be multidimensional, in which food poverty is the most visible of all the dimensions in the global south. While poverty is undoubtedly a cause of hunger, lack of adequate and proper nutrition itself is an underlying cause of poverty. The world of research can no longer discount the fact that poverty has an intertwined relationship with malnutrition and hunger. World Bank (2013) reports that the high rate of urbanisation in many developing countries, particularly in low-income ones, is taking place at a time when the availability of non-farm jobs is limited. In fact, non-farm productivity in the least developed countries declined 9 percent from 1980-83 to 2000-03 (UNCTAD, 2002). As a result, the urbanization process is accompanied by

a phenomenon referred to as the “urbanization of poverty”. In addition, the recent global financial crisis and rising food, fuel, and energy prices have affected developing countries, with a disproportionately large effect on the urban poor. Food and Agricultural Organisation (FAO) data indicate that the number of people with chronic food insecurity has risen to over 100 million people in two years from 2007 to 2009, the majority of whom are urban poor (FAO, 2009).

The urban poor are particularly vulnerable to changes in food prices and variation in income since food makes up a large proportion of their household expenses (often over 60 percent) and urban consumers are almost exclusively dependent on food purchases. Variations in income or food prices have a significant and direct impact on their diet (lower food intake, turning to cheaper or less nutritious food) and may also lead to reduced expenditures in healthcare and schooling or sale of productive assets (FAO, 2009). It is estimated that the rise in food prices between early 2007 and 2008 increased the number of people living in extreme poverty in urban areas in East Asia, South Asia, the Middle East and Sub-Saharan Africa by at least 1.5 percent (Baker, 2008).

Meaning and definitions of Urban Agriculture

Once again, the expression ‘urban agriculture’ (UA) represents a concept after concepts like ‘region’, ‘exclusion’, ‘coast’... where scholars, researchers and academics rarely agree on a universally agreed definition. UA is one of the aversive rarity terms in urban literature. There have been disparities in the definitions as regards what constitutes UA and areas within cities where UA is practicable. Reviews by notable scholars like (Smith, Ratta, Bernstein, 1996); (Mougeot, 2000); (Ogunbameru, Gwary, & Idrisa, 2004); (Taylor, 2010); (World Bank, 2013) – just to mention a few – as regards what the geography of UA in urban literature constitute, have tacitly indicated that UA cannot really be defined but described. Urban agriculture’s integration with the urban eco-system services is not captured in most definitions of the UA concept, and has relatively rendered it less so developed in operational terms. This is an area in need of much greater attention beyond initial steps taken by a few.

In defining UA concept, there must be an underlining thought that must bear a purpose. This section shall be looking at various regional arguments by noble scholars on what operationally constitute UA: For instance, Smith, Ratta, and Bernstein (1996)’s definition of UA lay emphasis on how urban waste can be recycled and how UA caters for daily urban demand. This definition has been revised by Mougeot (2000), which sees 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, re- 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’. UA according to World Bank (2013), is an industry located within (‘intra-urban’) or on the fringe (‘peri-urban’) of a town, a city, or a metropolis, that grows and raises, processes and distributes a diversity of agricultural products from both plants and animals, using human, land and water resources, products, and services found in and around that urban area. From all these regional and historical

definitions, it is crystal clear that UA has come at the tipping point of where urbanisation and poverty strike a balance. It has come as a means to helping low-income populations improve their quality of life, solve economic problems of low-income countries, and ultimately as a means of poverty alleviation. In other words, UA is an industry that is concerned with how food is cultivated, processed, transported and distributed.

Extent of Urban Agriculture Worldwide

Over the 10,000 years since agriculture began to be developed, people everywhere have discovered the food value of wild plants and animals, and domesticated and bred them (Brown, 2009). However, in recent years, there has been a worldwide on-going food and economic crises within cities due to the rapid expansion that requires measures at the urban management and high planning level, to create and include sustainable and innovative strategies to face futures conflicts associated with hunger, poverty food insecurity. Agricultural activities occur in various forms in many urban and peri-urban areas around the world. The percentage of urban families that farm ranges from 25 to 80 percent, and surveys in different cities have found it satisfying from 25 to 100 percent of the vegetable and protein demand (Smith, et al., 1996). In the same vein, Sanchez (2013) estimates that more than 15% of food production in the world come from urban agriculture (farming, horticulture, animal husbandry, fish ponds). Nonetheless, Smith, et al.(1996) estimates, accounted for 800 million people being involved in UA. However, there has been a significant and benign increase in the people's interests in UA within a decade, with predictions recording that nearly 1 billion people are engaged in UA, with 200 million producing food for markets.

Many countries both in developed and developing world are changing practices as regards how modern-day cities can accommodate growing of food and arrest the challenges coming out of the complex interplay of growing population and depleting resources (Steel, 2008). For instance, in the upper-income countries like United Kingdom (UK), 'underused and uncared-for land' is given to local communities in order to help meet the unmet demand of 100,000 people to grow their own food (Communities and Local Government, 2010). In China, Chinese planners incorporated food production into city planning. In the same vein Asian city states such as Hong Kong and Singapore has integrated UA into land use planning (Aziz & Amir, 1997). In Japan, most available space within and around cities is used for agriculture. In relative terms, Japanese cities allocate much less land to residential and more to agricultural use than both European and North American cities. Further, they have much less water-borne sewer service and more night soil. The-land use tax system in Japan encourages UA (Smith, et al., 1996). The dense urban population in Netherlands as well as the keen interest of the nation in UA has made the country a leader in agriculture production. Smith, et al. (1996) reports that "Randstad," is a national planning and zoning framework that maintains an 'agricultural core' within the regional South Holland "rim city," which includes Amsterdam, The Hague, Delft, and other towns and cities. From all indications, UA lacks formal recognition, and use of land for UA purposes is due to consent than legal rights. It is more than a given fact that UA is not a dominant land use in urban area due to needs from more pressing land uses like industrial, residential, commercial etc. However, decades ago in urban literature, the need for UA has presented a turning point

due to the fact that the rural agriculture can no longer feed ever growing urban population, and to this end, earlier and recent scholars of urban greening and food security have tacitly and publicly indicated UA has the leading concept to achieve sustainability more than any other emerging concepts.

In the lower-income nations for instance, UA has been identified as a survival pill. For instance, nearly 25 out of 65 million people living in urban areas of Eritrea, Ethiopia, Kenya, Tanzania, Uganda and Zambia currently obtain part of their food from UA and that by 2020, at least 35-40 million urban residents will depend on UA themselves (Denninger, Egero, & Lee-Smith, 1998). UA in sub Saharan African (SSA) cities, produces 20 – 40 % of urban food (Smith, et al., 2001). World Bank (2013) reports that in Nairobi, almost 300,000 households—perhaps as many as 1.18 million people—partly depend on UA for food and nutrition security and income (World Bank, 2013). Furthermore, more than 650 hectares of land in Nairobi is under urban and peri-urban production (World Bank, 2013). In Kampala 70% of the city's poultry products are produced by urban farmers (Smith, et al., 2001), Self-produced food in Lusaka accounts for one-third of total food consumption by the poor (Smith, Rata, Nasr, 1996).

Comparison between developed and developing countries regarding the extent of practice of UA shows clearly that practice of UA in upper-income nations is attributed to promotion of aesthetics and the need to reduce ecological footprints while in developing countries (many in sub-Sahara Africa), events surrounding the need for survival have controlled the practice of UA. Many upper-income cities (for example, Amsterdam, Berlin, Chicago, Los Angeles, New York, and Stockholm) also include urban farming and forestry in their plans for improving the environment, sustaining development, growing fresher produce, and revitalizing inner cities (Smith, Ratta & Bernstein, 1996). The high percentage of low-income earners among urban farmers suggests that the survival instinct may prompt agricultural activities in the urban and peri-urban areas of many developing countries. From the interview of 800 farmers in the fringe areas of Ibadan, Gbadegsein (1991) reports that about 70 percent of the respondents identified financial reasons as the impetus for starting farm businesses in the area. Thirty-two percent stated that they farm to minimize food expenditures, while a further 23 percent claimed that they farm to supplement family income.

Types and Areas Where Urban Agriculture is Practiced:

The issue of location is central to the practice of UA. In other words, location is a crucial element in understanding the diversity of styles and types of urban agriculture. The spaces urban farmers cultivate differ amongst cities, but are most likely to be small plots in low-density, often illegal or informal, settlements. Smith, et al. (1996) argues that in most cases, urban farming is located where the land is either not suitable for building or is awaiting development, rather than land that is particularly suitable for farming. Criteria according to which areas practicing UA vary from author to author: *where the difference between on-plot" (in the household space) and "off-plot" (use of publicly available or private open spaces in the city) is often the difference between subsistence and commercial farming; Location respective to residence (on-plot or off-plot), development status of site (built-up vs open-space), modality of*

tenure/usufruct of site (moratorium, lease, sharing, authorized or unauthorized – through personal agreement, customary law or commercial transaction); the official land-use category of the sector, where UA is practiced (residential, industrial, institutional, etc.). While, some authors have focused on home-plot areas (Drescher, 2001), others have aimed their study at off-plot and open-space locations (Mougeot, 2000). Misleading comparisons are often drawn across separate studies without due regard to the locational focus of original surveys. Many surveys however, have encompassed both on and off-plot locations under different tenure/usufruct modalities, revealing creative interactions between such locational categories (Sawio, 1993; Drescher, 2001). UA encompasses various types of farming systems that have widely different demands for urban space. In general Smith, Ratta and Bernstein (1996) identified three transformative locations for UA:

- i. The core(s) and corridors within cities, where land is at a premium, typically have farming in the form of intensive technologies such as hydroponic vegetables, shallow bed farms on rooftops, container gardens, and small livestock in coops. Intensive horticulture is found on temporarily vacant lots in redevelopment sites and on oversized plots.
- ii. The wedges between corridors of high-density development typically have market gardens, ornamental plant nurseries, dairies, and poultry farms.
- iii. The fringe is where the more land intensive farming occurs. This includes market gardens, orchards, dairies, livestock, and fuel wood lots. As the city grows and changes, these zones also change, as does the agriculture within them.

Understanding the Importance of Urban Agriculture in the Planning Process

“UA is a practice widely used in the past, and is still in common use in many urban areas around the globe. UA is one of the most exciting concepts of sustainable development since it addresses almost all areas of sustainability. It promotes self-reliance, community, and local economy while reducing many environmentally harmful practices from modern farming practices” (Hsin, 1996). In view of the sustainability discussion, and recent serious, worldwide problems in agriculture, especially in animal farming, urban and peri urban agriculture offer at least partly, a solution. Growing crops and breeding animals near the consumer avoid waste of energy and long transport distances. Evidence suggests that UA complements rural agriculture and increases the efficiency of the national food supply in that it: (IDRC, 1998).

- i. Provides products that rural agriculture cannot supply as well, e.g. perishable products, export crops. that require rapid delivery upon harvest;
- ii. Can substitute for food imports intended for urban consumption and thus saves foreign exchange;
- iii. Can release good rural agricultural land for export-oriented production;
- iv. Can reduce pressure to cultivate new rural land, relieving stresses on marginal rural lands;
- v. Can contribute to the generation of income in the rural sector by various and multiple interactions between the areas and their inhabitants (IDRC 1998).

Urban agriculture is a reality and has to be considered as an important activity near and inside cities. Cities obtain their food from a variety of sources, from rural, peri urban and

urban areas but also, from imported food. Therefore, urban and peri urban food production is, in many cases, a response to various factors.

Integration of UA into Land Use Plan: A response call to Poverty and its Ripple Effects

Continuous feeding of the present and succeeding generation presents a grim future. This is as a result of present growth trends. To address these lacunas, a greater focus on UA can help counter these ugly trends. World Bank (2015) argues that to permanently end poverty and hunger by 2030, the world needs a food system that can feed every person, every day, everywhere; that can raise real incomes of the poorest people; that can provide safe food and adequate nutrition. Promisingly, it is argued that strategies for attacking poverty in conjunction with policies to ensure food security offer the best hope of swiftly reducing mass poverty and hunger. However, recent studies show that economic growth alone will not take care of the problem of food insecurity. Hence, the need for UA which come as one or combination of these approaches as postulated in figure 1.

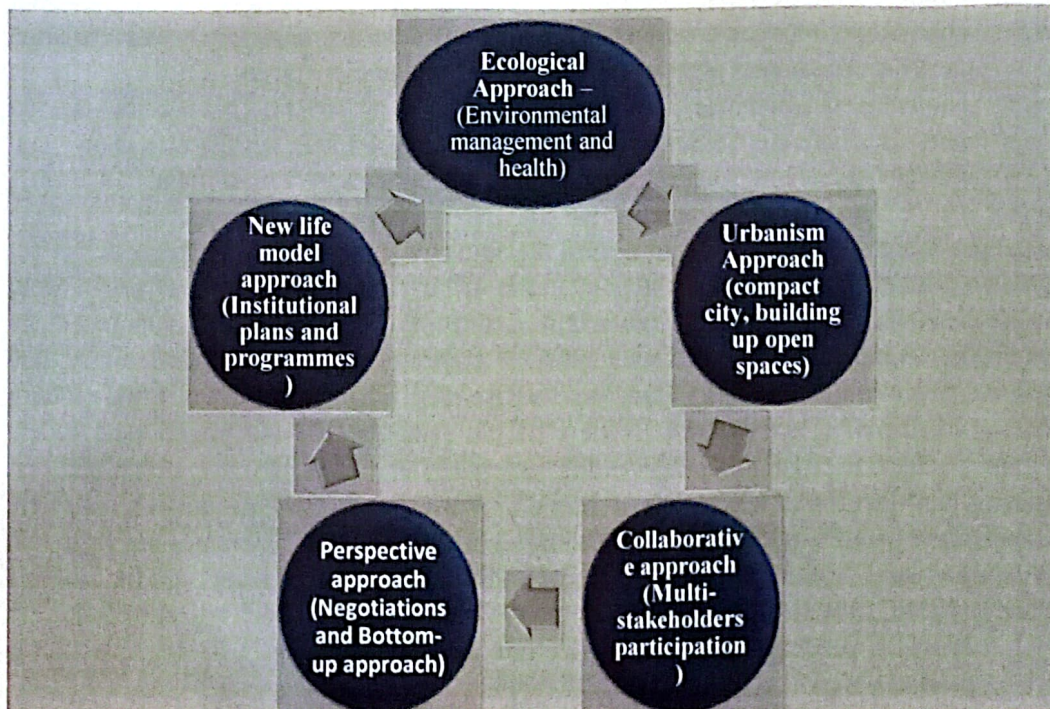


Figure 1: Sustainable UA Approaches; Source: (Sanchez, 2013)

For UA to be a panacea to the menace of poverty, hunger and food insecurity; a considerable push is needed to achieve this feat and UA has to be consciously recognised as a formal land use. Sanchez (2013) argues that all approaches fostering for formal recognition of UA have adapted UA's dynamics in shaping the new vision, oriented to the emergence of a new land use or its proper integration in the urban forms. In integrating UA into land use planning, there is need to provide official recognition in policy formulation process. Legitimising UA as a use of urban land is the first step in the healing process of

UA to the inevitable trinity of poverty, hunger and food security. Being able to grow one's food in urban area is one of the basic human urban rights. Integration of UA into land use plans brings formal recognition perceived to bring along environmental management and health, bottom up negotiations with relevant stakeholders, crosscutting collaborative approach, compact and productive city with more open spaces and institutional plans and programmes for the urban producers (Figure 1). Conceptually, urban planning needs to be adapted to the relatively new situation regarding UA as a sustainable land use (Dowall & Clark, 1997). Many serious issues might be overcome by focussing research efforts in this direction and by educating the public about wide range of benefits from urban agricultural systems and its proper integration and implementation into spatial planning and land use management (Taylor, 2010). Productive public spaces however, are the new sustainable vision of UA that should be explored through the planning tools to solve the intertwined problems of poverty, hunger, food insecurity.

On the other hand, Smith, *et al* (1996) argue clearly that UA can be integrated to form new investments and infrastructure. The report maintains further that the form that UA takes and the scope for its development in any one urban area is likely to vary greatly, depending on, among other things: the accessibility of agricultural inputs it brings, flexibility about rules governing the use of open land and water, prevailing economic circumstances and colonial traditions, available credit, knowledge and capabilities of potential urban producer households, and local attitudes towards UA. Urban farming is essentially a veritable tool that characteristically addresses a number of problems in innovative ways (Table 1). Environmental stewardship is enhanced through UA's efforts to green cities. Economic development and community revitalization are also achieved through urban farming when neighbourhoods take new pride in a community garden, when inner-city residents gain the ability to grow and market their own food, when inner-city farmers' markets provide new opportunities for entrepreneurs and commercial farmers (Brown, *et al.*, 2002).

Table 1: Characteristics of Urban and Peri Urban Agriculture

Characteristic of "Urban" and "Urban Agriculture"	Characteristic of "Peri Urban" and "Peri Urban Agriculture"
Attitudes differ between urban and peri urban dwellers	Peri urban production is economically dependent on the city
Different kind of people	Lower population density than urban
Different activities	More land/space available
Concept of "urban" varies a lot cross-nationally	PU area has more natural resources
UA is part time job	PUA full time job
UA technology is different from PUA	PUA technology is different from UA
Knowledge of urban farmers is different	Knowledge of peri urban farmers is different
Easy access to market	Less access to markets
Poor air quality	Better air quality
Primarily subsistence production	Primarily market-oriented production
High cost of labour	Low cost of labour

Source: (Drescher, 2001)

Urban Agriculture as a Livelihood Strategy

Urban agriculture has been found to benefit communities in a number of ways. UA can put vacant, under-utilized land, or land unsuitable for alternative built-up uses, into productive use. Specifically, it is seen as a critical component of sustainable community development. UA plays an important role in poverty alleviation as unemployed and partially employed persons, youth, home-bound mothers, and elderly persons can supplement family food and income through small-scale farming. UA, therefore, is an important antidote to urban unemployment because it alleviates urban poverty among those who might have been outcomes of selective migration to the city but cannot find gainful employment (Smith, Rata, Nasr, 1996). Accordingly, Tornaghi (2014) submits that urban agricultural practices are being portrayed as benevolent and unproblematic, with the potential to partially solve problems associated with food quality, security and affordability, reduce ecological footprints, increase community cohesion, achieve greater community resilience, reduce unemployment rate and promote urban sustainability. Table 2 clearly gives a detail of roles urban agriculture has played in securing jobs to people and ultimately contributing to livelihoods.

Table 2: Contribution of Urban Agriculture Production to Employment

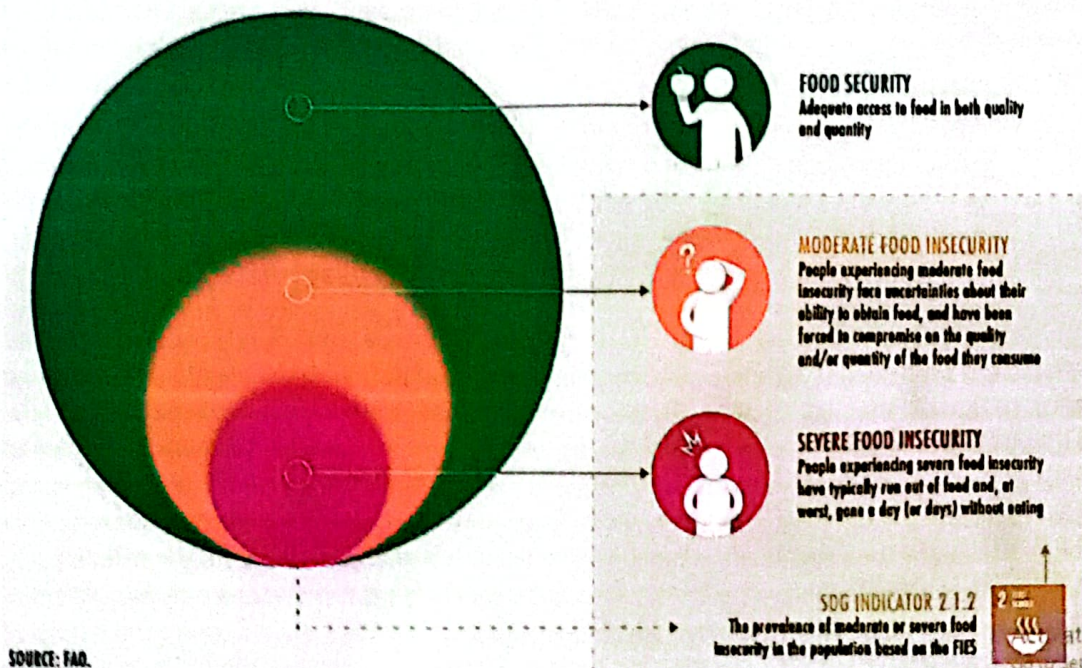
City	Urban Producers
Dakar, Senegal (Mbaye & Moustier, 2000)	3,000 family vegetable farms (14,000 jobs) of which 1,250 are fully commercial (9,000 jobs); 250 poultry units.
Dar es Salaam, Tanzania (Sawio, 1998)	15 to 20 percent of all families in 2 city areas have a home garden. UA forms at least 60 percent of the informal sector and is second largest source of urban employment (20 percent) in 1997.
Havana, Cuba (Gonzalez & Murphy, 2000)	117,000 direct and 26,000 indirect jobs in urban agriculture.
Shanghai, China (Yi-Zhang & Zhangen, 2000)	2.7 million Farmers, representing 31.8 percent of all workers, contribute 2 percent of the city's GDP through urban agriculture.
Manila, Philippines (IPC, 2007)	120,000 low-income households depend on local jasmine production—including jasmine farmers, garland makers, garlands sellers—for their livelihoods.
Ilorin, Nigeria (Aduloju, 2020)	14.34Ha is committed to UA, creating jobs for 902 persons with an average annual profit of ₦15.8million

Source: Authors' Compilations, 2020

Meaning and Dimensions of Food Security and Food Insecurity

The global thinking on achieving 2030 Agenda for sustainable development (SD) puts forward a transformational vision like UA recognizing that our world is changing, bringing with it, new challenges that must be overcome if we are to live in a world without hunger, food insecurity and malnutrition (FAO, IFAD, UNICEF, WFP, & WHO, 2019). The awakening fear along with the grim future that food insecurity holds was first heralded at the Hot Springs Conference of Food and Agriculture in 1943. HDFS (2011) argues clearly that since the time of the conference, the issue has undergone several redefinitions. Food security is a completely onerous concept to measure and define since its ontology hinges

on production, distribution and consumption of food. Food insecurity on the other hand lends itself more readily to measurement and analysis. It should be stressed that food security, famine and hunger are not to be confused: food security refers to the availability of food whereas famine and hunger are the consequence of the non-availability. The Food and Agriculture Organization (FAO) has by necessity defined food insecurity as “a situation that exists when people lack secure access to sufficient amounts of safe and nutritious food for normal growth and development and an active and healthy life.” However, Akinbami, Fall, & Smith (2002) argues more descriptively that food insecurity is the result of either high levels of poverty or growing costs of transporting food (Akinbami, Fall, & Smith, 2002). There are three distinct severity levels of food insecurity as postulated by FAO to be food security, Moderate food security and severe food insecurity (Figure 2). The disturbing fact is that about 2 billion people in the world experience moderate or severe food insecurity (FAO, et al., 2019). The lack of regular access to nutrition and sufficient food puts them at greater risk of malnutrition and poor health (FAO, IFAD, UNICEF, WFP, & WHO, 2019).



SOURCE: FAO.

Figure 1: Food-Insecurity Severity Levels

Food insecurity has been carefully classified into two broad groups (chronic food insecurity and transitional food insecurity), with the latter evolving from a sudden drop in the ability to produce or access enough food to maintain a good nutritional status. It is relatively unpredictable and can emerge suddenly. This makes planners' scheme and programmes more difficult and requires different capacities and interventions. Chronic food insecurity occurs when people are unable to meet their minimum food requirements over a sustained period of time. It is always a dividend of extended periods of poverty, lack of assets and

inadequate access to productive or financial resources (Stamoulis & Zezza, 2003). On the other hand, during the 1996 World Food Summit of November, held in Rome, the world agreed on a universal description of food security as when *"all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life"* (HDFS, 2011). Mercy Corps (2009) identified four interrelated variables/ dimensions that are central to achieving food security:

- i. *Food Availability* – when sufficient quantity is consistently available to all individuals through household production, domestic output, commercial imports or food assistance.
- ii. *Food Access* – when households and all individuals have adequate resources to obtain appropriate foods for a nutritious diet. Access depends on income available to the household, distribution of food among members of the household and the price of food.
- iii. *Food Utilization* – the proper use of food requires a diet with sufficient energy and essential nutrients, potable water and adequate sanitation. Effective utilization depends on good health and knowledge within households of basic principles of nutrition and proper childcare.
- iv. *Risk Management* – the degree to which individuals, households or communities can cope with and withstand stressful situations and shocks. Vulnerability shows the different categories that individuals, households or communities can suffer loss. This can be grouped into five categories by risk factors: environmental, market, political, social and health. Inability to manage risks can lead to food insecurity.

To ensure food security, an adequate diet must include not only calories but the full range of nutrients that humans need. A food secure household is one that can produce, or access, sufficient amounts of nutritious food for all family members, one that enjoys good health and sanitation facilities and practices, and one that is resilient to shocks that might make the household vulnerable again. In other words, a food secure household has met its essential health, economic and productive needs. While the household might still be poor, its members are not challenged by day-to-day threats to its survival caused by lack of food, and can work towards longer-term development priorities.

Nigeria Nutrition, Hunger and Food Security Equation

All heads of Government or their representatives at the 1996 World Food Summit held in Rome, pledged their support and commitments to achieving global food security and alleviation of hunger with the global goal of halving the population of undernourished persons by the year 2015 (FAO, 1996). Malnutrition in childhood and pregnancy has many adverse consequences for child survival and long-term well-being. It also has far-reaching consequences for human capital, economic productivity, and national development overall. Worldwide, about 840 million people, or about 14 percent of the total population, do not have adequate food (Anderson, 2009). As a result, these people suffer from under nutrition, a condition of nutrient deficiency that causes general weakness and fatigue, stymies mental

and physical development in children, and makes people susceptible to potentially fatal diseases such as dysentery, whooping cough, and tuberculosis. The report of Anderson (2009) reports that the majority of the world's undernourished people live in China, India, Africa, and Latin America.

The most basic thing we know is that ill health, malnutrition, hunger and ultra-poverty are mutually reinforcing many states in Nigeria with the wave of these maladies blowing from north to south. Nigeria has the highest number of children less than 5 years with chronic malnutrition (stunting or low height-for-age) in sub-Saharan Africa at more than 11.7 million. This is in accordance with the Demographic and Health Survey (DHS) by National Population Commission and ICF International, (2014). Population Reference Bureau (2013) reports that at least 11 infant deaths occur every minute in less developed countries. In Nigeria, 37 percent of children less than 5 years are stunted (USAID, 2018). The prevalence of stunting increases with age, peaking at 46 percent among children of 24–35 months old. Furthermore, by 2050 Nigeria's population is expected to grow to a staggering 440 million, which will herald Nigeria from 7th to 3rd most populous country in the world, after India and China (Population Reference Bureau, 2013). A scarcity of resources and land in rural areas has resulted in Nigeria having one of the highest urban growth rates in the world at 4.1 percent (Nigeria Federal Ministry of Health, 2014). With all these empirical evidences, it crystal clear that these consequences of malnutrition should be a significant concern for policy makers in Nigeria, and city planners should now be aware of how pocket spaces can be created to grow food within urban centres growing at 4.1%.

Food security and hunger are by no means tightly-defined concepts and different definitions arise depending on the number of factors involved. The causes of malnutrition and food insecurity in Nigeria are multifaceted and include poor infant, young child feeding practices, poverty, unemployment and lack of green spaces in urban centres to grow nutritious food. However, hunger is usually understood as an uncomfortable or painful sensation caused by insufficient food energy consumption. Scientifically, hunger is referred to as food deprivation. Simply put, all hungry people are food insecure, but not all food insecure people are hungry, as there are other causes of food insecurity, including those due to poor intake of micro-nutrients. The links between poverty, hunger and food insecurity are multidirectional. Low income are the primary causes of chronic and acute hunger (Onimawo, 2010). Adequate access to food in both quality and quantity remains a concern for all fields of study related to poverty and food. USAID (2018) reports that chronic and seasonal food insecurity in Nigeria occurs throughout the country, and is exacerbated by volatile and rising food prices, this confirms that given fact that even when food availability is adequate, low income impedes access to sufficient and appropriate food to maintain healthy life style. The impact of conflict and other shocks has resulted in acute levels of food insecurity in the North East zone (Famine Early Warning Systems Network (FEWSNET), 2017). An estimated 3.1 million people in the states of Borno, Yobe, and Adamawa received emergency food assistance or cash transfers in the first half of 2017 but, because much of the North East zone has been inaccessible to aid agencies, the number who need assistance is likely much greater (FEWSNET, 2017).

Food security globally is in three (3) stages. First are those experiencing adequate access to food in both quality and quantity (food security); Secondly, people experiencing moderate food insecurity usually face uncertainties about their ability to obtain food, and have been forced to compromise on the quality and/or quantity of the food they consume. Lastly, people experiencing severe food insecurity have typically run out of food and, at worst, gone a day (or days) without eating. From all these regional experience of inevitable trinity of poverty, hunger and food insecurity, it is imperative to start seeing UA as a panacea to these issues that are now cynosure of human existence. In the same vein, it should be worthy of note that UA throughout the world is transforming itself in response to political, economic, environmental, and technological changes. Its emerging role in today's urbanising world is just beginning to be understood and quantified (Smith, Nasr & Ratta, 2010). Food security and income generation, in the context of current and prospective increased urbanisation, are some of the positive outcomes related to the widespread practice of urban agriculture as a poverty alleviation strategy.

Policy Responses and Conclusion

The increasing bane of the inevitable trinity of poverty, hunger and food insecurity is readjusting its position in many nations of the world with more dominance in developing world. The world must come to the realisation that everything else can wait and certainly not food. Local, national and international governments must as matter of necessity kick start programmes advancing global food security by helping families and individuals meet their need for a reliable source of quality food and sufficient resources to produce or purchase it. Furthermore, the advent of UA as a supposed cure all must be re-emphasized particularly amongst nations facing food insecurity and adverse weather events. Nevertheless, integrating UA into land use planning, planners, decision makers... all need to provide official recognition in policy formulation process. Legitimising UA as a use of urban land is the first step in the healing process of UA to the inevitable trinity of poverty, hunger and food security. Being able to grow one's food in urban area is one of the basic human urban right. Considering the utility importance of UA socially (inclusive city); economically (productive city); and ecologically (green and healthy city), UA must be introduced to urban centres growing at the rate of 4.1% and consuming food every day. The advent of UA will reduce farm table distance and act as carbon capture.

International communities like World Bank, USAID, UKAID, WHO, and Un Habitat will need to come to the aid of countries experiencing the wave of poverty, hunger and food insecurity through investments in growth of the agriculture sector -- *from farm to fork* -- (different stages of the food chain system and apt examination of the practices and procedures that ensure the safety of our food) as this has shown to be at least twice as effective in reducing poverty as growth in other sectors. Nonetheless, investing in these smallholder farmers—many of whom are women—and in the markets around them is more important than ever. In order to feed a population expected to grow to 9 billion people by 2050. The world will have to double its current food production. Given scarcity of natural resources and other challenges, the world will need to be more efficient in how it meets this demand. To ensure that people have sufficient food, aligning short-term assistance with a long-term development strategy can help countries feed their own people.

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