FEEDING THE CITIES: TOWN PLANNING PRACTICES AND THE FOOD SECURITY IMPLICATION ON THE SUSTAINABILITY OF URBAN SETTLEMENTS – AN INTROSPECTIVE STUDY OF METROPOLITAN KADUNA, NIGERIA

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Abstract

Historically, settlements have provided within their precincts some proportion of their food needs through household gardening and fadama farming. Such activities have previously been supported by robust urban planning regulations based on generous land allocations and flexible guidelines and tenure rights. In recent times, such planning logic has been jettisoned through infill development in response to increasing rural-urban migration, rapid urbanization, and a growing demand for housing; as well as the speculation of land by the urban elites. It has been argued that such "developmental phenomena" have negative implications on urban food security. But reliable statistics on the implications are not adequately documented and brought to the fore. This paper therefore examines how recent urban planning practices based on infill have reduced the opportunities available for small-scale food production using the Government Reserved Areas (GRA) (previously European Reserved Areas) of Kaduna-Nigeria as case study. The methodology of the study relied on field surveys and the review of government layouts and documents. The use of Satellite imageries and the GIS was helpful in determining changes and trends in open space use for home gardening. The specific findings showed that more than 50% of land hitherto utilized for home gardening has been lost to infill development; which recent urban planning practices have permitted. By this process, urban planners have indirectly denied households the opportunity to supplement their food supplies and intake through home gardening; with all the attendant health repercussions. Indeed, the current trend in urban growth in Nigeria does not accord any attention to sustainability; but urban food security is germane to sustainable cities. Sustainable urban settlements must have some ability to feed its inhabitants without recourse to food importations. Conclusively, the paper identified and affirmed that the existing practices have negative implications on sustainable urban agriculture which is central to the sustainability of cities – food wise; and there is thus the need for changes. Therefore, the recommendation was made for new policies and flexible interpretation of tenure rights to expand the opportunities available to households of cities to meet some of their food needs in a sustainable manner in a world challenged by growing food insecurity.

Keywords: **Urban, planning, settlement, regulations, food, production, security, sustainable and city.**

INTRODUCTION

It is an established fact that historically, settlements have within their precincts provided some proportion of their food needs through household gardening and fadama farming. Such activities have been supported traditionally by robust urban

planning regulations based on generous land allocations and flexible guidelines and tenure rights. But, in recent times, such planning logic has been jettisoned in response to increasing rural-urban migrations; viz. rapid urbanization and the demand for housing; as well as the speculation of land by the urban elites.

It must be underscored here that robust urban land allocations allowed for the city dwellers, the opportunity to productively engage in backyard vegetable gardening and subsistence food production. This form of continual food production practices within the vicinity of the city walls helped to reduce household food expenditure and over dependence on food imports from the surrounding rural communities; to meet nutritional requirements; and is key to the building and maintenance of sustainable cities/settlements and/or urban centers. Health advantages have also been associated with the practice, as past time farming ensures physical fitness, hence reducing stress, high blood pressure, diabetics, obesity amongst others. This has the beneficial effect of enhancing the lifestyle and improvement on the general quality of life of the city inhabitants.

Indeed, the current trend in urban growth in Nigeria does not accord any attention to the sustainability of the cities/settlements – food wise. But urban food security is germane to sustainable cities. Sustainable urban/cities must have some ability to feed its inhabitants without recourse to food importations.

Sadly, today such activities which were supported and protected by robust sustainable physical planning rules and regulations based on generous land allocations to facilitate for such small scale food production activities have been jettisoned. Consequent on the gradual reduction in plot size allocations, backyard farming activity has been rendered unattractive and unfashionable. This situation has further been compounded by the "maximization of profit syndrome" of the largely urban/city elite land speculators; who have no regard for the principles of sustainable designs and construction. The sole aim of these land investors is to maximize profit - at all cost - in return for their investment; through over utilization of the already reduced plot sizes; with no due consideration to the other needs – especially the food requirements – of the urban/city households.

Conversely, the prudent and/or wise use of space in urban planning and development can significantly contribute to governments realization that urban food security is a major issue that requires well-built policy intervention (Dubbeling *et al.,* 2010).

To underscore this point, at the moment, prices of food commodities are rising, thus aggravating the already existing food insecurity situation in Nigeria; amidst the global food crisis. Though there is no food protests on Nigeria's streets today, but in over 30 major cities of the world, sharp increases in food prices and the deteriorating access to food for the urban poor has occurred (Dubbeling *et al.,* 2010). Indeed, in many parts of the world, soaring food crisis in the past has triggered off riots in Mexico, Indonesia, Yemen, the Philippines, Cambodia, Morocco, Senegal, Uzbekistan, Guinea, Mauritania, Egypt, Cameroon, Burkina Faso, Ivory Coast, Peru, Bolivia, and even Haiti that was once nearly food self sufficient but now relies on imports for most of its supplies (Fanawopo *et al.,* 2008). Nigeria today, according to the Food and Agricultural Organization (FAO) is among the group of 36 countries in Sub-Saharan Africa in food security crisis that cannot feed itself and therefore, relies on imports of staple foods, particularly rice. According to the World Bank's current report, poor families in most of Africa and Asia spend up to 80% of their budget on food and that high food prices are a matter of daily struggle for more than two billion people; with an estimated 100million people fallen into poverty in the last two years. Nigeria is reportedly ranked 20th on the 2006 Global

Hunger Index which also indicates that about 65% of Nigerians are food insecure. That is for every 100 Nigerians, 65 have insufficient access to the amount and variety of food for a healthy and productive life; resulting in widespread malnutrition (Gabriel and Binniyat, 2008). The World Bank reported food prices are up by 83% since 2005 in Nigeria and are expected to remain high through 2015 (Sambo, 2008).

Today, cities are becoming the principal territories for innovative physical planning strategies that aim to enhance sustainable urban living conditions. And compact development is one of such strategies, which in the older areas of cities is promoted through infill. In-fill otherwise called land excision is a contemporary strategy that is distinct from old and traditional British styled practice where compact rather than expansive developments are promoted. The arguments advanced for such strategy have been based on economic advantages; but there is a growing voice suggesting that health and social (crime) implications exist from overcrowding. Without a doubt, land speculation, subdivision inefficiencies and gentrification, are all associated with compact development. Yet there are other challenges, including the urban food security implications of in-fill which has direct bearing on the sustainability of cities – food wise - that are not being envisioned, debated nor investigated. This paper therefore attempts to explore how has infill development in the old European and Non European (Native) reserved areas (ERA and NRA's) of Malali and Barnawa in metropolitan Kaduna, Nigeria has undermined the capacity of urban settlements to supplement their food needs and/or reduced the opportunities available for small scale food production to feed the inhabitants of our cities as one of the basic pre-requisite needed towards building and maintaining sustainable cities – food wise.

METHODOLOGY

This study was undertaken in Kaduna metropolis of Kaduna State, Nigeria; located in the northern Guinea savanna agro-ecology of Nigeria (latitude 09^{O} 12"N, and longitude 6^{O} 9"E). Kaduna was founded in 1915 by Lord Lugard as a small military – cum- Administrative station for the control of the conquered Northern protectorate. Its early development followed comprehensive physical planning at least in the European and township areas under the guidance of Lord Luggard. The plans were based on rigid application of land use policies following which two distinctly segregated quarters; the European and non European reserved areas (ERA and NRA's) were established. Since independence, Kaduna has grown rapidly and is today challenged by an increasing influx of people (rural-urban migrations) and thus rapid urbanization. Its current population has been estimated at 1.2 million people. This growth overtime, has placed significant pressure on the city's available land resources. And rather than being accommodated in new neighborhoods, the successive governments have responded by in-fill development of the former European reservations which were adjudged to have excessive and "wasteful" lands. The European Reserved Areas (now GRA) and the Native quarters (Ali Akilu) are the two areas were the largest excisions have been made in Kaduna to accommodate new developments; and were therefore chosen for the case study to show how the in-fill policy has jeopardized planning, home gardening and thus the ability of such cities to be self sustainable in basic food production needs – urban food insecurity.

The study was based on physical surveys and review of approved layouts in two selected neighborhoods planned under colonial rule but which have sufficiently been altered over time. Principally the use of satellite imageries and physical

inventory of new developments were undertaken to supplement the information obtained from official documents including past proposals and physical development manuals. Much use was also made of cadastral sheets and the use of the GIS to determine the combined effects of in-fill development and the way the practice has facilitated the reduction of the opportunities and capacities available for small-scale food production in the Government Reserved Areas (GRA) of Kaduna-Nigeria.

RESULTS AND DISCUSSION

COLONIAL TOWN PLANNING AND THE EMERGENCE OF INFILL IN NIGERIA

Colonial town planning practices were carried out based on township ordinances and by use of policy tools like the master plans, zoning, subdivision regulations and building codes etc. The first town planning law in Nigeria was promulgated in 1863 for Lagos, to control development and urban sanitation. Colonial approaches to physical development from this point began to replace the traditional instruments for land use management that were structured according to local customs and tenure systems. In this period, urban planning was dominated by physical land use, planning and urban design; with the primary purpose of creating a suitable living environment for the European colonial administrators and their workers. Laws, memoranda, directives and ministerial guidelines were the tools the colonialists used to ensure that land use was in conformity with official policies (Urquhart, 1977). Outside Lagos, the township ordinance No. 29 of 1917 constituted the first national attempt at creating spatial order for cities by legislating on the creation of well laid out European Reserved Areas (ERA's) and Native Areas (NA's) called Townships. In the northern Nigeria, memorandum No.17 of 1906, Lord Luggard set out the planning guidelines by which the ERA's and Native Areas were to be developed. It was aimed "that all British officials should live near each other, viz. that dwelling houses should be 40 – 80 yards (36 – 73 meters) from each other and at a distance as far as one mile (1.6 km) apart" (Urquhart, 1977). On the European Reservation, house plots were to be approximately 90m^2 (ninety meters square) and bungalows spaced at 25 meters distance from the road and 55 meters from the servants' quarters or stable. This space, according to Luggard is large enough to be kept clean and in good sanitary condition; and adequate to secure privacy through the planting of trees in – between houses (Luggard, 1906). No plots were left vacant (thereby avoiding "leap – frog" development); thus evolving a composite development where each adjacent plot was developed and occupied. In each plot, adequate care was taken to place the building in a way that gardening is generously provided for. In the Non European Reservation (NER), plot size varied from 25m^2 (twenty five meters square) to 45 x 90 meters. This made the layout less specific since plot sizes were not standardized. Each plot size of about 45 x 135 meters carried between four and five families. Plots coverage within the NER was not allowed beyond 50%. Generally, generous lots were the major foot prints that provided for privacy, outdoor life, flower and food gardening.

Ever since independence, new town planning practices associated with compact development have been promoted through either infill in ERA's (Gordon and Richardson, 1997); or through creation of tiny lots in new neighborhoods. In-fill is the neo-traditional planning approach by which land is subdivided to accommodate a much greater number and mix of housing types. Schultz and Kassen (1986) defined it as a residential or non-residential development that occurs on vacant sites scattered throughout the more intensely developed areas of cities. Communities in that sense

are seen to have significant vacant land within their limits which for various reasons have been passed over in the normal course of urbanization; but which now have a need to be utilized. In a completely different sense, in-fill is also viewed as the creative recycling of underused properties (shopping complexes, buildings, etc) or as the pulling down of a property and re-developing it in a manner for more intense use.

Viewed as a growth management tool, in-fill became widespread in the early 1980s as alternative to sub-urban sprawl development which was associated with the colonial era.

In the USA, in-fill programs have been planned and carried out in the late 70's in Chicago, Dallas, Denver, etc. through the promotion of site re-use (MRSC, 1997; Karen Anderson-Bittenbender, 2001); and in Botswana as a means of creating new housing opportunities (David and Clarke, 1996). In Nigeria, in-fill was first carried out in 1980 under the Nigerian States Urban Development Program (NSUDP); in the Makama Urban upgrading program in Bauchi state (NSUDP, 1979). Today, in-fill development has occurred in almost every major urban centre in Nigeria, and its principles of compact development have equally been carried forward in the planning of new neighborhoods.

Distinct from the colonial experience where large plots are permitted, the foot prints of in-fill are tiny subdivisions of between 300m^2 and 900m^2. New urbanites associate this trend with the conservation of peri-urban space for agriculture, energy and environmental savings, cost effective and efficient infrastructure and service provision, and land re-distribution. Criticisms of such positions however have come by arguments that compact development has potential effect on livelihoods through diminishing the possibilities for food production through household farming; for healthy living; and thus, the ability of cities to be self sustaining – food wise.

INFILL DEVELOPMENT IN THE OLD ERA'S OF KADUNA AND FOOD SECURITY IMPLICATIONS:

a. Infill in the old Malali – Barnawa European Reserved Area.

The Malali-Barnawa European Reserved Area is a low density residential area equated with the officer quarters of the colonial Government. It was created between 1917 and 1927 and provided for 562 lots on about 640 hectares of land. Plot sizes in the neighborhood varied between one and two hectares with the majority covering 1.5ha (see table I). The in-fill that occurred in the area began shortly after independence when new layouts were created from cultivable land adjacent to the European quarters. The first excision in 1963 consisted of small layouts of between 2 and 25 plots created on empty pockets of land, and especially from the conversion of the Kalapanzi barracks (relocated) into a residential layout of 26 plots in what now is Kalapanzi terrace and Kalapanzi Avenue. By 1965, the total new subdivisions had risen to 221. At this period, new excisions covered approximately 0.5ha in area per plot.

Table I: Shows plot size distribution in the European Reserve Area (ERA)

Plot Size Category (ha)	No. of Plots.	Area (ha)	%
1.5 and above	116	185.6	29.0
1.2 – 1.5	132	184.8	28.87
0.8 – 1.2	206	206.0	32.19
0.4 – 0.8	106	63.6	9.94
Total	560	640.0	100

*Average plot size is 3.0 acres (1.2ha)

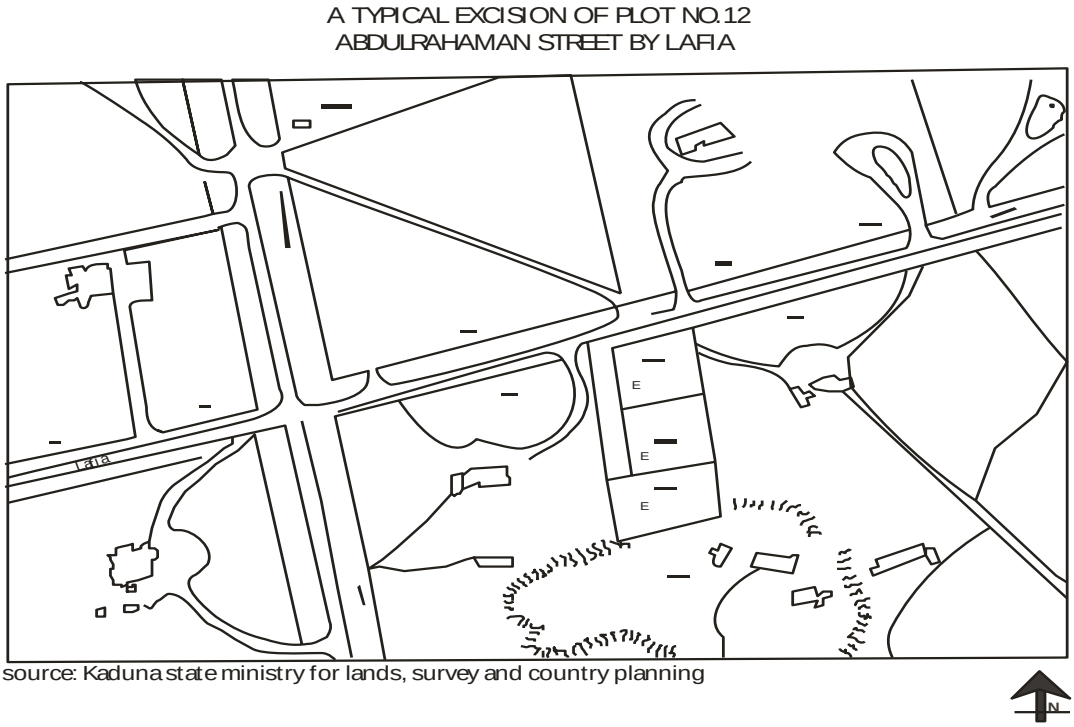
From 1970, in-fill in the area followed partly the recommendation of the Maxlock Plan (1967 – 2017), that existing large (about 1ha) plots referred to in the report as "wasteful sites" be further subdivided to permit the accommodation of a much larger number of dwellings (Maxlock Group Nigeria, 1967). Although not immediately implemented nor properly articulated as a policy, in-fill was later to become a more regular affair from 1981. In that year, 43 plots each on about 0.25ha were excised to provide for additional housing for public civil servants. Between 1991 and 2009 a further 519 carve out plots were made (see table 2). As shown from the table, the trend in in-fill development generally became active in the early 2000. Since 2004 however, in-fill has declined drastically.

Table 2: Shows the trend in carved out Plots (1963 – 2009)

Year	No	Average plot size in hectares	%
1963	221	0.5	22.22
1981	43	0.25	11.11
1991	62	0.25	11.11
1992	59	0.20	8.89
1994	19	0.18	8.0
2000	57	0.18	8.0
2001	50	0.15	6.66
2002	92	0.12	5.33
2003	96	0.10	4.44
2004	84	0.08	3.55
2005	22	0.08	3.55
2006	12	0.06	2.66
2007	8	0.05	2.22
2009	11	0.05	2.22
Total	880	2.25	100

It appears the possibilities for further excision has diminished. The largest decline had been from 84 in 2004 to 22 in 2005 and then further down to 11 in 2009. Other than the decline in the number of excised plots, there has also been a gradual decline in plot size over the years; from 0.5ha in 1963 to 0.05ha in 2009. The pressure for in-fill development in this area has come about mainly as a result of economic considerations from low cost housing construction budgets - as basic infrastructure is already available and well maintained. There is also the prestige associated with its history and the fact that government, after independence desired to accommodate the new and expanded senior cadre of the Nigerian Public Service in the old ERA's rather than in newly planned neighborhoods (see Fig. 1). In the original plan plots in the old ERA of Malali-Unguwar Rimi were to be developed at a Floor Area Ratio (FAR) not exceeding 60%. That is about 40% of the plot area is to be kept as open space for horticulture, home gardening and recreation.

Figure 1: Shows a typical plan on the excision of original plots on plot no. 12 Abdulrahaman Street by Lafia Road, Kaduna.



source: Kaduna state ministry for lands, survey and country planning

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b. In-fill in the Old Non European Reserved Areas (Ali Akilu Housing Estate)

The second case study covered the Ali Akilu housing estate. Previously Lord Lugards' junior service quarters (for clerks and artisans). The estate is in two parts (Ali Akilu East and West). It was constructed as blocks of row housing between 1913 and 1917. Ali Akilu East covered 9.1 hectares of land with a provision for 42 housing units. Each house occupied 0.21ha of land. The western Ali Akilu, originally had a provision for 49 units on 9.3ha of land; with each plot occupying 0.17ha. Going by the colonial plan, no plot was to be developed beyond 50% of its size, implying in that sense, that half the plot size is to be open space for landscaping, horticulture, home gardening and other related activities.

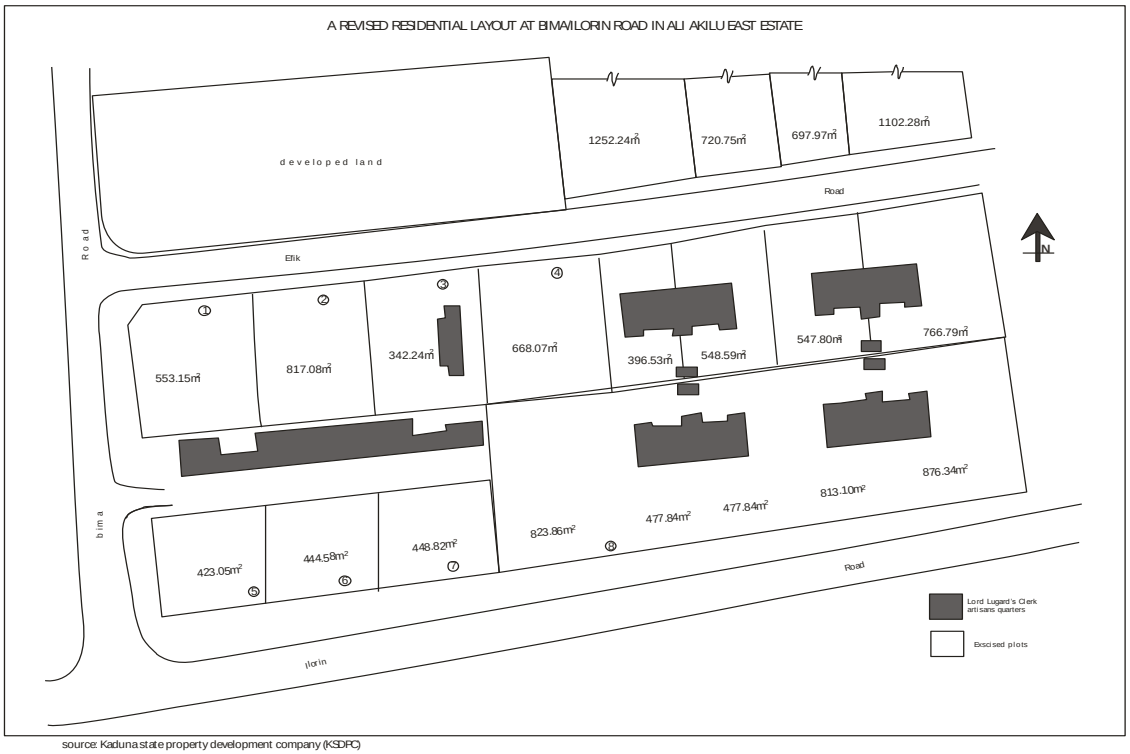
On these two sites, in-fill development began in 1986 with the preparation of re-development plans through which 120 new plots were excised from Ali Akilu East and 101 in the West. Following this excision, the average plot size declined to 0.08ha in the West and 0.07ha in the East (see table 3). Also, residential density, defined as the number of dwellings per hectare of land dramatically increased from about 6 to 18 dwellings units per hectare.

Table 3: Shows the distribution of in-fill plots in the Old Native Residential Area - NRA (Junior Staff Quarters)

Estate	Area coverage (ha)	Initial plots (No.)	Housing density	Average plot size (ha)	New in-fills (No)	Revised density	Average plot size (ha)
Ali Akilu East	9.1	42	5/ha	0.21	120	17/ha	0.07
Ali Akilu West	8.3	49	6/ha	0.17	101	18/ha	0.08

As in the Old European Reserved Area previously discussed, in-fill in the Ali Akilu estate has also been the response to pressure for serviced land. But in this case, the economic motivation was even much more obvious: the Kaduna State Development and Property Company - KSDPC (a quasi private company established by government to manage the properties on market principles) saw the opportunity of raising income through the sale of excised and serviced plots. Contrary to its original status, Ali Akilu Estate is now an elitist private housing neighborhood (see Fig. 2).

Figure 2: Presents the plan of a revised residential layout at Bida/Ilorin road in Ali Akilu East Estate



source: Kaduna state property development company (KSDPC)

THE FOOD SECURITY CHALLENGE OF INFILL DEVELOPMENT AND SUSTAINABILITY OF PLANNED URBAN SETTLEMENTS

Generally, it was estimated that excisions in the two case studies had collectively taken away about 80ha of open spaces hitherto utilized for horticulture or home gardening. Out of such spaces, the fresh food supplements of households (Tomatoes, Bananas and Plantains, Capsicum pepper, Groundnut, etc.) and at times the more basic needs as (Maize, Sweet potatoes, Cowpea, etc) have been supplied.

Therefore, based on some varied number of crops usually grown on home gardens and the crop yields in these areas, the potential loss of produce resulting from infill is estimated (see Table 4).

Table 4: Presents the potential loss of some home garden produce resulting from an estimated 80ha loss of open space to in-fill

Crop	Crop Yield (Kg/ha)	Total Crop loss/80ha loss of open space to infill (tones)	Total loss/acre of land converted to residential development due to in-fill (tones/*acre)
Tomatoes	10,000	800	4.05
Bananas & Plantains	20,000	1,600	8.10
Capsicum pepper	2,000	160	0.81
Cowpea	1,000	80	0.40
Groundnut	5,000	400	2.02
Sweet potatoes	12,000	960	4.86
Maize	2,000	160	0.81

*one acre = 0.40ha

It is projected that about 8.1, 4.05, and 0.81 tones of produce is lost from Bananas and Plantains, tomatoes, and Capsicum pepper respectively for every acre of land converted to residential development (Table 4).

In addition, a further survey to establish how much of home gardening currently takes place on excised plots revealed that of the 1,450 plots surveyed only 16% have any form of gardening taking place; and of this only 4% was devoted for food (produce) gardening. Besides, in 70% of the cases, the floor area ratio (FAR) - which is the total coverage of the building as a proportion of total plot area - was 70% in the old ERA's and 85% in the NRA's. This is much higher than the 55% allowable by the Urban Planning Board for low density development and 65% for high density residential neighborhoods. The consequence of all this, is that in their current form, open spaces available in excised plots barely permit parking and basic circulation, and almost nothing of home gardening.

Further findings of this study revealed that, a loss of about 4.0 tones of tomatoes produce per acre as a result of infill, equates to a loss of about ₦ 200,000.00±; and this could be up to ₦ 500,000.00± (or more at pick periods) in income accruing to the family from home gardening; when the two case scenarios are considered.

In fact, when opportunities as this, are lost for gardening, certain repercussions on household expenditure are known to arise. Though this has not been purposely determined in this study, but taking into account the average expenditure bill of households in Nigeria at about 80%, a saving of up to 10% which is possible through home gardening can free resources to boost family incomes which could be committed to financing family health care, housing and electricity bills, education etc. leading to some level of food security for the household or the family unit in a sustainable manner.

To underscore this point, sustainability in a system has been said to incorporate concepts of both resilience (the capacity of systems to resist shocks and stresses) and persistence (the capacity of systems to continue over long periods), and addresses many wider economic, social and environmental outcomes; while, food security can be defined as a condition where "all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life." And indicators of food insecurity in a given region can be said to include number of "hungry" or malnourished people, of underweight children and of people

suffering from micronutrient deficiency (UNCTAD, 2008).

Indeed, the larger understanding of the concept of food security begins with the consideration of the household as a fundamental unit. They need to be able to get the food they need to be healthy and active – wherever they get it from and however it is provided. Consequently, household units depend on their incomes; savings and the other assets they have, and the present cost of food – for children, that depends on the amount of food they are given. Without a doubt, the focus on household food security is not misplaced because it is the basic earning and decision making unit on which the most nutritionally vulnerable people (i.e. the infants and small children, pregnant and nursing women etc.) depend (Hubbard, 1995).

In this regard, a food secure *household* is defined as one which has access to enough food for individual members to lead a healthy life. At the *sub-national*, *national* and *global* levels, food security is the assurance of access for all to an adequate food supply. Critical to the understanding of food security is recognizing that it hinges as much on lack of purchasing power and entitlement as on variable supply. This implies that, to guarantee food security, what's required are long-term solutions which take into account the socio-economic, environmental as well as the political factors in which the people live. What is important for households and individuals is the *availability* and *adequacy* of food intake; and this intake can either be produced or procured (Alamgir and Arora, 1991). No doubt, food insecurity at the household level means extreme poverty: not being sure that the family will have enough to eat if incomes fall, prices rise substantially, or the family increases. And this is the direst form of poverty – in recent times called food poverty (Hubbard, 1995). Increasing urban poverty goes hand in hand with growing food insecurity and malnutrition in cities (Dubbeling *et al.,* 2010). Therefore, the promotion of such innovative planning policies and programmes that enhance urban and peri-urban agricultural production will go a long way in building sustainable cities or urban centers which can feed themselves without recourse to food imports. This complementarily reduces the impact of global hunger, poverty and food insecurity (Sambo and Odion, 2011).

CONCLUSION AND RECOMMENDATIONS

CONCLUSION: Urban planners have bought into the debate for compact development without adequately exploring the potential implications. Compact development no doubt has its economic arguments not all of which makes sense. The advantages of cost effective supply of infrastructure when compact development is promoted at the town level, does not always add up in the equation, which it is considered that there are economic costs to health and livelihood challenges resulting from congested living environments (pollution, noise, etc) and household food expenditure when opportunities are diminished for home gardening unlike for cities lacking sufficient expansion areas, Kaduna has within its territory attractive opportunities to expand based on sustainable development planning principles that balance up economic social and environmental objectives. Not only have planners been slow in creating new urban districts the few created after independence have been based on land subdivision guidelines in which small lots and high density developments are promoted. Now that in-fill has gone the full circle (as possibilities are exhausted) and the implications of small subdivisions are known regarding food security challenges for building sustainable urban settlements/cities; new strategy would be

required in improving urban planning for sustainable developmental outcomes.

RECOMMENDATION(S): From the foregone, it is conclusively affirmed that the existing subdivision regulations should be reviewed in line with current realities. More generous plot sizes ought to be permitted and FAR's revised and strictly enforced to ensure that social and environmental objectives of livelihood are adequately protected. In this context high density plots of 15 x 25m should be revised upwards to 25 x 30m as minimum and FAR strictly enforced at not more than 60%. By this, sufficient open spaces will available to permit for home gardening, recreation and other associated activities. Such action will enhance livelihood in the cities by expanding their capacities to meet some of their food needs in a sustainable manner; in a world challenged by increasing food insecurity and unsustainable planning practices cum agricultural policies and programmes.

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