

City Planning, City Growth and Food Security: The Inevitable Trinity in The Nigerian Food Equation

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Abstract: In Nigeria, the rising urban population is a reality that need be acknowledged as it presents multidimensional challenges for every aspect of life and especially the food situation and security. There is the un-abating land use change resulting in the shrinkage of land for urban and peri-urban agriculture. Owing to increasing population and land use change, per capital food supply is on the decline. Despite the fact that length of fallow period keeps reducing or is virtually non-existent, the proportion of the urban poor is on the increase and impulsively, peri-urban agriculture and urban agriculture have emerged and are intensifying expectedly. This will assume greater importance in the years ahead. Using elaborate literature search, this study presents a scenario of urban land use and land use change as affected by land tenure systems, land values, urban population dynamics and urban areas as vast nutrient sinks. All these imply fertilizer imports and nutrient recycling if food supplies from urban and peri-urban agriculture (UA and PUA) are to be sustained. The implications of population characteristics are discussed as it affects food security. The nature of PUA is examined to know its contributions to the urban food equation. The promises and threats of PUA as safety valves in the food equation are alluded to in the study. The concluding discussions dwell on a number of issues. These include policy goals and implications for PUA, with regards to population equilibrium, food and job security, poverty alleviation, gender sensitive support for women and the full utilization of sound land management principles. These are with the view of obtaining optimum yield from this inevitable trinity.

Key words: Food equations, land use change, land tenure, food security, nutrient cycle, sustainable cities

INTRODUCTION

Until the last 50 years or so, most of the Third World had few large cities and the majority of the population lived in rural settings^[1] affirm that the world's population is becoming increasingly urban and the pace is particularly phenomenal in African countries and cities. In most studies the proportion of population living in urban areas exactly doubled between 1950 and 1985. In the same vein,^[2] also submitted that while the population of the developed world grew by 41%, the developing world grew by 117% between 1950 and 1985. Gilbert and Gugler (op cit) were to add that the population dynamics all over is fuelled essentially by changes from the countryside, high rate of fertility, falling death rates and un-abating city-ward migration hence most African societies transform numerically from rural societies in two or three decades. This submission is particularly true of Nigeria and other cities south of the Sahara.

The early cities were compact, self sustaining and contained a handful of administrative and religious elites, supported by an over-whelming rural folks and agricultural surpluses. Cities today are thoroughly heterogeneous, sprawling and spilling on hitherto rural

and peri-urban agricultural lands. Critical issue is the fact that this growth is accompanied by a rapid growth in the number of urban inhabitants who live on marginal existence^[1]. Reveal that between 50-78% of urban dwellers constitute the 'urban poor' hence he described the phenomenon as 'urbanisation of poverty'. The increasing proportion of the urban poor aptly portrays Third World urbanization as simple demographic re-engineering involving a shift in base of rural poverty and technology. Given the emerging city growth -population nexus, cities now extract food resources from increasingly far farmlands and over stressed intra urban landmasses for their energy needs.

The study now discusses the food situation in Nigeria, land tenure and the urban population dynamics in Nigeria. It further discusses consequent land use changes in cities and the suburbs as well as the implications for food security.

The food situation in nigerian economy: Agriculture remains a major contributor to the Nigerian economy in terms of its GDP contributions and employment generation. Between 1960 and 1965, agriculture contributed over 59% to the nation's GDP. This fell to

Table 1: Percentage of total populations in urban areas of Africa-by-regions 1950-1985-2000

	1950	1970	1985	*2000
East Africa	5.3	10.3	18.1	20.0
Middle Africa	8.1	24.8	35.6	32.2
West Africa	9.5	17.6	24.9	35.0
North Africa	23.2	36.5	42.1	46.0
South Africa	36.5	44.1	52.5	42.0

Sources: UN (1982, 1988) Demographic yearbooks, *PRB (2000) World Population Datasheet

53% between 1970 and 1971 and 49% by the end of 1974. The decline continued till the early 1980s with agriculture accounting for only 22.4% GDP contributions^[3]. Furthermore, the nation embarked on major importation of food items. By 1991 and 1995, there existed a minor up-surge in the data sheet which can be attributed to the macro-economic policies of the structural adjustment programme years. It need be stressed that agriculture when well tendered, will generate needed foreign exchange, industrial raw materials and food produce for domestic needs; more so that agriculture since inception of life has served as man's supply of food and energy requirements.

To maintain humanity, agriculture (food production) must at least hypothetically match the pace of human population growth across the nations. The PRB^[4] population data sheet has given these growth rates for Africa and Nigeria as 2.4 and 2.8%, respectively and 1.4 and 1.7%, respectively per annum for the world and the developing world, respectively. By implication and for bare survival therefore, food production must not be at a pace lower than these Figures, else crises will set in since man needs more than survival. In most studies, production rate falls below this population growth rate, hence crises situation creeps in. This imbalance implies a difficulty for the individual-especially in Nigeria and countries of the developing nations-to achieve higher quality of life through nutrition or higher income. This shortfall amounts to a food crisis or an imbalance in the food supply equation.

Food production shortfall in Nigeria can be attributed to a number of factors, among which are: the small production units, backward production techniques, inadequate mechanization in areas suitable for it, inadequate use of fertilizers and pesticides, inadequate political will or lip service as well as defective tenure systems among others. Among this gamut of factors, the land tenure system is highlighted as a town planning management problem in this study.

Land tenure: Agricultural practice at inception relied on food gathering and hunting. Man's maximum contributions to agricultural development do not go beyond eliminating infestation and prevention of degradation (in storage) by animals in his environment. This arrangement over time grew to be a tradition or

custom whereby man has the oversight of an area in consonance with a pattern which the community implicitly or tacitly agrees with. The individual thereby establishes a right of use over particular areas of land; hence we now talk of traditional or customary land tenure system.

Traditional formal description sees land tenure as the right held in land or rights to land. This has been defined as:

‘the relationship of man to soil in the widest sense, in so far as it is laid down in native laws and customs and in the measure in which it controls political life, affects the performance of public ceremonies and gives access to opportunities^[5].

A part from granting a framework for economic use of land in conformity with native laws and customs, the tenure system constitutes a means of administrative control of the socio political life of the community. In this regards, land entails territorial and cultural elements, the values and the belief systems in an area attached to the use of specific areas of land. Malinowski ⁽⁶⁾ went on to say that Man's tenure relations transform the land. Human beings subdivided the land, classify it, apportion it and encapsulate with legal ideas, sentimental and mythological beliefs. Against this background however, the development control machinery in Nigeria allows for use of land within built up areas and the neighborhood to be devoted to agriculture. The Town and Country Planning law (CAP 123) WNLN 60 of 1961. The use of private open spaces for Urban Agriculture in the coinage:

For the purpose of this study of the scheme, land shall be deemed to be used as a private open space if and only if it is used.

- As an ornamental garden or pleasure ground or as a private ground for sports.
- As a farm for low growing crops, or grazing land and market gardens (horticulture), other than land used wholly or principally for the purpose of a plantation forest or firewood plantation.

Western Nigeria legal notes, cited in Ola (1977): In the same light, the Master plan-Kaduna, 1917 -1967 -2017', one of such earliest documents for any Nigerian urban center in principle, allows for the creation of the satellite agricultural towns to house about 35,000 people outside the main city core to produce and supply cheaper farm produce from nearby farms and forests than that brought expensively from distances to feed the town's anticipated over 200,000 populace. This no doubt is an embrace of integrated Peri Urban Agriculture within the planned system of the future city.

It is in this regard that land use planning, controls and regulations in the sense of physical planning administration become relevant. Land Tenure and prevailing land use can be seen to be multi-dimensional and responsive to prevailing land values. Since agricultural production is genetically and inextricably interwoven with mother earth, man's social relations with land for material needs demand our attention any day. Land and land use become the fundamental basis of the social and economic existence of Man, hence its use is aligned with the social attitudes of man, the restrictions of the orbit of free will or the relative freedom of individual action vis-à-vis the absolute and proprietary rights of the community.

The role of market forces -demand and supply -also operates on the use to which land is put. Land and its use being a commodity, traded in the land market, where efforts needed to make land productive and the net income accruable over time determines what is invested in or not. Chapin Jr^[6] affirms that changing culture bound phenomenon such as traditions, customs and beliefs influence land use pattern. This is a reflection of the value system, hinged on the potential ability of land to produce satisfaction or income over time. Until PUA and UA values can be made appreciable by direct Government interventions, these two sources of input into the food equation will remain in the backwaters of relevance.

Urban population dynamics: Urbanization in the sense of 'the relative increase in the urban population as a proportion of the total and its consequences has been one of the most widely discussed social issues these last three decades. From the reckoning of Harpham *et al.*^[7] the principal causes of urbanization remains uncertain. However, rapid city growth are explained in the light of rapid rates of population growth pressing on limited land available for farming, thus pushing landless labour into the cities and economic forces pulling migrants into the cities Harpham *et al.*^[7]. These amounted to the 'push and pull' theories, which occasion rapidly changing characteristics of the urban population structure in the cities.

Urbanization in the last two or three centuries has been tied to the use of fossil fuels such as coals in factories and the rail system. This engendered the first industrial society^[8]. Chemical energy in oil also made massive urbanization possible. This attracted so many people to the few vantage centres hence^[9] saw industrial revolution as dramatically reversing population distribution between village and the city. Until recently vast majority of the population lived in villages. A small minority of the population mainly the ruling class inhabited the cities. Shifts all over in the population dynamics even at local levels reveal a cause of alarm and

a pointer to the need for more aggressive feeding plans. The World Wide Fund for Nature (1986) believe that man's nutritional deficit is such that by about 2025, humanity must produce three times as much food as it does today, to balance her food demands. Hence every avenue that contributes to the food equation must be exploited. Unfortunately, modern techniques of the modern man do not seem to provide the needed respite as the environmental basis of food production is being destroyed through regional and urban land use change, land and sea pollution, soil erosion, habitat loss and other human aggressions against the environment. The influx of the population from the rural countryside and their biological growth crowd the cities. Shanty developments are placed on available marginal spaces of land which otherwise would have been put into urban agriculture use.

It need be mentioned here however that the city management paraphernalia- The Town and Country Planning Authorities -recognize and enshrine the development of Urban Agriculture and Peri Urban Agriculture *ab initio*. From the days of Ebenezer Howard and his Garden City Movement as well as the other founding fathers of the town planning profession, (Titus Saltaire, Cadbury and others), working men's districts were built with provisions for gardens and elaborate green areas for ornamentals and horticulture. These were cities plans, looked upon as watersheds of inspiration in the planning practice in Nigeria. Contemporary examples in Nigeria can be drawn from the contents of the 'Kaduna-1917-1967-2017-a document that governs the growth of Kaduna city as well as the Town and Country Planning laws (CAP 123) WNLN 60 of 1961. The Somolu-Ilupeju Scheme Order^[10]. The two documents among many others -as stated elsewhere make statutory provisions for Urban Agriculture and Peri Urban Agriculture (UA and PUA). Increasing urban population however crowds in on every space. This is more so the studies as land values heighten and uses more valued than agrarian use displace Urban and Peri Urban Agricultural land uses to farther and less valued sites. Essentially therefore, a major challenge of the conspiracies of rapid rate of urbanization, the tenure system and changing urban land values is the organization of sufficient food supply on a sustainable basis for our cities.

Food equation, urbanization and agriculture in nigeria:

The food equation in Nigeria thrives on the following important indices namely :

- The natural processes on which the technology of agriculture is based
- The performance of the agricultural sector of the Nigerian economy in the 20th century.

- A few of the factors that have affected agricultural performance
- Suggestions for improvement of the natural performance of the agricultural sector and
- The role of biotechnology in the daily bread equations.

The above will only be functional when the basic photosynthetic production in plant communities is guaranteed. While in places like USA, food is sufficiently abundant that in order to stabilize and increase farmer's incomes, the government has found it cheaper as far back as the 1960s to pay farmers money in order to;

- Reduce hectares of land put to the cultivation of feed grains (maize, sorghum, barley and oats), wheat and soybeans.
- Store a portion of these farm products for sometime after harvest rather than make them available for sale immediately and
- Divert farmlands for the production of other crops^[11].

In contrast to this, food is becoming increasingly scarce and luxurious in Africa, Latin America and Asia. Literature now affirms that the area of grain-land supporting each person is less than one-sixth of a football pitch. Loss of grain-land is steadily being attributed to competing ancillary land uses or urbanization. More land is now needed for housing development as well as infrastructural outlays. Urban pollution also distorts the photosynthetic process of aquatic communities, which thrive on phytoplankton, algae, etc. The changes in diet from monotonous grain or starch base to more meat, fruits, etc., which require more land support, complicate the situation the more. Further more, our paradox lies in the fact that we are feeding more people today, than as at any other time in history and there are more hungry people today (the urban poor) than at any previous time.

The population story need be alluded to. This is usually described with 2 simple curves the J and S curves. With the J-curve, literature affirms that it took the world up to 1850 to attain the first billion population mark (Miller Jnr.,^[12]) but only 80 years to make the next billion. Thereafter, the doubling time in years gets drastically reduced over time. Given a system as we have in the world, when overpopulation occurs relative to resources available, there is a threat of population crash through starvation, diseases and other man-induced catastrophes. With the lower animals, physiological adjustments that reduce fertility set in. This is not the case with man. The population increase poses a great

threat to the global ecosystem and the national subunits especially in less developed countries as Nigeria.

The basic source of food for man lies in the chemical process of photosynthesis. Glucose is produced as a primary product of photosynthesis in the presence of light and chlorophyll as the catalyst. Since science have not succeeded in extracting active chlorophyll in its active form nor synthesize it in-vitro, care need be taken in the way we defoliate or deforest the environment, especially with regards to urban growth and expansion. It is only when science achieves any of these 2 conditions above that we can balance the food equation at will; more so that agriculture (food production) is the exploitation of the photosynthetic process.

As earlier mentioned, the rate of urbanization of Nigeria is phenomenal. Owing to this, there is an intense pressure on demand for urban land and consequently, the build up to city spaces and steady encroachment of other urban land usage on hitherto urban and peri-urban agricultural areas. There is a profound change in man's attitude toward land and living room, owing to the current urbanization of life. For the urban man, there are problems of effective use and organization of his space, while the needs such as land for producing food, has not ceased to be a prime concern.

Urbanization has not reduced the need for population control; rather it has brought a shift from a predominantly rural existence to a predominantly urban one, changing a situation of land hunger into one of land abundance. Man's old drive for outward expansion can now be redirected towards intensive expansion opportunities for work and living within same region and of cause an onslaught on urban land masses for urban agriculture. This development brings about a steady loss of the biological base that supports the communities. Multiple non-wood food products - leaves, roots, fruits, exudates, small and big animals all nutritional complements -are all endangered.

It can thus be stated that the high population growth rate and urbanization rate constitute great challenge for food production especially from urban and peri-urban agricultural sources in the country. This is quite significant as UA and PUA account for example, for about 70% of fruits, vegetables and ornamental plants grown on urban land^[13].

Without the urban and peri-urban contributions to the city's nutrient intake, the challenge of feeding the cities will be enormous. For a city of about 4 million inhabitants, food requirements average about 3000 tons / day. This implies about 2 three-ton trucks entering the city every 3 minutes. Staple food materials, vegetable,

fruits, fish, meat and all that are needed originate from different areas.

Food security readily poses a logistical challenge in view of transportation, city traffic, sheer quantity and variety needed, handling etc. The local contributions of UA and PUA sources should therefore be preserved and encouraged at all times.

Dynamics and challenges of ua and pua: In anticipation of a sustained growth in population, food product must double within the next 30 years. The natural resource to produce this such as the soil, water, diversity of crops and livestock are finite and vulnerable to degradation. Between 1950 and 1995, rapid population growth reduced by half the amount of cultivated land per person, empirically from more than half an hectare to barely one-quarter hectare per caput. Apart from this, only 1.1% of world's land is really suited for agriculture - (though this varies from country to country), land per person will therefore continue to shrink in the face of other competing land uses.

Expanded agricultural production especially within the frontiers of the urban setting will have to continue against resource limits. UA and PUA may be expanded to fragile and marginal lands while intensive farming will have to strongly contend with the use of organic and inorganic farm supplements to boost agricultural production. UA is quite wide spread and almost a permanent feature of the landscape in many cities. This is reflected in the acreage of land farmed within and around built-up space in the cities and the number of urban residents engaged in UA. We see subsistence farming manifesting itself all over. Vegetables, food crops, poultry, goat keeping, fish farming, help supplement income of the urban dweller. The use of organic wastes-human and animal wastes -for food production or as fertilizer is on the increase. This however, is a negative factor as the possibility of diseases transmission, which will negate the gains, is quiet high. This is more so the case as organic fertilizers contains large quantities of pathogens.

There is the desperate need to discover and minimize the environmental impacts of intensification of PUA and UA. There is the need to increase productivity and production from these sources, while at the same time reducing pollution and environmental resource degradation. There is the need to reduce soil erosion and improve management of irrigated areas.

DISCUSSION

In the light of the discussions of this study, it appears population drift is a menace we have to live with particularly in the urban centres. This by implication

means that more intra urban spaces and peri-urban spaces will be 'eaten' up to service the soaring population. It is also clear that more of the population that drifts into town will be in the class of the urban poor, for whom every need is desperate. It is clear too that the contribution of food materials from UA and PUA are indispensable where the sustainable existence of our cities is a priority.

Attaining food security in view of unabating population change and land use change is a complex task. This primary responsibility lies with the government. Clear-cut policy initiatives must be set in motion that will address among many factors :

- The 'push' factor in the rural centres. These may include the creation of the enabling environment for rural dwellers to be fulfilled in the rural countryside. There should be sound policies that make for general peace, social, political as well as economic stability. Issues of equity and gender equality should be addressed. When put in place, this will aid rural revitalization and thus help slow down and redress the rate of rural-urban migration.
- Ecologically sound, participatory land use planning that identifies and mitigates environmental impact of increased population related activities should be done. This ensures compatibility of activities and guarantees biological support of the environment. This is crucial to the food equation.
- Socio economic policies that encourage producers to manage soil fertility and moisture, pest population and biological diversity through integrated management systems should be done.
- Government should also invest aggressively in human, capital and rural infrastructure by integrating research findings, education and extension. Farmers should be helped to adopt environmental friendly food production methods.
- Continuous environmental assessment, monitoring and evaluation of the impacts of food production practices and the feed back of this information to policy makers and producers should be encouraged.
- Urban and Peri Urban Agricultures should be granted security of tenure in cities. A step further in this direction is to institutionalize Urban and Peri Urban Agricultural practices in the country. These farmers should be known by their unions or associations, registered and suitable sites for their use properly inventoried by Government and preserved for exclusive agrarian uses. Such sites will include extensive inland valleys and marshlands. This asides granting food security, will control urban floods. It will place check on the use of flood plains and river valleys for uses they are least suitable for, which in the name of changing land value will be encroached upon for residential development.

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