

Agriculture for Urban center

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Abstract

Lagos state is the most populous city in Nigeria, a home to 21 million people (10.6% of Nigeria's population) despite occupying less than 0.4% land size in the nation. The increasing population is a big stress on agriculture, with large competition for land, impact of climate change, lack of funds and insurance for the farmer as there is increased poverty amongst the farmers. There is a need to find a way to increase food production in the city - technology and artificial intelligence gets to play a key role in this. Soilless farming will be a way to ensure vegetables and cereals which ranks as second and third greatest import into the state can be produced locally in the state thus ensuring food production is healthy for the farmers, the consumers and the environment as well ensuring food production is not seasonal because hunger is not seasonal.

Keywords: *Soilless Farming; Food Production*

Introduction

Lagos city - with less than 0.4% land mass in Nigeria (3,577 bkm², Nigeria is 923,768 km²), is the smallest in land mass amongst the 36 states in Nigeria, it is however the largest city in Nigeria. Well over 22% of the state is covered with water. The city is home to 21 million people, with about 86 people relocating to the state every hour, if Lagos were a country, with its financial muscle it will be the 5th largest economy in the continent.

Nigeria needs Lagos more than Lagos needs Nigeria as Lagos state serves as the route to export 95% of Nigeria's goods, and also a route to import most of Nigeria's needs. It stands as the hub for entertainment, sports, finance and much more! Like New York, it is the hub for dreamers, for those with a zeal to succeed. Most in rural areas see Lagos as the place to be, with many entrepreneurs having a dream of bringing their products to "the center of excellence". However, the need to feed the 21 million mouths remains a big challenge. With a budget of N1.046 trillion, this equals a budget of N49.81 per person; thus, saying Lagos state is rich becomes a myth.

Farmers' issues

Lagos state even in budgeting has constantly ensured every sector of the economy is paramount except agriculture which is continuously less than 5% of annual budget for the state. There is a myth that Lagos state has no farmers, but the truth is the state has 500,000 practicing farmers - about 2.4% of the population, approximately same percentage of farmers in USA. However, farmers in Lagos state are faced low on-farm production (most get 1.2 - 1.5 tons/hectare), low access to finance as the farms are not bankable due to many issues faced by farmers, unwillingness for insurance companies to insure agriculture especially farming, difficult access to market especially for the small scale farmers coupled with post-harvest losses, devaluation of the naira resulting in increased cost of farm operations without a corresponding increase in price of produce thus the farmer is under the burden of macroeconomic impact, policy realities and incon-

sistency, lack of access to land as most land ear-marked for agriculture are being converted to business hubs or residential areas coupled with the land use act, the reality of climate change, alarming poverty, lack of processing centers for produce, unstructured markets controlled solely by the privileged, coastal encroachment and flooding, value chain underdevelopment, weak extension services, high insecurity and competition with other states in the country as well as foreign countries who bring their produce into the state.

Finding a solution

While there is no single solution to the agricultural problem in urban centers, it is important however to adopt technology to ensure a few of the issues faced by farmers can be mitigated. The solution isn't to increase the number of farmers as that would but breed poverty but rather to increase the inclusion of technology and artificial intelligence so that the machines can do what humans toil to do and humans in turn can do what machines cannot do - think!

Soilless farming

Soilless farming is one of such technologies which can help ensure food supply is complemented in the city. Soilless farming in simple terms is growing of crops without soil, it is important to note that soilless farming isn't a way to replace soil but rather to complement soil. The number 2nd and 3rd highest imports into Lagos state are vegetables and cereals, behind tuber crops. Lagos state can produce for itself these two crops with the land available by employing soilless farming and vertical farming. Soilless farming includes hydroponics and aquaponics.

Hydroponics consist of both substrate and non-substrate based systems, they include Deepwater culture, floating system, Ebb and flow, nutrient film technique and aeroponics; while aquaponics is a combination of hydroponics and aquaculture where the waste product of fish is used for the feeding of plants and this is recycled.

The advantage of soilless farming includes:

1. Non-seasonal food production as food production should not be seasonal because hunger is not seasonal, with soilless farming, the cheapest a commodity during its season will become the price all year round,
2. Higher productivity as more can be grown with spacing based only on the space needed for growth, in addition vertical growing is possible
3. The use of AI ensures labour is at the minimum especially at a time when the average age of the Nigerian farmer is 60 years. The argument for most is agriculture should employ more hands to develop the economy and thus refuse AI and technology, but I argue should banks go back to use of ledgers, go back to letter writing to make post office employ more hands, or better still do away with cars, airplanes etc. and use donkeys as mode of transport just to create more jobs, if this is a No, then why agriculture?
4. Soilless farming is "sexy" and appealing to the next generation of farmers, who would naturally not pick up hoes and cutlasses but they won't say no to remote controlled farms
5. The farms are cheaper to run, with most of the costs being for setup, the inputs needed to run the farm are cheap as these include labour, power and nutrient.
6. It is pro-environment as it reduces the impact of climate change, this is especially good for city dwellers. It helps in water, air and land conservation as water is recycled.
7. No use of herbicides and insecticides which is healthier for the environment, the consumer and the farmer. It also allows the farmer to avoid soil borne diseases.
8. It will create a new design for the cities as we are able to showcase agricultural architectural designs for the future sky scrapers in the state where the walls can be used as farms - providing food for the city, as well as cleaning the air.

9. It can easily be integrated back into our schools (from primary to tertiary) as agricultural science as a subject is either eliminated or purely theoretical in most schools because they do not have lands, so we have a generation of kids who know the price of every food but not the value.
10. Bankability of farming - with the precision of soilless farming, it is easier for banks to invest in agriculture as most of the issues faced by farmers are taken care of, thus also allowing insurance companies to join the value chain to underwrite the little risk that remains.
11. Lagos can indeed own its own farmers' market or hubs which would decentralize Lagos as Lagosians spend an average of 7 hours daily in traffic, so having access to fresh foods in different aspects of the city would also reduce movement, ensure fresh supply of food (vegetables and cereals, with a few tubers), which would improve the health of the citizens.

Soilless farming has its issues including initial high capital for setup, knowledge base for farmers willing to adopt the technology, power and government policies. The route to Lagos being center of excellence is beyond being the hub of entertainment, finance, sports, and more, for a nation or a city that can't feed itself will be enslaved to others who can feed it. Lagos state needs a focused agricultural program, adopt technology and AI to increase efficiency in food production, distribution and storage, soilless farming will play a key role in this.

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