

Cost Benefit Analysis of Household Backyard Nano Poultry (Layers) Production in Post Fuel Subsidy Removal Regime in Nigeria

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Abstract - There is no doubt population growth influences consumption of food and related. According to UNICEF, 100 children under the age of five years die every hour while fifteen million children are at the risk of “wasting” in 2024 Nigeria. (Shibayan, 2022). An indication of nutritional crises which require urgent and sustainable solutions and a challenge to all, more importantly animal protein which is the most expensive of food items. Eggs contributed about 36.5 per cent of the protein intake of Nigerians (Eboh M. et al, 2021), thus, a critical pillar for food security.

The data for this study was from both primary and secondary sources. The primary data was collected from Isa brown point of lay pullets and the secondary data. From the result of the CBA, ₦2,085,303.80 was realized as income from eggs production within the period under consideration, ₦40,000.00 was from manure while indirect benefit from egg consumed by the household was valued at an average of cost of ₦19,475.79 per monthly. The NPV ₦698,964.53 and Benefit/Cost Ratio 1.67, implies that the project can guarantee future cash flow, improve family income, meet animal protein needs and be self-sustaining, even, in fuel subsidy removal regime and inflation.

Backyard nano domestic egg production as an economic strategy that every household should embrace, especially low income earners in order to improve their nutritional wellbeing and also earn additional income. Government should encourage backyard nano poultry layers' egg farms as palliative to relieve households and improve animal protein consumption across homes.

Keyword: *Backyard; Benefit; Household; Nano; Cost*

I. BACKGROUND

The aftermath of deregulation of fuel in Nigeria calls for reasonable adjustment and the households cannot be exempted in order to have access to food in the right quantity and quality in line with the Sustainable Development Goals (SDGs) on food security and sustainability. However, the price of food items is relatively very unstable, the inflation rate as at February 2024 was 31.7% (Aina, 2024), while salary of employees was fixed and the sales volume of the business owners were shrinking/declining. There are both food and nutritional crises in Nigeria with the general inflation in Q1 2024 at 31.7% and food price inflation at 33.7%, the purchasing power is declining and the activities of terrorism seem unabated. About one eighth ($\frac{1}{8}$) of Nigeria's

population was projected for nutritional crises in 2024 –the challenge is more obvious as indicated by food prices upsurge the nation is witnessing. According to Eboh & Eromosele 2021, eggs contributed about 36.5 percent of the protein intake of Nigerians, thus a critical pillar to the successful attainment of the SDG food nutrition and health. The National Bureau of Statistic (NBS) food price report for January 2024 indicated that egg price rose by 33.45% to 54% on a yearly basis depending on sizes (NAN, 2024).

In January 2023, an egg was sold between ₦60 to ₦70, and a crate sold between ₦1,700.00 and ₦1,900.00 (Author, field survey 2023). The price of eggs is soaring, selling at between ₦150 and ₦200 per unit, while a crate sale between ₦3, 500 and ₦4,000 in Abuja and Kwara State depending on the size ((NAN, 2024; Author field survey , 2024). Nigerians love to eat eggs, but the economic reality makes eggs, especially for children, a luxury and the upsurge in the price may further deter households. As most are left with no option than to either stop completely or cut their purchase of it by 50% or even more, due to very low purchasing power of an average family.

Nigeria, is on the lower ebb of demand and consumption of eggs compared to most advanced countries in the world. On the average, before deregulation of petroleum, Nigerians consumed less than 80 eggs per person annually compared to 300 by China, Mexico and the United States, and also South Africa with average annual consumption per person estimated to 180 eggs as at 2021 (Hussein, 2021). Considering the health and nutritional benefit derived from poultry eggs which includes: protein (12.1g), carbohydrates (0.68g), lipids (12.1g), calcium (56mg), Magnesium (12mg), among others., egg is an important food ingredient /material to reduce malnutrition.

It is no gainsaying that most Nigerians engaged in one form of farming or another to augment their monthly earnings and keeping poultry in the backyard has been part of African society for ages. However, backyard nano poultry egg production for domestic usage is hardly considered by many compared to broiler and cockerel which people raised in anticipation for the upcoming occasions (Author field survey, 2023). According to (Amitverain, 2023; Omnisperience, 2020) nano business refers to as a tiny enterprise with a limited size and scope, a very small scale entity that is often operated by a single individual or that employs less than one full-time member of staff. It is imperative to improve the quality of animal protein consumption and augment family income at the least cost in the dispensation of fuel subsidy removal.

II. LITERATURE REVIEW AND CONCEPTUAL STUDIES

There is no doubt that poultry farming has become a remunerative business and pre-eminence over all other livestock enterprises in the developing countries. It carries a scope for quick and large profit (Rath, 2015). (Singh, 2018) asserted that poultry improves rural livelihoods and is mainly concentrated in vast rural areas characterized by low input and output scavenging, with minimal investment in housing, feeding, watering and health care. Manoj Kumar, et al. 2019, appraised the status of backyard poultry farming (in India) and its impact on socioeconomic and nutritional status of rural people, their findings reveals that backyard poultry farming provides families with income, nutritionally rich food sources (meat and eggs), boosts up women and unemployed youth, and reduces the gap between demand and supply of poultry eggs and meat. It was also observed that the required input/infrastructural is low and it can easily be handled by women, aged family members and children. In terms of benefits, poultry eggs and meat is readily available at the cheapest price to meet the protein requirement of the family or populace if sold. The study suggested introduction of improved suitable poultry breeds for backyard farming, scientific skill development of farmers on feeding, housing and disease prevention as well as management as a remedy to the constraints.

Robinson (2020) asserted that poultry production dominated by backyard with low input and output, and enhancing the livelihoods of rural populations, especially in low- and middle-income countries (LMICs), considerable yield gaps exist. The study observed that the majority owned fifty chickens in the study area and intensification of backyard poultry can increase poultry productivity, production and income. The study suggested that interventions should take cognizance of diversity in profile and constraint for poultry production development.

The study of (Kumar2, 2021) shows that the income from poultry farming is so reasonable and normal profits are earned with less effort. The study suggested financial, information and training support by the government for the poultry industry regardless of scale to increase production and productivity of the farmers.

Poultry can provide subsidiary income and also manure to increase yield of crops. It makes one of the best uses of available local resources by smallholder farmers whose production contributes significantly to the meet need of local populations with additional income and high quality protein (Ram, Singh, & Laishram, 2017). Poultry is an eco-friendly approach as these are very active in pest control and also provide manure. Backyard poultry was profitable and layers production was more profitable and also provides supplementary income in shortest possible time with very minimum capital investment, simple in operation and ensures availability of egg and meat even in remote rural area (Sonkar, 2020; Amos, 2006)

The study of (Oyelami et al 2023) revealed that majority of backyard poultry farmers are female with most of them less

than 40 years old and were formally educated and most engaged in backyard poultry rearing for income purpose. The study recommended financial support from stakeholders such as grants and single digit loans to these farmers. While the farmers too could group themselves into cooperative and thrift societies to enable them create an avenue for soft loan among themselves.

III. MATERIALS AND METHODS

Data for this study was from both primary and secondary sources. The primary data was collected from Isa brown point of lay pullets which were purchased from Yamffy Farm. ISA Browns is a prolific egg-laying breed with longevity and life span of up to 8 years, and egg-laying period of 2-3 years. (poultryaustralia). The study area was Offa LGA. The secondary data has been collected from newspapers, surveys, journals and various search engines. A single backyard poultry layers (egg) production (farm) was taken as a study sample. The housing system adopted combines beneficiary features of battery and deep litter system and laying for twelve months. The birds were fed commercial formulated feed and supplemented with edible kitchen wastes.

Analytical Techniques

The data from this project was subjected to Cost Benefit Analysis (CBA). This is because an in-depth cost-benefit analysis is sufficient enough to make a well-informed, rational decision for projects that involve small- to mid-level capital expenditures and are short to intermediate in terms of time to completion.

- ✓ A cost-benefit analysis (CBA) is the process used to measure the benefits of a decision or taking action minus the costs associated with taking that action.
- ✓ A CBA involves measurable financial metrics such as revenue earned or costs saved as a result of the decision to pursue a project.
- ✓ A CBA can also include intangible benefits and costs or effects from a decision. (Adam Hayes 2021).

$$NPV = \sum_{t=1}^n = \frac{Bt - Ct}{(1+r)^t} \dots \dots \dots 1$$

Benefit/Cost	Ratio
$\sum_{t=1}^n = \frac{Bt}{(1+r)^t}$	$\dots \dots \dots 2$
$\frac{Ct}{(1+r)^t}$	

Where: Σ = Summation, $t = 1$, Bt = Benefits in each project year, Ct = Costs in each project year, n = Number of year, r = Interest (discount) rate, NPV = Net Present Value,

The CBA was carried out under the following conditions (assumptions): -

- Average retailers price was used for calculating the revenue.

- Retailer cost of egg @ ₦150.00 at prevailing average market price.
- Farm gate price @ ₦ 85.97/egg based on the total cost of production.
- Consumption @ 10 eggs/day/Household.
- Production of one year was considered.
- Discounting factor of 35% Commercial bank rate on Loan
- Discounting factor of 22% CBN Monetary Policy Rate.
- Family Labour valued at $\frac{1}{8}$ of mandays @ ₦30,000.00 minimum wage.

IV. RESULTS

Table I. Summary of Cost of Production

S/n	Cost Items	Amount (₦)	%
i.	Point of Lay	150,000.00	10.60
ii.	Feeds	1,046,750.00	74.00
iii.	Medication: Drugs & Vaccine	20,750.00	1.47
iv.	Wood Shavings (50kg Bag)	14,250.00	1.01
v.	Bank/Transfer Charges	3,500.00	0.25
vi.	Transportation	20,000.00	1.41
vii.	Light	5,000.00	0.35
viii.	Labour Cost	61,363.64	4.34
ix.	House	72,000.00	5.09
x.	Water	20,853.00	1.47
	GRAND TOTAL	1,414,466.64	100.00

Table i. present the cost incurred on fifty backyard nano poultry layers' birds kept in production for one year. From the study, the most significant cost items are feed (74%), stock at point of lay (10.6%), housing (5.09%) and 4.34% of the total cost of production. The family labour though free was valued at $\frac{1}{8}$ manday constituted 4.34% of the total cost of production.

Table II. Summary of Household Consumption and Benefit

S/n	Items	Amount (₦)
i.	Consumption	547,500.00
ii.	Farm Gate Price	313,790.50
iii.	Benefit	233,709.50

Table ii. presents the household consumption and benefit derived from backyard nano poultry layers' farming. The value of eggs consumed by the household was estimated at ₦547,500.00 with an average of ₦45,625.00 worth of eggs consumed monthly. The marginal value accrued to the farmer and that of the retailer on every unit of egg produced and retailed to the consumer respectively became the benefit to the household. This was because the household buying price was ₦ 85.97 instead of paying between ₦ 150.00 and ₦ 200.00 at the retail shop.

Table III. Summary of Cost and Revenue from Nano Backyard Egg Production

S/n	Benefit Items	Amount (₦)
i.	Eggs (crates)	2,085,303.80
ii.	Manure (bag)	40,000.00
iii.	Cost saving through backyard production	233,709.50
iv.	Profit from sales of eggs	670,837.16
v.	Total Benefit	2,359,013.30
vi.	Total Cost	1,414,466.64
vii.	Incremental Benefit/Profit	944,546.66

Table iii. presents the summary of the cost, revenue and incremental benefit derived from the backyard nano egg production.

From the table, ₦2,085,303.80 was realized as income from eggs production within the period under consideration, ₦40,000.00 was from manure and indirect benefit from egg consumed by the household was valued at an average cost of ₦19,475.79 per month. The total incremental benefit from backyard nano egg production was ₦944,546.66 in twelve months. The average monthly revenue from egg production was ₦173,775.32 while the total cost of production was ₦1,414,466.64 out of which 74% was expended on feed. The revenue from manure amounted to ₦40,000.00 while savings realized by the household as a result of accessibility to eggs at the production cost from the backyard nano egg production was highly significant. The household will be able to save ₦233,709.50 annually if it consumed eggs produced at the backyard in addition to the health benefit and ease of accessibility associated with backyard farming.

Table IV. Net Present Value (NPV) and Benefit Cost Ratio from Backyard Nano Layers Production

Year	Incremental Benefits	Discount factor at 35%	NPV @ 35%	Discount Costs	Discounted Revenue
i.	944,546.66	0.74	698,964.53	1,046,705.31	1,745,669.84

Table iv. present the NPV and Benefit Cost Ratio on backyard Nano poultry layers' egg production at 35% discount factor which was an average interest rate prevailing among commercial banks in the study area. The discounted cost and revenue was ₦1,046,705.31 and ₦1,745,669.84 respectively. The NPV was 698,964.53 and the Benefit/Cost Ratio was 1.67. From the NPV on the backyard nano poultry egg production, the cash inflow, discounted to their present value, significantly exceeds the initial investment and associated costs. This suggests that the project is likely to generate more wealth, enhancing the overall financial health and growth prospects of the business.

V. CONCLUSION

Raising poultry birds in the backyard for production of eggs at nano level requires no sophisticated infrastructure to set up and can be easily handled by all members of the family irrespective of their ages. or sex. Although nano backyard egg production is subsistence in nature, it is however a self-sustained worthy investment that could meet food need; improves quality of household animal protein consumption; improves household health status and augment household income at the least cost, more importantly in the dispensation of fuel subsidy removal regime that is characterized with inflation.

RECOMMENDATIONS

Backyard nano domestic egg production could be an economic strategy to support households. From the outcome of the analysis the following recommendations are made

1. Households should embark on backyard nano layers farming to improve their nutritional wellbeing and augment their income.
2. A minimum of ten laying birds should be kept by every household depending on the family size for a more meaningful production.
3. Parents should engage their children in more profitable ventures through nano egg production in their backyard.
4. Production of make-shift portable housing for household layers' production at a subsidized rate.
5. Government should encourage backyard nano poultry layers' egg production which is a more sustainable intervention and dependable means of providing palliative compared to school feeding

programmes as a way of relieving and improving animal protein consumption across homes.

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