Assessment of Poultry Farming Profitability in Northern Nigeria: A Theoretical and Empirical Review

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Abstract
Poultry production is one of the fastest-growing sub-sectors of Nigerian agriculture, and Northern Nigeria spanning the North-West, North-East and North-Central geopolitical zones hosts a substantial share of the country's smallholder and commercial flocks. This paper undertakes a theoretical assessment of poultry farming profitability in the region by synthesizing conceptual models of farm profitability with evidence drawn from published empirical studies conducted across Kaduna, Sokoto, Bauchi, Kano, Nasarawa, Kwara and the Federal Capital Territory. Using a desk-review approach anchored on farm budgeting and production economics theory, the paper develops a conceptual framework linking inputs, costs, revenue and profitability determinants, and illustrates this framework with cost-structure and profitability data reported in the literature. Findings indicate that feed and day-old chick costs dominate total production cost (often exceeding 85 percent of variable cost), that profitability indices reported across studies range roughly between 25 and 40 percent, and that farming experience, flock size, access to credit and association membership are recurrent determinants of profitability, while disease incidence, feed price volatility and weak infrastructure constrain it. The paper concludes that poultry farming in Northern Nigeria remains a profitable enterprise on average but one whose margins are structurally exposed to input-cost shocks, and it recommends targeted interventions in feed-cost stabilisation, credit access, disease control and farmer cooperation.

Keywords: *poultry farming, profitability, farm budgeting, Northern Nigeria, cost-benefit analysis*

1. Introduction

Poultry farming occupies a central place in Nigeria's livestock economy, contributing significantly to household protein supply, rural employment and income generation. The Central Bank of Nigeria valued the domestic poultry industry at approximately ₦1.6 trillion, underscoring its scale within the wider agricultural sector (CBN, 2019). Within this national picture, Northern Nigeria comprising the North-West, North-East and North-Central geopolitical zones presents a distinctive production environment shaped by an extensive livestock tradition, relatively lower land pressure, and a climate that, despite seasonal heat stress, supports both backyard and commercial poultry enterprises. Profitability is the central economic question facing any poultry enterprise: does the value of output generated by a flock exceed the cost of the inputs and management committed to producing it? Answering this question is not merely of academic interest. For the smallholder

farmer weighing whether to expand a flock, for the commercial investor assessing entry into layer or broiler production, and for policymakers designing input-subsidy or credit programmes, a rigorous understanding of the cost-revenue structure of poultry enterprises is indispensable.A substantial body of empirical research has examined the economics of poultry production in specific Nigerian localities, including Kaduna State (Suleiman et al., 2018), Sokoto State (Maikasuwa & Jabo, 2011; Dalhatu et al., 2018), Bauchi State (Sani et al., 2000), Nasarawa State (Girei et al., 2018), Kwara State (Journal of Economics and Allied Research, n.d.), and the Federal Capital Territory (Nmadu et al., 2014). However, these studies are typically localized, employ varying methodologies, and are rarely synthesized into a single, coherent theoretical account of what drives and constrains poultry profitability across the wider Northern region. This paper addresses that gap.

Objectives of the study

The specific objectives of this paper are to:

1. articulate a theoretical/conceptual framework for assessing poultry farm profitability
2. synthesize cost, revenue and profitability evidence reported in the empirical literature on Northern Nigeria;
3. identify the recurrent determinants of, and constraints to, profitability in the region; and
4. derive policy-relevant recommendations for improving the economic performance of the sub-sector.

2. Literature Review and Theoretical Framework

2.1 The concept of farm profitability

Profitability in farm business analysis refers to the capacity of an enterprise to generate a surplus of revenue over the cost of resources employed in production (Olukosi & Erhabor, 1988, as commonly cited in Nigerian farm-management literature). Farm budgeting theory decomposes this relationship into total revenue (TR), total variable cost (TVC) and total fixed cost (TFC), from which several standard indicators are derived: gross margin (TR − TVC), net farm income (TR − TC, where TC = TVC + TFC), the profitability ratio (net farm income divided by total cost), and the benefit-cost ratio (TR divided by TC). These measures, though conceptually simple, remain the analytical backbone of nearly all empirical profitability studies reviewed for this paper.

2.2 Empirical evidence from Northern Nigeria

In Kaduna State, *Suleiman et al. (2018)* surveyed 160 poultry farmers across four agricultural zones and applied multiple regression analysis, obtaining an R^2 of 0.658 — meaning that roughly two-thirds of the variation in profitability was explained by the socio-economic variables considered. Farming experience and access to credit were positively and significantly associated with profitability at the 1 percent level, while household size exerted a negative influence, consistent with the view that larger households divert income toward consumption rather than reinvestment. The study also identified high feed and vaccination costs, disease incidence and high mortality as the principal constraints faced by farmers. In Sokoto metropolis, *Maikasuwa and Jabo (2011)* examined 100 backyard poultry farmers using farm budgeting techniques. The majority of farms (64 percent) operated with modest flock sizes of between 10 and 50 birds, and personal savings financed 82 percent of investment capital. Variable costs accounted for 88.41 percent of total production cost, and the average net farm income was ₦48,745.58 per farmer per annum — a modest but positive return consistent with backyard, rather than commercial, scale operations. A

related study by *Dalhatu et al. (2018)* on allocative efficiency in layer and broiler production in Sokoto State similarly reported that resource-use inefficiencies constrain the realisation of full profit potential. At a broader regional scale, *Adeyonu and Odozi (2022)* analysed broiler farms across the North-Central and South-West geopolitical zones and reported a profitability index of 39.85 percent, confirming that broiler enterprises are, on average, a profitable undertaking. The positive drivers of profitability identified included years of farming experience, flock size, engagement in other livelihood activities, processing of broilers before sale, and membership of the Poultry Association of Nigeria (PAN). Notably, access to credit displayed an unexpected negative relationship with profitability in that study, which the authors attributed to the burden of loan repayment obligations relative to the scale of many borrowing farms.

In Nasarawa State, *Girei et al. (2018)* assessed costs and returns among 60 egg producers in Lafia Local Government Area, finding that the majority of respondents were male, within the productive age bracket of 31–40 years, and operating with relatively small households — a demographic pattern that recurs across most of the reviewed studies. The authors recommended cooperative formation to widen access to credit and feed inputs. Comparable evidence from Kwara State, part of the North-Central zone, reported a monthly gross margin of ₦33,368.82 and a rate of return to egg production of 25.94 percent (Journal of Economics and Allied Research, n.d.), while an earlier study in the Federal Capital Territory, Abuja, examined the profitability and resource-use efficiency of poultry egg production, concluding that egg enterprises in the territory operated profitably but below full technical efficiency (*Nmadu et al., 2014*). In Bauchi State, one of the earliest works reviewed, *Sani et al. (2000)*, examined the economics of poultry production in Bauchi Local Government Area and similarly found a positive, if modest, return to investment.

Taken together, these studies — spanning the North-West (Kaduna, Sokoto), North-East (Bauchi) and North-Central (Nasarawa, Kwara, FCT) zones — paint a broadly consistent picture: poultry farming in Northern Nigeria is generally profitable, but profitability is modest at the backyard/smallholder scale and structurally sensitive to feed cost, disease, and access to credit.

2.3 Theoretical framework

Building on production economics theory and the empirical patterns above, this paper adopts a conceptual framework in which farm inputs flow into a production process that yields marketable output; output sold in the market generates total revenue, while the input bundle generates total cost. The interaction of revenue and cost determines farm profitability, which is in turn shaped by two clusters of determinants: farm-level factors internal to the farmer and enterprise (experience, flock size, education, credit access, extension contact, association membership), and external factors largely outside the farmer's control (feed price movements, disease outbreaks, insecurity, climatic stress, infrastructure and policy). This framework guides the synthesis of evidence presented in Section 4.

3. Methodology

This paper adopts a theoretical/desk-review methodology rather than primary field survey. It systematically synthesizes peer-reviewed and grey literature on poultry production economics in Northern Nigeria, focusing on studies that report explicit cost, revenue or profitability figures. The synthesis follows three steps: (i) identification of relevant empirical studies conducted in Northern Nigerian states; (ii) extraction of comparable profitability indicators (net farm income, profitability ratio, gross margin, rate of return); and (iii) integration of these indicators into the conceptual framework developed in Section 2.3. Where the literature does not report a directly comparable

figure for a given location, this is stated explicitly rather than estimated, in keeping with the theoretical and illustrative character of the paper. One hypothetical worked example (Section 4.3) is also presented, using cost-ratio assumptions drawn from the reviewed literature, purely to demonstrate the application of standard profitability formulae; it is explicitly not presented as primary survey data.

4. Synthesis of Evidence

4.1 Comparative summary of reviewed studies

Table 1 summarizes the profitability evidence reported across the reviewed studies. Although methodologies and reporting units differ some studies report a naira value of net farm income, others a percentage rate of return or profitability index the consistent conclusion is that poultry enterprises across Northern Nigeria generate a positive net return, even though the magnitude of that return varies considerably with enterprise scale, species (broiler versus layer), and locality.

Table 1. Summary of reviewed empirical studies on poultry profitability in Northern Nigeria

State / Zone	Enterprise & Sample	Key Profitability Evidence	Source
Kaduna (NW)	Mixed poultry; 160 farmers	R^2 = 0.658; experience & credit access positively significant (1%); household size negatively significant	Suleiman et al. (2018)
Sokoto (NW)	Backyard poultry; 100 farmers	Net farm income ₦48,745.58/farmer/annum; variable cost = 88.41% of total cost	Maikasuwa & Jabo (2011)
Sokoto (NW)	Layer & broiler enterprises	Resource-allocation inefficiencies identified; scope to raise profit through better input allocation	Dalhatu et al. (2018)
North-Central & South-West	Broiler farms	Profitability index = 39.85%; experience, flock size, PAN membership positive drivers	Adeyonu & Odozi (2022)
Nasarawa (NC)	Egg production; 60 farmers	Positive cost-return balance; cooperative access recommended to widen credit/feed access	Girei et al. (2018)
Kwara (NC)	Egg production; 119 farmers	Gross margin = ₦33,368.82/month; rate of return = 25.94%	J. of Economics & Allied Research (n.d.)
FCT Abuja (NC)	Egg production	Profitable but operating below full technical/resource-use efficiency	Nmadu et al. (2014)
Bauchi (NE)	Mixed poultry	Positive, modest return to investment reported	Sani et al. (2000)

State / Zone	Enterprise & Sample	Key Profitability Evidence	Source
National	Industry-wide	Poultry industry valued at approximately ₦1.6 trillion	CBN (2019)

4.2 Cost structure

A recurring finding across the literature is the dominance of variable costs chiefly feed, day-old chicks and medication in total production cost. In the Sokoto backyard poultry study, variable cost constituted 88.41 percent of total cost, leaving fixed cost (housing, equipment and depreciation) at only 11.59 percent (Maikasuwa & Jabo, 2011). This pattern, illustrated in Figure 1, is broadly consistent with findings elsewhere in the Nigerian literature that feed alone typically accounts for the largest single share of production expenditure (Suleiman et al., 2018; Heise et al., 2015).

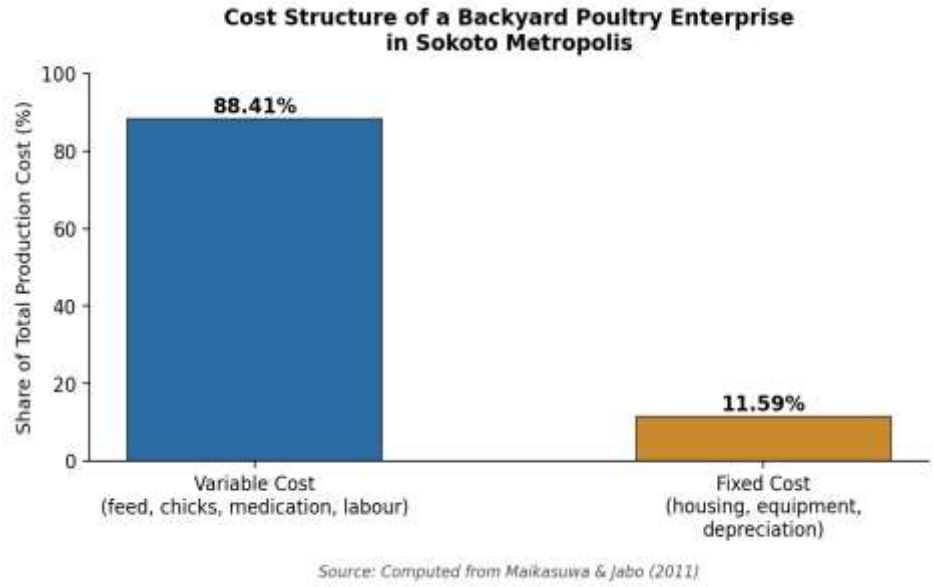


Figure 1. Cost structure of a backyard poultry enterprise in Sokoto Metropolis.

The practical implication of this cost structure is that poultry profitability in the region is highly sensitive to feed-price movements. Because feed is a variable cost incurred continuously throughout the production cycle, even modest increases in maize or soybean meal prices — the principal feed ingredients — translate directly into reduced margins unless offset by corresponding increases in output prices.

4.3 Illustrative profitability computation

To demonstrate the application of the theoretical framework in Section 2.3, Table 2 presents a hypothetical, illustrative cost-revenue structure for a medium-scale broiler enterprise of 500 birds over one production cycle (approximately eight weeks). The cost ratios applied (variable cost close to 85–88 percent of total cost, feed as the dominant variable cost item) are drawn from the reviewed literature; the absolute naira figures are illustrative and are not drawn from a specific field survey.

Table 2. Illustrative cost-revenue structure for a hypothetical 500-bird broiler enterprise (author's construct, based on cost ratios reported in reviewed literature)

Item	Amount (₦)	Share of Total Cost
Day-old chicks (500 @ ₦650)	325,000	16.4%
Feed (starter, grower, finisher)	1,150,000	58.1%
Medication & vaccines	95,000	4.8%
Labour	120,000	6.1%
Fuel/energy & water	60,000	3.0%
Total variable cost (TVC)	1,750,000	88.4%
Housing, equipment & depreciation (TFC)	230,000	11.6%
Total cost (TC = TVC + TFC)	1,980,000	100%
Total revenue (475 birds sold @ ₦5,200 avg.)	2,470,000	—
Gross margin (TR − TVC)	720,000	—
Net farm income (TR − TC)	490,000	—
Profitability ratio (NFI / TC)	0.25 (25%)	—
Benefit-cost ratio (TR / TC)	1.25	—

This illustrative example yields a profitability ratio of approximately 25 percent, which falls within the range of profitability indices actually reported in the empirical literature 25.94 percent for Kwara State egg production and 39.85 percent for broiler farms in the North-Central and South-West zones (Figure 2) lending plausibility to the assumed cost structure while underscoring that the example itself remains a theoretical illustration rather than a survey finding.

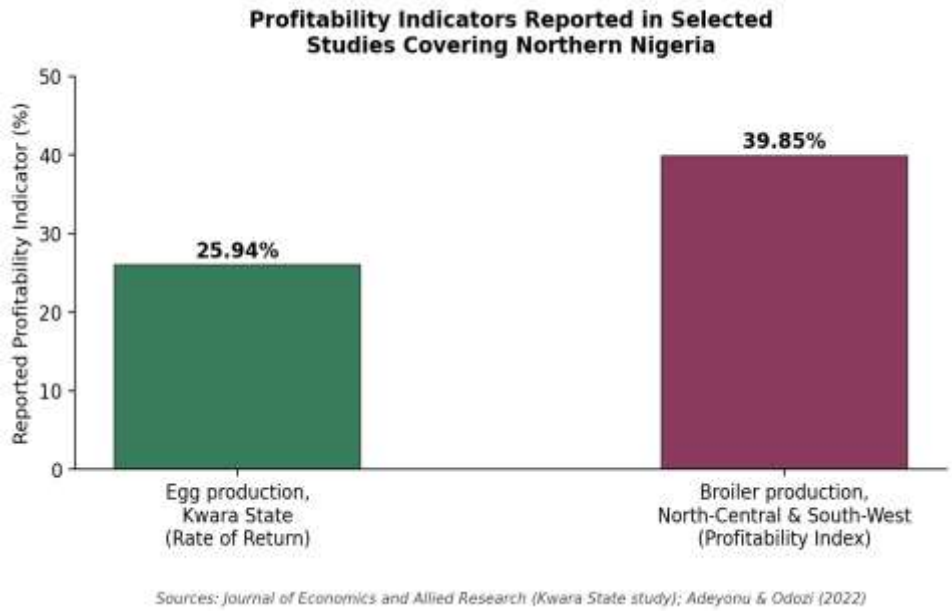


Figure 2. Profitability indicators reported in selected studies covering Northern Nigeria.

5. Determinants and Constraints of Profitability

Synthesizing the reviewed studies, farm-level determinants that recur across multiple locations include years of farming experience, flock size, level of education, access to formal credit, extension contact, and membership of farmer associations such as the Poultry Association of Nigeria (Suleiman et al., 2018; Adeyonu & Odozi, 2022). Larger household size, by contrast, has been associated with reduced profitability, plausibly reflecting competing consumption demands on farm income (Suleiman et al., 2018).

On the constraint side, four clusters of challenges recur throughout the literature: high and volatile input costs (particularly feed and day-old chicks); disease and mortality, especially Newcastle disease and coccidiosis, compounded by heat stress during the dry season; weak access to formal finance, which pushes most farmers toward personal savings as the dominant source of investment capital (Maikasuwa & Jabo, 2011); and infrastructural and market gaps, including poor rural roads, erratic electricity supply and weak market information systems.

- High input costs: feed price volatility, cost of day-old chicks, vaccine and drug cost.
- Disease and mortality: Newcastle disease, coccidiosis, poor biosecurity, heat stress in the dry season.
- Weak access to finance: limited formal credit, high interest rates, reliance on personal savings.
- Infrastructural and market gaps: poor rural roads and storage, erratic electricity, weak market information. These constraints do not operate in isolation. High feed cost interacts with disease-related mortality: a farmer who has already sunk substantial feed expenditure into a flock and then loses birds to disease suffers a compounded loss, since the sunk variable cost is not recovered through any output. This interaction helps explain why disease control and biosecurity investment yield returns that extend well beyond the direct cost of veterinary inputs.

6. Discussion

The evidence reviewed supports three broad conclusions. First, poultry farming in Northern Nigeria is, on average, a profitable enterprise across production scales from backyard flocks of a

few dozen birds to commercial broiler and layer operations a conclusion consistent with the wider Nigerian poultry literature (Heise et al., 2015). Second, the margin of profitability is structurally narrow and cost-sensitive: because variable costs, and feed in particular, dominate the cost structure, profitability is highly elastic with respect to input-price shocks, exchange-rate movements (given the import dependence of some feed ingredients and breeding stock), and disease outbreaks. Third, profitability is not evenly distributed; it is systematically higher among farmers with more experience, larger flocks, association membership and access to credit, suggesting that policy interventions targeted at these specific margins rather than blanket subsidies may offer the most cost-effective route to raising sector-wide profitability.

The theoretical framework developed in this paper (Section 2.3) is deliberately general, and its value lies in organizing otherwise fragmented, locality-specific findings into a common analytical structure. Future empirical work could usefully test this framework directly through a harmonized, multi-state survey instrument applied simultaneously across the North-West, North-East and North-Central zones, which would allow the profitability comparisons that this desk review has only been able to approximate from disparate secondary sources.

7. Conclusion

This paper has assessed the profitability of poultry farming in Northern Nigeria through a theoretical synthesis of the region's empirical literature, spanning Kaduna, Sokoto, Bauchi, Nasarawa, Kwara and the Federal Capital Territory. The evidence indicates that poultry farming is a generally profitable enterprise, with profitability indices in the reviewed studies ranging from roughly 25 to 40 percent, but one whose economics are dominated by variable, feed-driven costs and shaped by farmer experience, flock size, credit access and disease exposure. A conceptual framework linking inputs, costs, revenue and profitability determinants has been proposed to guide future empirical and policy work. Realizing the full income and food-security potential of the sub-sector will require coordinated attention to feed-cost stabilization, credit access, disease control and rural infrastructure.

8. Recommendations

1. Strengthen farmer cooperatives and association membership (e.g., the Poultry Association of Nigeria) to improve collective bargaining power for feed purchase and access to credit.
2. Expand targeted agricultural credit schemes with terms suited to the seasonal cash-flow pattern of poultry production, addressing the heavy reliance on personal savings observed among smallholders.
3. Invest in local feed-ingredient value chains (maize, soybean) to reduce exposure to feed-price volatility, given that feed constitutes the single largest cost component.
4. Improve extension and biosecurity training to reduce disease-related mortality, particularly for Newcastle disease and coccidiosis, and to mitigate heat-stress losses during the dry season.
5. Support rural infrastructure — roads, electricity and market information systems to reduce marketing costs and post-harvest losses of poultry products.

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