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## Broiler production in South Africa: Is there space for smallholders in the commercial chicken coup?

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### ABSTRACT

It is agreed that agriculture provides avenues for impoverished households to produce and trade their way out of poverty. However, this requires market access and value chain integration of small-scale farmers. This paper explores the possibilities for integration of small-scale farmers into the mainstream commercial broiler value chain in South Africa. Production costs of small-scale producers are evaluated within the context of their commercial counterparts, with a case study approach. It revealed that small-scale producers pay more for inputs but also receive a substantial premium for sales of live birds in the informal market. This results in attractive gross margins for small-scale producers. There is, however, a production ceiling, due to demand and production considerations, associated with small-scale broiler production. This ultimately results in a dualistic industry with an informal (live sale) value chain at the one end of the spectrum and a sophisticated large-scale commercial value chain at the other. Given the salient production features and investment requirements associated with large-scale broiler production, organic growth from the small-scale value chain into the commercial value chain seems improbable. The dual nature of this industry should therefore be considered when developing policy geared towards development, poverty alleviation and value chain integration.

### KEYWORDS

Production scale; mainstream market access; broiler production

## 1. Introduction

Seville et al. (2011) state that agriculture is the best way for an estimated 1.5 billion people, around the globe, to produce and trade their way out of poverty. It is therefore imperative to link small-scale farmers to markets and integrate them into more formalised, commercial value chains.<sup>1</sup> In South Africa, agriculture can be characterised as a dual industry, with commercial farmers at the one end of the spectrum and small-scale farmers at the other. According to Statistics South Africa's Labour Force Survey (2000–07), there are approximately 6 million households in South Africa that engage in smallholder agricultural

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<sup>1</sup>It is acknowledged that small-scale production could also be for commercial purposes. However, for the purposes of this study the commercial value chain should be understood as an organised value chain often characterised by high levels of vertical integration. These chains are also associated with high throughput/production volumes. As a result, 'commercial producers' and 'large-scale producers' are used interchangeably throughout the study.

activities (Aliber & Hart, 2009). Although a large portion of these households site the reason for engagement in agriculture as ‘obtaining extra food’, it can safely be assumed that a large share of these farmers would also be inclined to reap the economic benefits associated with surplus production and trade.

An issue specific to South Africa, but related to the concept of poverty reduction and livelihoods, is that of transformation. Due to its history of apartheid and segregation, South Africa is plagued by an extremely unequal income distribution and the associated marginalisation of various poor, previously disadvantaged households from the mainstream economy. As a result of this, South Africa’s economic development policy is a broader-based industrialisation path, characterised by greater participation of poor and historically disadvantaged people, businesses and marginalised regions, in the mainstream economy. At first glance, the poultry industry seems to provide an ideal platform to achieve these envisioned objectives. This is premised on the argument that chicken production does not require large tracts of scarce land, has low entry costs and represents a popular enterprise for new producers, particularly at subsistence level (Clauer, 2009). Given the specific requirements associated with broiler production, the questions that beckon are: ‘*Can small-scale producers from a disadvantaged background be enabled to function in the mainstream commercial broiler value chain?*’, ‘*If so, how?*’, ‘*If not, where does this leave them?*’ Before these issues can be considered, a thorough understanding of the current realities in broiler production and the market is required.

In light of the above, a twofold research problem can be developed. The first and overarching research question is if and how small-scale<sup>2</sup> poultry producers in South Africa can be integrated into the mainstream commercial value chain. The second problem, which is, in fact, a prerequisite for answering the first is that there is currently no established typology that allows researchers and policymakers to classify poultry producers. Classification is essential to understand the nature and type of opportunities that could be available to integrate small-scale producers into a formal supply chain.

## 2. Objectives of the study

In line with the problem statement above, the major objective of the current study was to investigate the possibility of integrating small-scale poultry producers of South Africa into the mainstream commercial poultry value chain. Specifically, the study sought to:

- (a) determine the general nature and features associated with poultry production in South Africa;
- (b) develop a typology for small-scale poultry producers of South Africa; and
- (c) relate the features and characteristics of small-scale poultry producers to implications for value chain inclusion and transformation.

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<sup>2</sup>Kirsten & van Zyl (1998) note that South African agriculture is comprised of two categories of farmers, namely, small-scale farmers and large-scale commercial farmers. They further point out that the term small scale has many interpretations. These include subsistence farmers, farmers on small pieces of land, farmers with a small throughput, etc. For the purposes of this study small scale is understood to be low throughput/production volumes of broilers.

### 3. Data and methods

In order to achieve the aforementioned objectives, the study employed several data sources and methods. A study of the scientific and popular literature helped to determine the features associated with commercial poultry production in South Africa.

In order to establish the key features associated with small-scale poultry production, secondary data with descriptive statistical analysis were used. Informative discussions with coordinators of the Developing Poultry Farmers Organization (DPFO) at the South African Poultry Association (SAPA) revealed that small-scale broiler production is commonly associated with sales to the informal market. As a result of this, the precise size of this market is uncertain. In order to get a better understanding about this market, a database compiled by the DPFO was considered. It includes 300 respondents surveyed on a quarterly basis. This database is, however, not considered to be representative of small-scale production at large.

In order to develop a typology for small-scale producers in South Africa, the authors relied on steps and definitions laid out in Kluge (2000). Kluge (2000) explains that every typology is part of a grouping process in that an object field, in this case smallholder poultry producers in South Africa, is divided into categories with the help of certain attribute(s). For this specific study, the key attribute considered was the production capacity and/or production throughput of the small-scale producers. Other attributes of importance were whether or not the producers sold live birds and whether or not the producers had an off-take contract with a company.

Exploratory research on the production cost structure, and other features associated with the typology grouping, was done by means of structured interviews. This generated case studies of the different small-scale producer types. Yin (1984) denotes three types of case studies, namely, exploratory case studies, descriptive case studies and explanatory case studies. This study falls into the descriptive category since the case studies aim to shed light on the key features of the different types of smallholder producers. Interviews were conducted with one or two respondents in each grouping and respondents were identified from the DPFO database mentioned above.

### 4. Overview of large-scale broiler production in South Africa

The commercial broiler industry in South Africa is comparable to other boiler industries around the world, and has developed as a result of the features of the underlying product. The two key characteristics that are prevalent in broiler value chains are a high level of integration in the supply chain and production scale requirements. As such, the South African broiler industry is dominated by a few large integrated firms that account for the largest part of the supply chain. Broiler producers grow birds on contracts for these firms based on relational contracting (Davids, 2013). The contract growing scheme is prevalent in broiler production around the globe because a broiler producer requires large numbers of birds to be marketed at the same time. A contractual off-take agreement provides market surety and as a result of this exposure risk is reduced. The scale requirement in broiler production, at least in South Africa, is as a result of the price determination process. Local price determination is impacted by large import volumes from Northern Hemisphere countries and Brazil. These are some of the most efficient broiler production

countries in the world. In terms of technical efficiency, South Africa's performance is comparable to these countries. However, once input costs are taken into account, local producers lose ground.<sup>3</sup> One of the key drivers of higher production costs in South Africa, compared to Brazil and the USA, is that South Africa imports approximately 90% of its soybean meal requirements (Davids, 2013). Soybean meal therefore trades at import parity. In addition to this, regulated prices of inputs such as electricity and labour add to the cost pressures faced by local producers. To remain competitive, increased efficiency is an ever-increasing consideration. One of the ways to remain efficient is to invest in sophisticated production systems. This requires substantial capital investments that are only feasible if large volumes are pushed through the system to ensure that the fixed cost per unit is as low as possible.

Another factor that necessitates investment into sophisticated technology is the tournament pricing method employed by the large integrated firms to compensate growers. According to Davids (2013):

The integrator makes use of pre-stated formulas in order to calculate the average costs that a producer should incur given a set of performance standards relating to feed conversion, mortality, slaughter mass and the production efficiency factor at a given age. The average performance of all producers for a stated time period preceding the cycle in question is used to calculate the amount of inputs that the grower should use in order to achieve the desired standards and the grower is compensated based on these quantities, regardless of the actual amount of inputs used. Paying for actual inputs used effectively means that a producer that performed better than average will be over compensated for inputs used while a producer that performed worse than average will be undercompensated for inputs used.

This system encourages efficiency and inefficient operations will not be feasible over the long run.

## 5. Typology of small-scale farmers

Given the features of the commercial industry, the first step to answering the question on whether small-scale growers could be integrated into the commercial broiler supply chain, is to consider the features of small-scale production in South Africa.

This was done through informative discussions with coordinators of the DPFO at the SAPA during the second and third quarter of 2014. It was established that small-scale broiler production is commonly associated with sales to the informal market and as a result of this the precise size of this market is uncertain. As mentioned above, in order to get a better understanding about this market, a database compiled by the DPFO was considered. The 300 odd respondents, which are surveyed on a quarterly basis, do however, provide a general idea of some of the key features associated with this sector and is therefore used as a starting point.

Analysis of the abovementioned data showed that 75% of these farmers placed less than 1000 chicks per cycle. However, capacity indications supplied by the DPFO farmers indicate that nearly 70% of small-scale broiler farmers have chicken housing facilities larger than 500 birds. In fact, 64% have housing facilities with a capacity exceeding 1000

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<sup>3</sup>BFAP (2016) reports that in 2013, feed prices in South Africa were 27% higher than countries with surplus production in soybeans and that prices of day-old chicks were up to 25% higher than other large boiler production countries such as the USA.

chickens. In terms of placement and capacity, this is considerably smaller than commercial units in South Africa and around the globe which place thousands of birds per cycle.

Internationally, in a study done on broiler production in South Asia it was found that ‘... a broiler farm with a capacity of less than 4000 birds is not advisable unless the farmer has his own retail outlet’ and ‘... moderately integrated production units usually have a capacity of between 4000 and 10 000 birds’ (Food and Agricultural Organization of the United Nations, 2003). In South Africa, the production of 40 000 birds per cycle is considered to be small-scale production (SAPA, 2016). Based on the above considerations and data from the DPFO survey, an important issue can be highlighted: small-scale broiler farmers in South Africa generally have very small operations with the majority of respondents placing 1000 birds per cycle or less. This is significantly less than the published benchmarks for small-scale commercial production, cited above.

From exploratory discussions with industry stakeholders, there seemed to be a lot of heterogeneity in small-scale production units in South Africa. These discussions essentially revealed the following categories of small-scale broiler producers in South Africa:

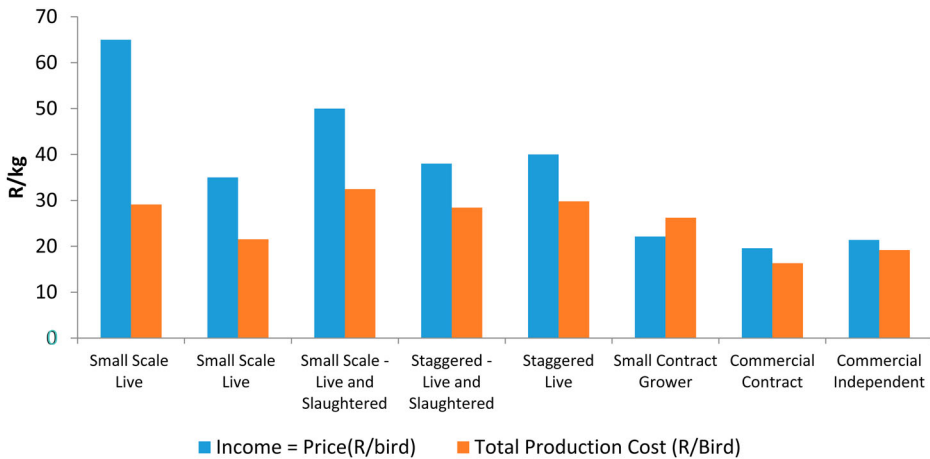
- Very small production units with live sales.
- Very small production units with live and slaughtered sales.
- Small to medium small-scale units with live sales and staggered (multi-batch) placement.
- Small to medium small-scale farmers that slaughter with staggered (multi-batch) placement.
- Small to medium small-scale contract grower.

Respondents in each of these categories were interviewed. The respondents on the larger end of the continuum typically had more sophisticated operations (housing, lighting, temperature control) that required a larger capital outlay than their smaller counterparts.

## 6. Comparative production costs and features

A survey was developed in order to gather data in a standardised form for different types of production units, as identified above. The survey included questions on technical performance data and key variable production cost. Efficiency and production cost are key factors that impact on the profitability of a business. Profits, in turn, determine if there is capacity for re-investment in order to grow the operation. The interviews were conducted in the third quarter of 2014 in the Gauteng, North West and Limpopo provinces in South Africa.

In order to obtain the relative costs of production related to various types of small-scale producers, as well as larger commercial producers, detailed interviews, guided by the standardised survey, were conducted with a small number of production units. One respondent of each of the types identified in section 3 were interviewed with the exception of small units with live sales and commercial contract production. For small-scale producers with live sales, two respondents were interviewed and for the contract growers the figures are based on an average of four producers that produce for different



**Figure 1.** Output prices of different broiler enterprises (Q4, 2014).

holding companies. This approach is similar to the methodology applied by international institutions, such as the agribenchmark initiative where only a small number of participants are interviewed, allowing for a more detailed discussion compared to a large-scale, statistically representative survey. A large-scale representative study is definitely something that could be considered for future research. This study, however, steered away from it, predominantly due to timing issues. Since a broiler production cycle is very short, and various small-scale producers do not have adequate record-keeping, all surveys had to be concluded in a short space of time to make the results comparable.

Figure 1 is a comparative representation of the income and variable production cost (in South African rand (R)/bird) for the different broiler enterprises. A more detailed breakdown, with additional technical data, of the different enterprises is presented in Table 1. From the graph and table, it is apparent that the production cost for small-scale farmers is, in most cases, more than the cost incurred by large-scale producers. This is due to the fact that small-scale farmers usually do not form part of an integrated supply chain and cannot procure inputs in bulk. In contrast to this, small-scale producers receive a premium on their output prices as well. This resulted in gross margins of small-scale farmers, especially those with live sales, to be much more favourable than those of large-scale producers. This can be seen in Figure 2, which shows small-scale farmers with live sales to have the largest margin and independent large-scale growers to have the smallest margin. What is also noteworthy is that small-scale contract producers made a negative gross margin (for the period in question). This reaffirms the fact that contract production requires scale to spread the significant capital investment across output units.

From the data collected and discussions with the various respondents, the following also became apparent:

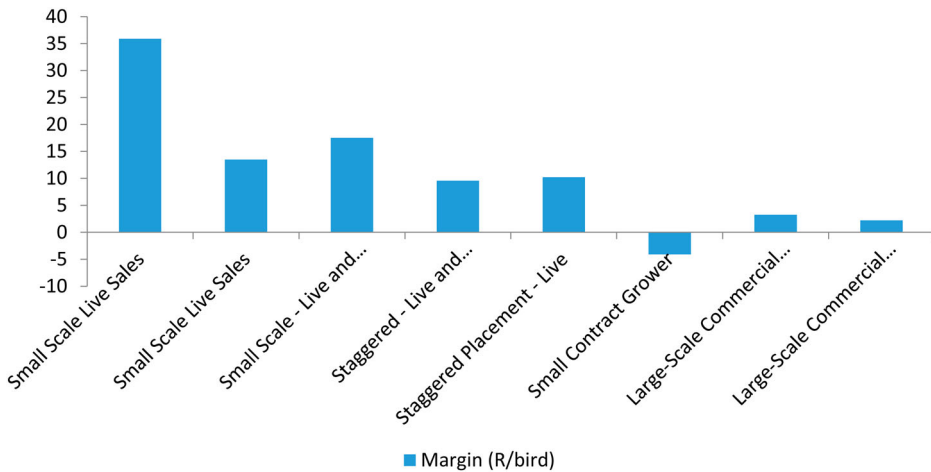
- Production systems employed by smaller emerging producers have distinct advantages. In marketing products directly to consumers (live sales), producers obtain a substantial

**Table 1.** Production cost and output prices for different broiler enterprises (Q4, 2014).

	Small-scale live sales	Small-scale live sales	Small scale – live and slaughtered	Staggered – live and slaughtered	Staggered placement – live	Small contract grower	Large-scale commercial production (contract)	Large-scale commercial production (independent)
Number of chickens	394	600	1500	9500	9900	25 000	290 000	1 440 000
Number of houses	1	2	1	9	7		6	30
Length of growth cycle (days)	42	42	42	35	38	36	34	34
Length of vacant period (days)	21	14	7	14	7	14	14	14
Length of total cycle	63	56	49	49	45	50	48	48
Mortality (%)	3		20	2.5	20	6	4.8	4.8
Average live mass at end of cycle (kg)	2.2	2	2	1.8	1.7	1.8	1.8	1.8
<i>Cost of production per bird</i>								
Bedding	NA	0.43	0.17	0.44	0.08	0.48	0.11	0.11
Catching	NA	NA	0.08	NA	NA	0.31	0.09	0.09
Cleaning	NA	NA	0.75	NA	NA	0.16	0.09	0.09
DOCs	6	5.5	4.5	7	5.1	4.64	3.41	3.41
Transport of DOC	1.02	NA	0.17	0.53	NA	NA	NA	NA
Electricity	4.57	0.25	NA	0.25	0.24	0.24	0.14	0.14
Feed	14.89	15	26.18	20	24.24	19.52	11.70	11.70
Heating	1.22	NA	NA	NA	0.05	0.72	0.22	0.22
Medicine and vaccinations	0.67	0.33	0.17	0.2	0.01	NA	0.13	0.13
Repairs and maintenance	NA	NA	NA	NA	NA	NA	0.16	0.16
Other diverse costs						NA		
Transport of at end of cycle	0.76	NA	0.45	NA	0.07	0.16	0.07	0.07
Slaughtering costs	NA	NA	3.9	0.83	NA	NA	NA	2.86
Total production cost (R/bird)	29.12	21.52	32.47	28.42	29.79	26.23	16.31	19.17
Income = Price (R/bird)	65	35	50	38	40	22.14	19.58	21.38

DOC, day old chick.





**Figure 2.** Gross margin per bird for different broiler production enterprises (Q4, 2014).

premium for their chickens and despite the inflated production costs, margins per chicken are far higher than that of large-scale commercial producers.

- Given the scale and location of production, continuous, reliable access to affordable, quality inputs remains a challenge, as does market access for mature birds. Sale of live birds directly to consumers represents somewhat of a niche market, albeit sales into an informal market, and hence producers do not compete directly with retail stores. There is, however, a distinct limit to the number of birds that can be marketed informally, by a small-scale grower, at any one time. When a large number of chickens reach maturity at the same time, there is no guarantee of an immediate market for all of them and when a share of the mature chickens are fed until they are sold, the cost of production increases.
- When unable to market the chickens themselves, producers can sell live chickens to an abattoir, which will then undertake the marketing of the carcasses. This represents the same outlet as that of large-scale, contracted/commercial producers, and hence the price received for mature broilers will be market related. Given the large number of birds that need to be sold at the same time and the limited number of abattoirs in close proximity to small-scale producers, individual producers have little bargaining power regarding the price. Furthermore, the cost of production of these small-scale producers is higher than that of commercial contract producers with scale advantages. As a result, the abattoir price, as opposed to the live sales price, could potentially leave producers with little or no profit margin.
- As an alternative to live sales, small-scale producers have the option of incurring the additional slaughter costs themselves and then marketing the carcasses in order to obtain a higher price. Initial surveys indicate that the costs of slaughter amount to approximately R4 per chicken. This option has the associated challenge of a large number of broilers that have to be marketed informally. Producers in this instance would need refrigeration and storage facilities for the time required to market all carcasses, which presents another limiting factor to the scale at which such a marketing system can be employed.

## 7. Implications for small-scale producers' value chain integration

The dual nature of the South African agricultural industry is therefore also apparent in the broiler industry and there seems to be two distinct value chains. The first is the commercial value chain characterised by small margins (as apparent from [Table 1](#)) and high levels of integration. The second is the informal market in which live sales are common. The commercial value chain, in turn, requires high production volumes, whereas the informal market is serviced by smaller producers. Given this, and keeping in mind that the policy mandate in South Africa envisions more small-scale (previously disadvantaged) producers to become part of mainstream commercial value chains, the questions in the introduction can be elaborated on as follows:

- Given the salient features of production and the South African broiler industry, can small-scale farmers be integrated successfully into commercial value chains?
- If so, how?
- If not, where does this leave small-scale producers?

Based on these initial findings, the short answer to the first question seems to be 'no'. Integration into commercial value chains has definite size implications that would require substantial growth in production capacity of all the categories of small-scale producers interviewed. Size is a key determinant of efficiency levels that can be achieved. Access to sophisticated production technology requires substantial capital investment which in turn, requires large production volumes to keep average production cost per unit as low as possible. The way in which producer remuneration is determined in the commercial value chain is highly impacted by efficiency. If a producer does not have the scale requirements to achieve this efficiency, production will not be sustainable.

If one regards the contract producer's information in [Table 1](#), it confirms that there are certain sizes that do not seem to be economically feasible. Small producers considering expansion find themselves in somewhat of a catch-22 situation. Unable to procure inputs in bulk due to the limited size of the operation, their input costs are significantly higher than that of commercial, contracted producers. Whilst able to compete in the live bird market, the realistic number of chickens that can be marketed at a single time limits the size of the operation. Due to the effective production ceiling that this places on small-scale broiler production, gradual, organic growth from small-scale to large-scale commercial production seems unlikely.

It seems that there is a range of operational sizes that are not feasible and it is effectively this range that divides the industry into the two categories discussed above. The transformation/value chain integration strategy should therefore be developed with this dualistic nature in mind. Based on this, a strategy could include elements of the following:

- Transformation through the establishment of large-scale commercial producers. From a policy perspective, this could possibly entail allocating large grants to a small number of beneficiaries. These grants would typically be used to overcome the barriers to entry into the industry, associated with large capital investments.
- Transformation through the growth of small-scale production. This would entail the establishment of more small-scale producers and increasing the capacity of established

small-scale producers. In order to fully understand how a strategy can be developed to achieve this, a deeper understanding of the live bird market, in South Africa, is needed. This is proposed for future research.

It is further important to clearly define value chain integration and commercialisation. Although there are limited opportunities for commercialisation, in the opinions of the authors there are, however, opportunities for policymakers to facilitate value chain integration, albeit not in the mainstream commercial broiler value chain in South Africa. Current grant programmes should focus on small-scale farmers with the objective of increasing production share of small-scale farmers as a total proportion of the industry. This would ultimately require the establishment of more small-scale farmers but also to ensure that the established producers are functioning at full capacity. In terms of establishing new farmers, government assistance should be focused on areas that are conducive for growth in live bird sales. This could typically be areas with households without refrigeration capacity and a cultural preference for live bird procurement.

## 8. Conclusion

Results revealed that efficiency and production cost seem to be affected by scale and that these factors provide a divide between two ends of the production spectrum. This causes the industry to be dualistic in terms of production scale. A production ceiling of around 10 000 live birds (staggered/multi-batch approach) for small-scale producers was observed. This is significantly less than the scale requirements associated with commercial poultry value chains. Value chain integration through organic growth in capacity for small-scale producers therefore seems improbable.

This study also serves as a starting point for possible future research into value chain integration of small-scale broiler farmers. The findings of this study were based on case study research, the choice of which was driven by time and budget constraints. A future study based on inference testing with a representative sample could go a long way to validating these results.

## Disclosure statement

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