

Extended Abstract

Paper/Poster Title	Analysing the competitiveness of dairy farms in Ghana and Senegal: an application of typical farm approach
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Abstract prepared for presentation at the 96th Annual Conference of the Agricultural Economics Society, K U Leuven, Belgium

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Abstract	<i>200 words max</i>
<p>Milk production and per capita consumption in West Africa are among the lowest in the world. Using the typical farm approach, this study aimed to gain an in-depth understanding of the most prevailing dairy production systems, their performance, and milk production costs in Ghana and Senegal. In Ghana, three typical farms were determined to represent each identified production system: intensive (GH-03), semi-extensive (GH-35), and extensive production system (GH-27). The cost of milk production for GH-03, GH-35, and GH-27 were €58/100kg Energy Corrected Milk (ECM), €48/100kg ECM, and €39/100kg ECM, respectively. GH-03 and GH-35 farms had a positive entrepreneur's profit and covered their total production costs from dairying in the short-term, medium-term, and long-term. However, labour and feed costs represent a higher portion of milk production costs in Ghana. The GH-35 and GH-27 farms primarily focus on beef production rather than milk production. Therefore, the quantities of milk produced in these production systems are far from adequate concerning local demand. Low milk yield, shortage of green fodder, absence of artificial insemination, lack of cooling and storage facility, lack of organized marketing facility were the main challenges faced by small-scale dairy farmers in Ghana.</p>	
Keywords	Dairy, typical farms, performance, production systems, production costs, competitiveness, Ghana, Senegal
JEL Code	Q12, Q13
Introduction	<i>100 – 250 words</i>
<p>Rapid population growth, rising per capita income, and fast-growing urbanization have led to large increases in the milk and dairy products demand in West Africa, and this trend will inevitably continue. Between 1996 and 2018, per capita consumption of milk has increased from 3.9 kg to 9.9 kg milk equivalent in Ghana and 25.9 kg to 47.7 kg milk equivalent in Senegal (Zamani et al., 2021). Nevertheless, local milk production has failed to catch up with such a growing demand, and presently both countries rely heavily on imports, mainly from the European Union (EU). Thus, boosting raw milk production is needed to reduce the reliance on imported milk powder.</p> <p>Cattle are primarily kept for beef production, and dairying is still a developing and neglected industry in both countries. Research on the economics of different dairy</p>	

production systems that address cost and returns from milk production of different production regions in Ghana and Senegal is limited. Thus, this paper presents a comparative analysis of dairy farming in Ghana and Senegal, with three specific objectives: i) identify and characterize the prevailing dairy production systems, ii) measure and compare the cost of production and profitability of the identified systems, and iii) draw policy implications for the evolution of the dairy sector in the medium to long term.

Methodology

100 – 250 words

The research was conducted within the framework of the typical farm approach. The approach develops empirically grounded farm data sets based on farm observations, semi-structured interviews, and focus group discussions. Chibanda et al. (2020) explain that each farm data can be defined as a 'virtual' farm representing the most common farm type, "typical farm," within a production system.

We constructed three typical dairy farms representing the most common dairy production systems in each country. The typical farms were constructed through a series of steps that Chibanda et al. (2020) refer to as the agri benchmark Standard Operating Procedure (SOP). **Step 1**, by reviewing national statistics and consulting local experts, the researchers identified the most common dairy production systems and most important production regions. **Step 2**, in consultation with local experts, the researchers selected individual farms with characteristics that represent the identified typical production systems. The selected farms were visited, and semi-structured interviews were conducted with producers to point out the physical and cost parameters of the selected farms. **Step 3**, focus groups were then conducted to determine the farm data's plausibility and gain an in-depth understanding of the production systems. **Step 4**, the collected typical farm data was analysed using the Technology Impact Policy Impact Calculations (TIPI-CAL) model.

The data was collected from the selected dairy farmers in Ghana between February and March 2020. While field data collection from Senegal was postponed to January 2022 due to COVID-19 related travel restrictions. Therefore, the result section will be limited to the Ghana case study.

Results

100 – 250 words

The Agbogba, Tema, and Tamale regions were identified as the most important regions in terms of dairy production in Ghana. The intensive, semi-extensive, and extensive production systems were identified as the most common "typical" production systems in the country. The typical farms that were selected were named according to the country code and the number of milking cows. They are GH-03, GH-35, and CH-27 representing intensive, semi-extensive, and extensive production systems, respectively.

Figure 1 illustrates that the intensive system described by GH-03 has the highest production costs, followed by the semi-extensive system GH-35 and the extensive system GH-27. Moreover, labour costs represent 46% of the total farm costs for GH-03, 20% for GH-35, and 77% for GH-27. Furthermore, feed costs account for up to 20% of total costs in the GH-03 and up to 72% in the GH-35. The cost of milk

production for GH-03, GH-35, and GH-27 was €58/100kg Energy Corrected Milk (ECM), €48/100kg ECM, and €39/100kg ECM, respectively.

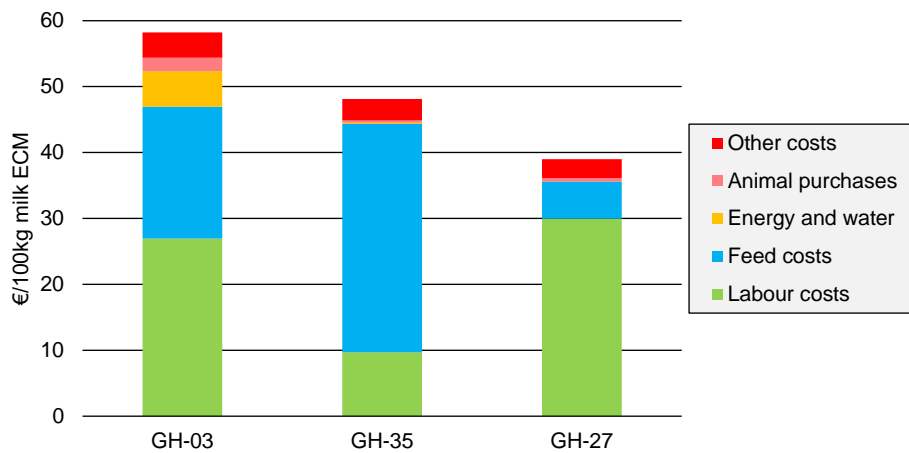


Figure 1. Comparison of the cost structure of the identified dairy cattle farming systems in Ghana

Figure 2 shows that GH_03 makes a very high return from milk, corresponding to 91% of total returns, followed by GH_35 (77%) and GH_27 (67%) farming systems.

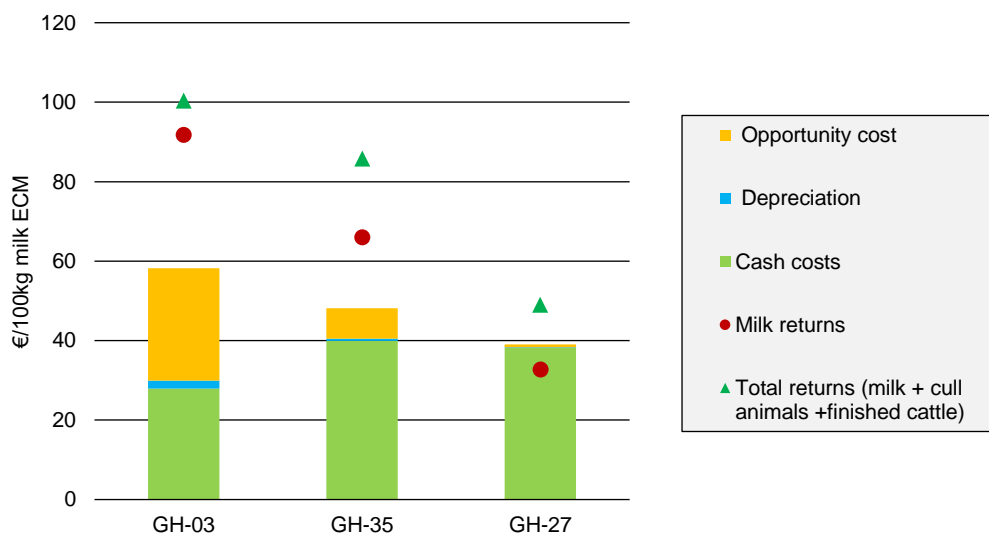


Figure 2. Comparison of profitability of the identified dairy cattle farming systems in Ghana

The Dakar, Kolda, and Dahra regions were identified as the most important regions in terms of dairy production in Senegal. The peri-urban, agropastoral, and pastoral systems were recognized as the country's most prevailing "typical" production systems.

Discussion and Conclusion

100 – 250 words

In Ghana, GH-03 and GH-35 farms had a positive entrepreneur's profit and covered total production costs in the short-term (considering only cash costs), medium-term (covering both cash and depreciation costs), and long-term (for cash, depreciation, and opportunity costs). Although the extensive production system (GH-

27) showed the lowest production costs, the low milk prices make the farm unprofitable in the short-term. GH_03 has the highest production cost, and it is the only typical farm with costs for energy and water. The relatively high labour costs in GH-03 are mainly attributable to higher opportunity costs of family labour. Whereas, Gh-27 is managed by hired labour called Fulani and his family, who are entirely responsible for cattle management and milking. This pushed up the labour costs to reach 77% of the total production costs. The High feed cost in GH-03 may be attributed to the fact that this farm is entirely on purchased feed supplements during the six months of the dry season and purchased grass during the wet season. While GH-35 usually provides purchased feeds only during the dry season. The GH-27 farm has the lowest feed costs, primarily because of year-round grazing. Reduced feed costs therefore play a vital role in increasing farm profit. The introduction of improved forage varieties during the dry season appears to be a sustainable solution to increase milk yield. Especially, In GH-35 and GH-27, local cattle breeds have a low genetic potential for milk production and rear mainly for milk production. Therefore, artificial insemination and higher-grade bulls may be utilized to produce crossbreeds to increase milk yield. The government and other stakeholders should encourage dairy farmers to overcome the challenges in each production system, which ultimately reduces the production cost and enhances competitiveness.

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