Project brief

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Cost of production and profitability of dairy farms in Ghana and Senegal

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- **Cattle are primarily kept for beef production, while dairying is still a developing industry in Ghana and Senegal**
- **Agro-pastoral and pastoral systems are characterized by local breeds with low milk-yielding capacities**
- **Ghana has lower costs of raw milk production compared to Senegal**
- **Feed costs and family labour are crucial factors in the profitability and competitiveness of dairy production systems**

Background and aims

Rapid population growth, rising per capita income, and urbanization have led to large increases in the milk 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. Nevertheless, domestic milk production has been insufficient to meet the increasing demand, and presently both countries rely heavily on imports of milk products, mainly from the European Union. Thus, boosting domestic raw milk production is needed if the reduction of imported milk powder is an objective.

This Project brief presents the results of the second work package of IMMPEX. The main purpose of this work package is to identify and characterize the prevailing dairy production systems and measure and compare the cost of milk production of different milk production systems in Ghana and Senegal.

Data and methods

For our study, we constructed six typical dairy farms representing the most common dairy production systems in each country. The typical farms were constructed through a series of steps referred to as the *agri benchmark* Standard Operating Procedure (SOP). **Step 1**, by reviewing national statistics and consulting local experts, the researchers identified the most important production regions and within them most common dairy production systems. **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 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.

Key findings

The key characteristics of the typical farms are summarised in Table 1. The typical farms were named according to their country code and the number of their milking cows. The differences between all the farming systems are primarily driven by the disparities in inputs and outputs.

Table 1: Characteristics of the typical dairy production systems

Farm	GH_03 Confined-cut and carry	GH_35 Agro-pastoral	GH_27 Pastoral	SN_90 Confined silage	SN_15 Agropastoral	SN_15 Pastoral
Breeds	Jersey Local x Sanga Friesian	Jersey x Local Nigeria x Local	Sanga	Holstein, Normande	Gobra, Ndama, Diakore	Gobra, Gouzerat
Milking cows	3	35	27	90	15	15
Farm land (ha)	0.2	0.4	1.6	73	1	8
Milk yield kg/cow/year	4160	1063	963	3150	600	179
Cattle sold	Calves	Finished cattle	Finished cattle	Calves	Finished cattle	Finished cattle
Labour (hrs/year)	1,008	4,592	2,080	37,440	6,760	4,704
Feed ration	Cut grass Wheat bran, Brewers grain	Grazing, Wheat bran Cassava peels	Grazing Cow-pea Cassava peels	Sorghum Maize silage, Maize grain, Panicum, Rice bran	Grazing, Crop residues Cottonseed Peanut hay	Grazing, Peanut oil cake, Maize

Source: Own survey and calculations.

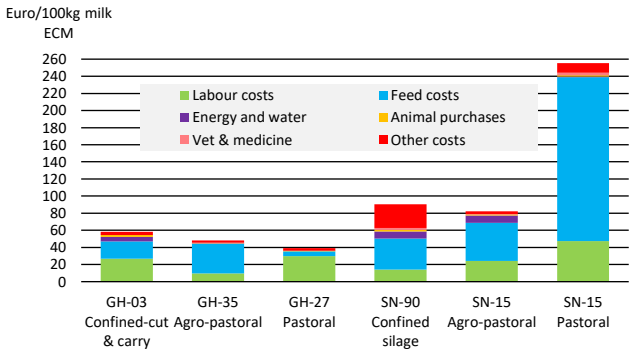
Figure 1 compares costs of milk production and reveals that milk production in Ghana is relatively cost-competitive compared to Senegal. Feed and labor costs are the highest variable costs on all dairy farms in Ghana and Senegal.

In Ghana, feed costs account for up to 36% of the total costs for GH_03 and 72% for GH_35, and 15% for GH_27. GH_03 relies entirely on purchased feed supplements during the dry season and also purchases grass and plantain leaves during the wet season. However, GH_35 usually provides purchased feeds only

during the dry season (November to March) to help maintain milk production. GH_35 has higher feed costs in comparison to GH_03 because it provides feed to bulls as the farm keeps its bulls on the farm for an extended period. In contrast, GH_03 sells its calves after weaning. The farm GH_27 has the lowest feed costs (year-round grazing) but the highest labour costs. The Fulani cattle keepers accompany the animals permanently, receive a basic wage and keep the milk produced on the farm, which we have valued at the milk price.

In Senegal, feed costs account for up to 40% of the total costs for SN_90 and 54% for SN_15 (agro-pastoral), and 75% for SN_15 (pastoral). Low productivity indicators for SN_15 (pastoral) represented by low calving rate and high mortality have led to high production costs per unit production. Moreover, SN_15 (pastoral) had the highest feed cost due to the long dry season (November to June), which depends highly on purchased feed with limited grazing. Similar to GH_03, SN_90 provides more concentrates to its cows: the concentrates are both purchased and homegrown, and the high feed cost is mainly due to Holstein cows with high feed requirements. SN_90 has high depreciation costs due to large investments in buildings and machinery for Holstein cows. The high labor cost in SN_15 (agro-pastoral) and SN_15 (pastoral) is mainly attributed to the high opportunity cost of family labor. The availability of grazing land in Ghana and cheaper agro-industrial by-products also contribute to lowering the costs of milk production compared to Senegal.

Figure 1: Comparision of milk production costs

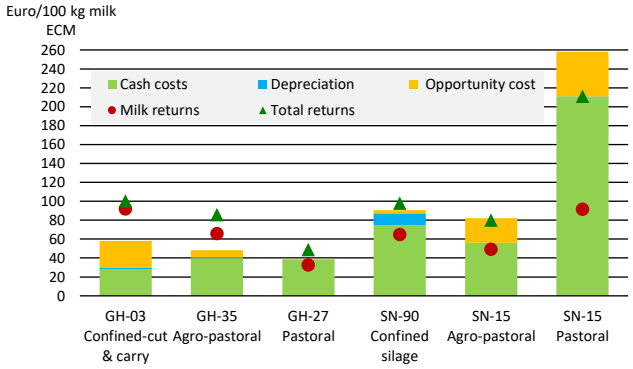


Source: Own survey and calculations.

Figure 2 shows that GH_03 makes a high return of 91% of total returns from milk, followed by GH_35 (76%) and GH_27 (65%). The differences in the results can be attributed to the better genetic potential of milking cows, better animal husbandry practices, and access to a better milk price that enabled GH-03 farmers to get higher milk returns. However, due to low productivity and low milk prices, milk returns in GH_27 are not able to cover cash costs. Except for GH_03, all farms in Ghana and Senegal earned considerable returns from heifers and cull cows.

Despite low milk yield, SN_15 (pastoral) farms enjoy higher milk prices as the availability of milk on the market is scarce. The study confirmed that all the farms besides SN_15 (agro-pastoral) and SN_15 (pastoral) were profitable in the short, medium, and long terms. SN_15 (pastoral) had the lowest milk yield and highest feed costs. Therefore, SN_15 (agro-pastoral) and SN_15 (pastoral) are economically unviable in the long term because total returns cannot cover the total costs.

Figure 2: Comparision of milk productionprofitability



Source: Own survey and calculations.

Advice for policymakers

Based on the results of this study, it is suggested that both countries face similar challenges. Therefore, the following actions would assist the increase of domestic milk production and potentially its market share.

- Improve access to quality breeding services, both in terms of artificial insemination and appropriate breeding bulls, to significantly increase milk production. Also, it is important to improve the indigenous cattle breeds through genetically selecting the best sires available domestically.
- Increase the access and utilization of locally available, relatively cheap crop residues and agro-industrial by-products (e.g., groundnut, cowpea).
- Bridging the knowledge and skill gaps in dairy husbandry through developing and implementing training modules on, e.g., fodder production and conservation, feed storage, feed formulation, and feeding dairy cows. Moreover, actively encourage farmers to participate in training and continue to advance their knowledge and skills.
- Increase dairy market outlets by forming market-oriented dairy producer led-cooperative and increasing and improving infrastructure facilities in order to reduce transaction costs associated with distance from milk market outlets (roads, cooling and milk processing facilities).

Further Information

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