

# Project *brief*

Thünen Institute of Market Analysis

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## Trade and Agricultural Policy Analysis: The Dairy Sectors of Ghana and Senegal

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- **Scarce water resources and the harsh climate are constraints for the domestic production of milk in Ghana and Senegal.**
- **Restricting imports would reduce the availability and accessibility of dairy products.**
- **Genetic improvement policies through Artificial Insemination projects have been the main policy in the dairy sector of Senegal and increased production by 80 000 tons in 2018.**
- **The Ghanaian dairy sector does not feature prominently in economic planning or agricultural policies.**

### Background and aims

This Project brief summarizes the fifth work package of the project “Impact of Meat and Milk Product Exports on Developing Countries” (IMMPEX). It represents a summary of the impact analysis of dairy policies in Senegal and Ghana.

In both countries, the self-sufficiency rate of dairy products is very low. In 2018, it was 29% in Senegal and 15% in Ghana. The past 20 years show a strong increase in imports and a smaller growth in domestic milk production in both countries. While in Senegal local milk production is more important and on a higher level, domestic production in Ghana is low. To increase domestic production, Senegal has implemented agricultural policies that mainly target the genetic improvement of local breeds of cattle. Ghana's policy interventions are minor in that sector. Here, the main goal is to produce beef rather than milk. On the trade policy side, both countries only have a few import restrictions (tariffs in the range of 5 % to 20 %) so far because on the one hand imported products like milk powder are used

in the value chain and processed into final dairy products (value added). On the other hand, domestic producers might not be able to meet the demand. More specifically, we intend to assess two policy effects; a) domestic policies in the Ghanaian dairy sector, and b) artificial insemination projects in the Senegalese dairy production.

### Method and data

Due to limited data availability, empirical analysis of policy effects in Ghana and Senegal is a difficult task. To overcome this challenge in our analysis, we use the Synthetic Control Method (SCM) to evaluate the potential effects of the policy interventions on the dairy sectors of Ghana and Senegal. We use the annual panel dataset to evaluate the policies. The data is taken from the FAO and the World Bank.

### Key findings in Senegal

Senegal has implemented two consecutive Artificial Insemination programs since 2008. These programs include the Special Artificial Insemination Program (PSIA) and the Dairy Industry Development Support Project (PRADELAIT). Our findings indicate that the domestic production of milk has increased after the Artificial Insemination projects were implemented in 2008 (Figure 1). The gap between the observed production and synthetic (estimated) Senegal demonstrates the potential positive effects of the Artificial Insemination projects. In 2018 80 thousand tons of additional milk supply can be attributed to the Artificial Insemination projects. From 2008 to 2018 the production of milk grew by 66 % in total. Most of the growth (40%) can be attributed to the Artificial Insemination projects.

The production objective of the PSIA was to obtain additional milk production in Senegal of up to 400 million liters by 2012. The SCM results imply that only 20 % of the initial objective were achieved by 2012. Despite its positive effect, the lower

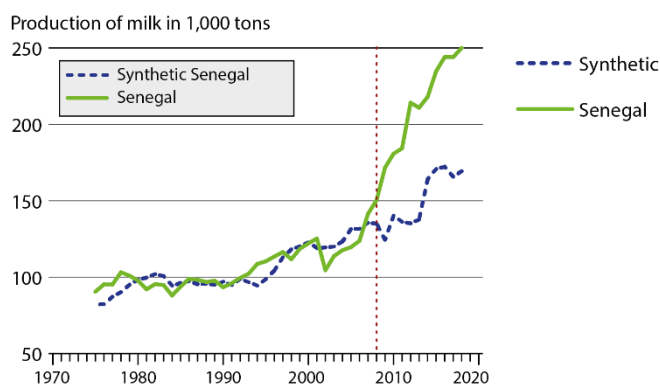


Figure 1: Actual milk production of Senegal vs. synthetic, Senegal

yield of milk production could be partly caused by low feed quality and animal health. Besides, the dairy sector of Senegal has been facing several challenges including water resource scarcity and harsh environmental conditions. Due to water resource shortage, herder, especially in the northern region, rely heavily on groundwater, as the average rainfall is low and erratic.

Water used in milk production includes both drinking water for cattle and water used to produce animal feed. In this context, we consider blue water, which is used to water animals, as well as green water, which is the sum of soil evaporation and plant transpiration, which is primarily related to feeding animals. We calculate the water required for implementing Artificial Insemination projects in Senegal from 2008 to 2018 using the water footprint of fluid milk estimated by the literature. Figure 2 presents the volume of water required to achieve the outcome of the Artificial Insemination projects from 2008 to 2018. In total, 0.84 km<sup>3</sup> of extra water was required, consisting of 0.07 and 0.77 km<sup>3</sup> of blue and green water respectively. In 2018, the total extra water required for Artificial Insemination projects accounted for 5 % of annual agricultural water withdrawals in Senegal. It is worth noting that apart from the positive effects of Artificial Insemination projects on domestic production, there is still a huge gap between total imports and production in Senegal. To bridge this gap by reducing the dependency on imports, more water resources might be required which is a serious constraint for domestic production. Furthermore, the maximum tariff that is allowed for Senegal under WTO rules (i.e. bound tariff rate) is set for dairy products between 15 % and 30 %. This means that Senegal would be able to gradually raise these tariffs without violating WTO rules. This policy, however, would have a negative effect on the availability of dairy products.

### Key findings in Ghana

We find that over the entire period of 2002 to 2015, actual domestic milk production in Ghana remains relatively constant. Overall, the public interventions in Ghana's dairy sector are minor and thus we do not expect significant progress in milk production due to domestic policies. There are two reasons backing up this hypothesis: Firstly, the dairy sector does not feature prominently in economic planning or agricultural policies in Ghana. Furthermore, the implemented policies primarily addressed non-production issues in the dairy sector. Second, cattle producers' main goal is to produce meat (beef) rather than milk. The maximum tariff that is allowed for Ghana under WTO rules is set for dairy products between 40 % and 99 %. This means that Ghana would have the possibility to further increase these tariffs without violating WTO laws. However, this policy would have negative effects on the availability of dairy products.

### Conclusions

- In Senegal, the objectives of Artificial Insemination projects may not be achieved mainly due to harsh environmental conditions and water resource shortages.
- Since the drought-tolerant breeds are not typically high-yielding dairy cattle, domestic demand can only be met by imports. This can help to save water resources and increase the availability and accessibility of dairy products in Ghana and Senegal – especially in the dry season.
- Protectionist measures such as trade bans or an increase in tariffs on imported dairy products would reduce the availability and accessibility of dairy products.

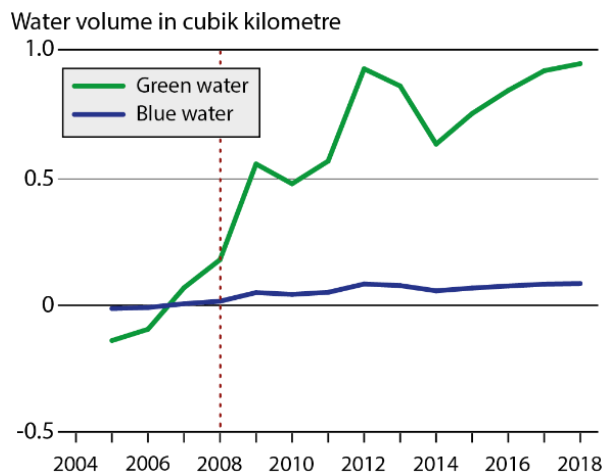


Figure 2: Extra water required for Artificial Insemination projects

### Further Information

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 Zamani O, Chibanda C, Boimah M, Asante-Addo C (Forthcoming) Policy Effects and Coherence in the Agricultural Sector of Developing Countries: Evidence from Ghana.

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