

The efficiency of milk production in Malawi



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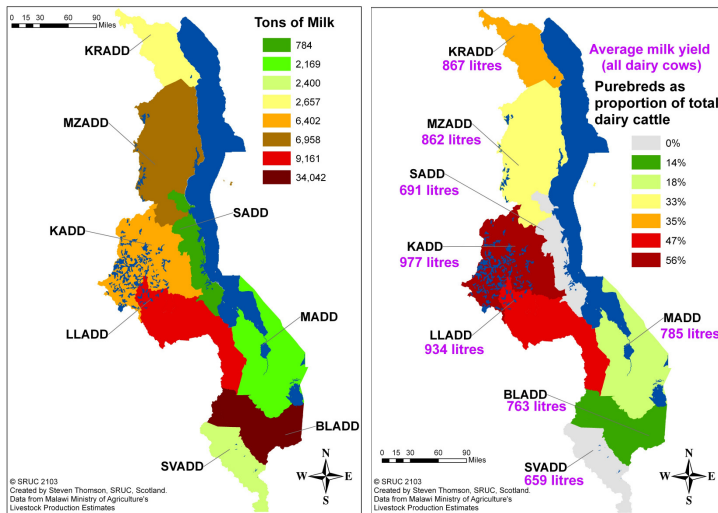
Introduction

Over the last few decades there has been an increasing focus on expanding milk production within Malawi. Despite a series of interventions towards this sector, significant constraints to output growth are still present. This poster presents preliminary estimates of the distribution of efficiencies within this sector and identifies some underlying drivers behind inefficiency.

Data

Figure 1 shows spatial data of dairy production in Malawi. Whilst the Southern region has the majority of dairy cattle and milk production, farmers are more reliant on crossbred dairy cows. The Central region, whilst less important than the South for milk production, has considerably more purebred cattle which is a result of recent interventions in this region. This clearly has an effect on yield per cow which is higher in the central regions (LLAD, KADD) compared to the South. However, introduction of these purebreds will increase the pressure on providing inputs and expertise to manage increasing yield.

Figure 1: Distribution of milk production, average milk yield and breed, 2013



Methodology

In order to explore this question further, a detailed questionnaire was administered to 460 farms over the period February to March 2013. This was in order to understand physical, financial and managerial aspects of milk production within Malawi. Key descriptive variables are presented in Table 1 below.

Table 1: Descriptive statistics, mean and standard deviations

	Yield (litres per cow/day)	Age (years)	Area (ha)	Experience (years)	Cows (No)	Pure Bred (% total herd)
North	14.9	48.7	4.4	5.8	1.6	0.8
SD	5.1	15.6	3.8	3.8	0.7	0.3
Central	15.8	46.0	2.9	6.8	1.4	0.9
SD	6.1	13.9	2.0	4.8	0.7	0.3
South	15.0	46.0	1.6	8.4	1.7	0.8
SD	5.2	12.2	1.3	9.3	0.7	0.4

We apply Data Envelopment Analysis (DEA) which is a non-parametric technique for comparing relative efficiency within a sample of decision-making units. We impose both an output orientation and variable returns to scale. This holds inputs fixed and aims to optimise milk production at the whole farm level. This aligns with current policy to ensure increases in milk output and quantifies the amount by which milk output could be expanded. This poster focuses only on technical efficiency, that is the relationship between physical inputs and outputs.

Results

The median and range of efficiency rankings are shown in Figure 2. This shows the Central region has the most efficient farms, but also the most variable, in terms of technical efficiency.

Figure 2: Spread of technical efficiency by region

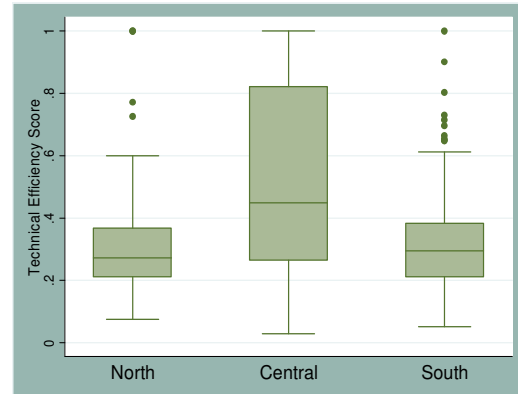


Table 2 shows estimates of a Tobit regression, which indicates the effect of various drivers on increasing efficiency. Age and education are not seen as significant drivers of efficiency growth within this sector. However, years of experience, as would be expected, is positive.

Table 2: Results of Tobit Regression analysis

Variable	Coefficient
Intercept	-0.55***
Age (years)	-0.07
Education (level)	0.09
Total farming area (ha)	0.17***
Experience (years in farming)	0.05*
Pure Breeds (percentage of total herd)	0.09***
Central (compared to North)	1.01***
South (compared to North)	0.19

indicates significance level (*, 0.05; **, 0.001; ***, 0.0001)

Notable drivers of efficiency are regional, specifically farms in the Central region have a significant higher effect on efficiency (compared to the North). In addition, a greater effect is seen from having more pure breeds compared to crosses, as well as a larger farm area, indicating the possibilities for increasing returns to scale within this sector.

Conclusions

- Whilst these are preliminary results we can highlight the following areas for further investigation:
- There is significant regional distribution in the efficiency of milk production in Malawi.
- The rise in the availability of pure breeds has driven efficiencies upwards, but this is complemented by increasing levels of experience in managing dairy herds as well as access to land area.
- Theoretically, if all farms could perform on the technology frontier the level of milk supplied would be increased by over 250% on the present recorded outputs of these farms. In physical terms this would mean the 460 farms surveyed here could offer an increase in supply of around 8,000 litres per day.

Acknowledgements

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