Financial impacts of intervention reducing young stock mortality for smallholders in Ethiopia

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1. Introduction

Ethiopia is home to 66 million cattle, and 88 million sheep and goats. Livestock are an important asset for smallholder farmers, and high mortality in young stock has the potential to cause significant financial loss.

With the aim of reducing levels of mortality from birth to weaning, the Young Stock Mortality Reduction Consortium (YSMRC) was launched in 2016. The YSMRC collaborated on a pilot project to deliver a basic package of health and husbandry interventions[1].

2a. Materials & methods: *Intervention*

The pilot project delivered a package of interventions to 600 households in mixed and pastoral systems.

Baseline data for the trial was collected from March to August 2019, prior to the introduction of any interventions. These were introduced to participating households via training sessions throughout the 1-year study period. Post-intervention evaluations were carried out from March to July 2020.

[1]*For details refer to **Allan et al. (2023)**, Reducing camel & small ruminant young stock mortality in Ethiopia, under review at Preventive Veterinary Medicine.*

2b. Materials & methods: *Measuring benefits*

To measure financial benefits, we converted reduced mortality to an increase in the number of progeny surviving to 12 months of age, and estimated the value (V) of an animal aged 12 months (t) as:

$$V_t = P \times \frac{a_t}{A} \times \frac{w_t}{W} \times (1 - f)$$

P	sale price of an adult animal
a_t	% of animals born still alive at time t
A	% of animals born that reach adult age
w_t	weight at time t
W	mature weight
f	feed costs as a % of the adult sale price

We calculated the present value of 10 years benefits using a 3% discount rate, and the benefit-to-cost ratio per intervention (where the cost per intervention is 4,231 ETB, or US $80, per household, in each system).

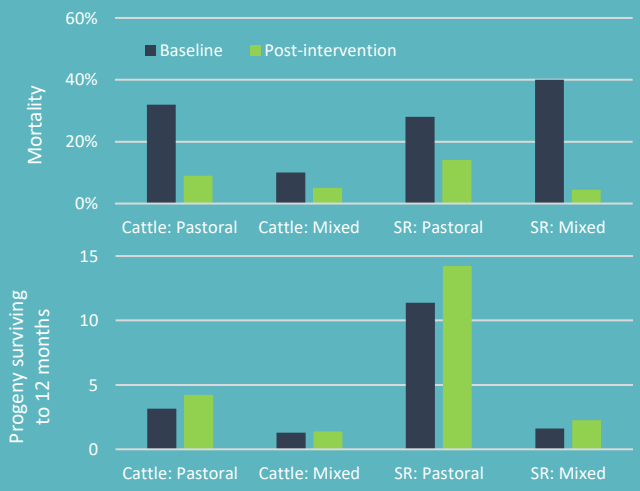

Fig 1a & 1b) Mortality & progeny surviving to 12 months at baseline and post-intervention

3. Results & discussion

Large reductions in mortality translate to smaller increases in the number of progeny reaching 12 months age. The value of cattle at 12 months is much less than at maturity, due to the younger animal's lower weight (SR reach maturity at 12 months.)

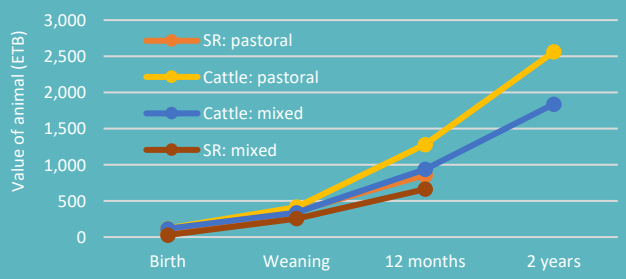

Fig 2) Estimated value of animal (in ETB) from birth to weaning.

In pastoral systems, benefits for cattle and small ruminants exceed the cost to deliver the intervention per household. In mixed systems the benefits are lower than the costs due to lower baseline mortality and smaller herds/flocks (where fewer females express less benefits from an equal reduction in mortality percentage). The results are not significantly different even with 25% higher estimated animal values.

	Cattle		*Small ruminants*	
	Pastoral	**Mixed**	**Pastoral**	**Mixed**
-25%	8,752 (2.1)	521 (0.1)	15,538 (3.7)	2,743 (0.6)
Base	**11,669 (2.8)**	**695 (0.2)**	**20,718 (4.9)**	**3,658 (0.9)**
+25%	14,586 (3.4)	869 (0.2)	25,897 (6.1)	4,572 (1.1)

Table 1) PV of 10 years benefits (in ETB), cost-to-benefit ratio, & sensitivity to the value of an animal at 12 months.

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