

Intervention impact assessment for reducing livestock mortality



THE UNIVERSITY of EDINBURGH
Royal (Dick) School of
Veterinary Studies

Supporting
Evidence-based
Interventions



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SEBI interventions

- **Target = Reduce national ruminant livestock mortality rates by 10-15% in 10 years** (in Ethiopia & Nigeria)
- Young stock mortality (YSM) reduction workshops
- Mastitis Vaccine
- Best practice mastitis reduction workshops

- Other future interventions...
 - Build framework that can be applied to other interventions in the future

Approach for impact assessment

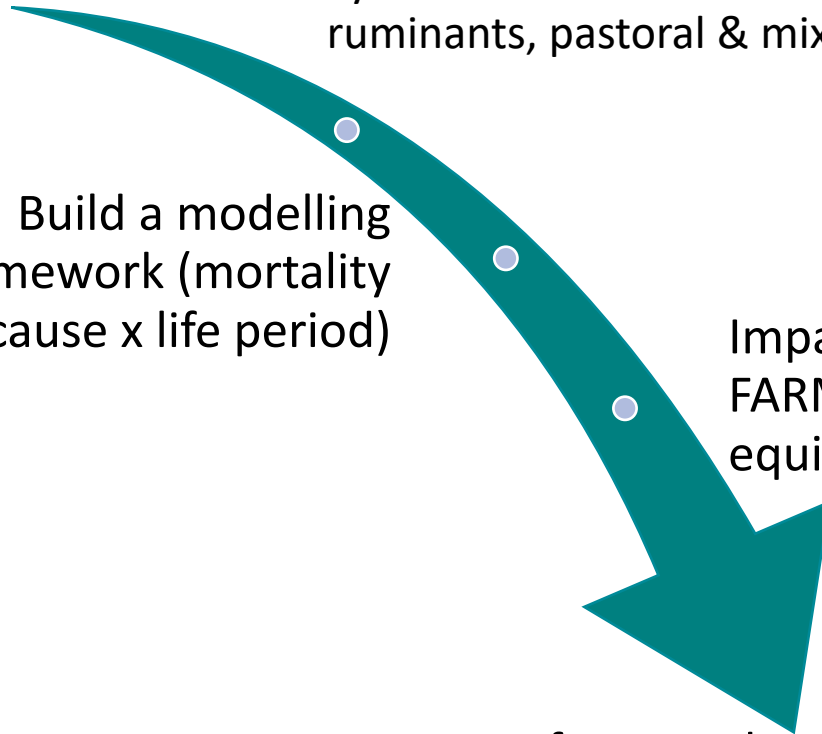
Establish baseline
mortality

Systems = cattle & small
ruminants, pastoral & mixed

Build a modelling
framework (mortality
cause x life period)

Impact of intervention – on
FARM mortality & mortality
equivalents

Impact of accumulated interventions – on
NATIONAL mortality (over 10 years)



Step 1 = Establish Baseline Mortality

Survey (Vets & academics)

Literature review



Conception to birth	10%
Birth to 7 days	15%
7 days to weaning	15%
Weaning to slaughter	10%
Total mortality	50%

Step 2 = Period x Cause of mortality

“Allocate” baseline mortality at each period, according to cause of mortality

	Malnutrition	Weak at birth	Diarrhea	Respiratory disease	Parasite	Predator	Other	
Conception to birth	8%						2%	10%
Birth to 7 days	5%	5%				3%	2%	15%
7 days to weaning	2%	1%	2%	4%	2%	2%	2%	15%
Weaning to slaughter	4%		2%	4%				10%
Total mortality	19%	6%	4%	8%	2%	5%	6%	50%

Example only.

Step 3 = impact per farm

e.g. Colostrum feeding at birth

Intervention: Reduces mortality due to malnutrition & weakness at birth

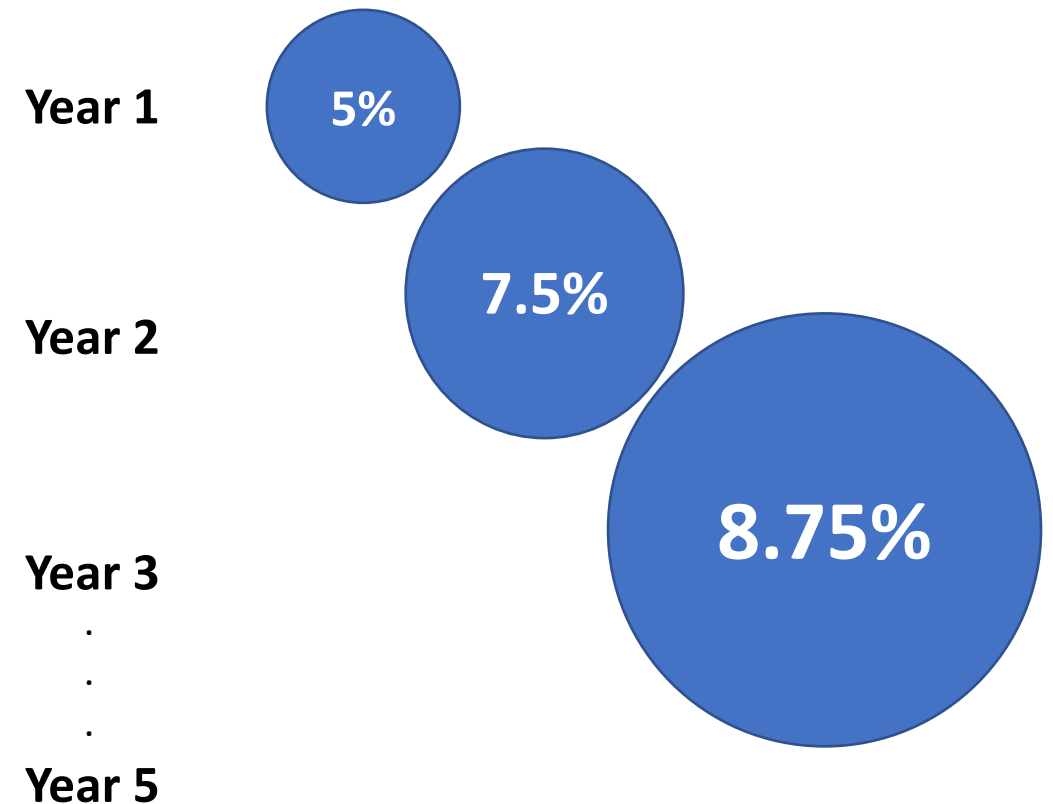
	Malnutrition	Weak at birth	Diarrhea	Respiratory disease	Parasite	Predator	Other	
Conception to birth	8%						2%	10%
Birth to 7 days	2%	5%				3%	2%	12%
7 days to weaning	1%	0%	2%	4%	2%	2%	2%	13%
Weaning to slaughter	4%		2%	4%				10%
Total mortality	15%	5%	4%	8%	2%	5%	6%	45%

Decrease in baseline mortality

Step 3 = impact accumulation

- E.g. workshop teaches farmers skills
- **Farmers improve techniques & practices over time**
- Impact of intervention increases (diminishing) over time

Decrease in baseline mortality



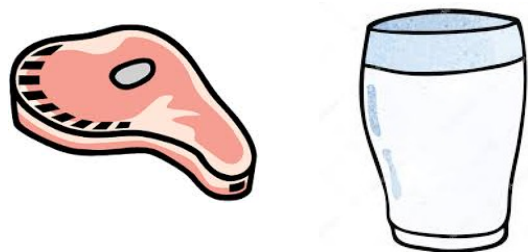
Mortality equivalents

- Not all interventions affect mortality directly
 - Mastitis has indirect effects, via malnutrition of suckling offspring
 - Mastitis also reduces milk production
- **How to compare the impact of production-focused interventions vs. mortality-focused interventions?**

Mortality equivalents

For interventions that prevent production loss

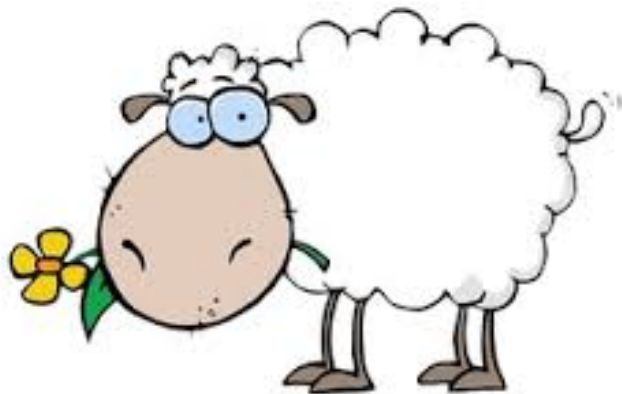
Extra profit meat + milk/ lifetime (+\$4)



=



Equivalent extra
animals ALIVE (+4%)



How much in
mortality terms?

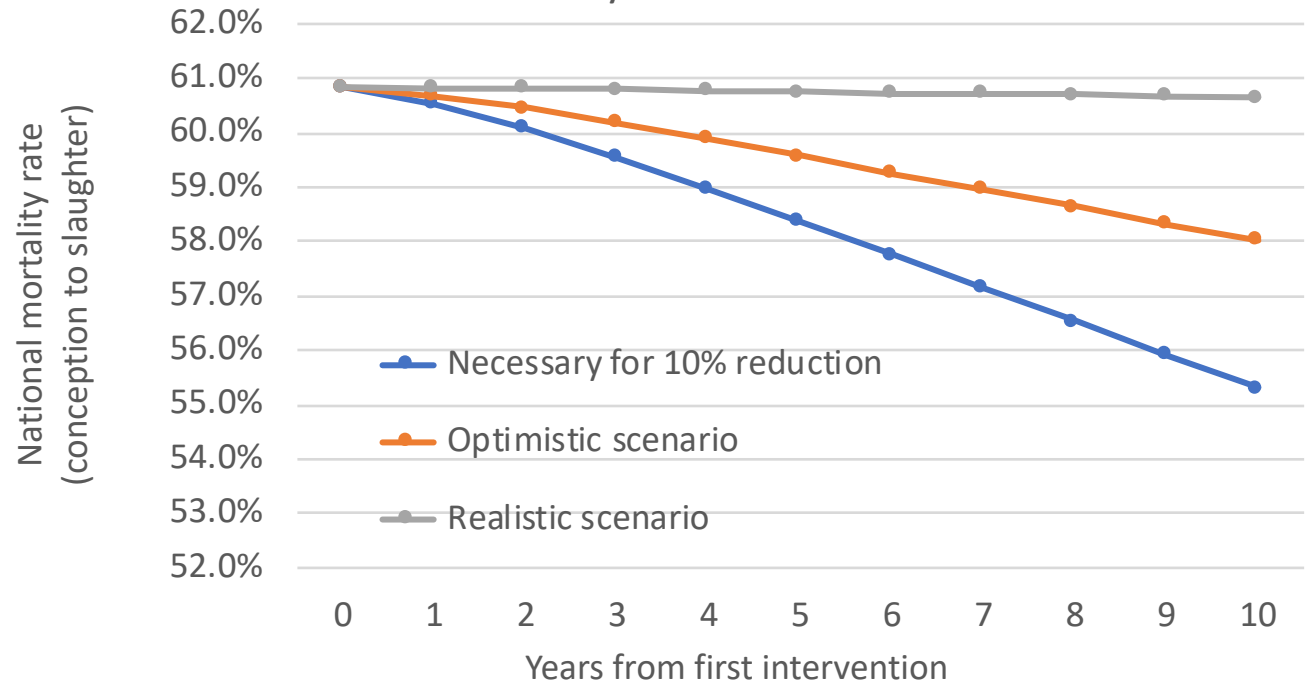


Average animal
lifetime profit
\$100

Step 4 = national impact scenarios

- Realistic
 - 900 farms /year
- Optimistic
 - Higher impact per farm (50%)
 - Increase to 9000 farms /year
- Necessary
 - 10% decrease requires 17k farms/ year

Total intervention impact for Cattle in Ethiopian Pastoral system



YSM example – effort required

		Realistic (900 farms/year)		Optimistic (9,000 farms/year)		Necessary
		% of target achieved*	Deaths averted/year	% of target achieved*	Deaths averted/year	Interventions /year
YSM reduction project	Ethiopia/Cattle/Pastoral	3.1%	9,412	46.3%	141,175	17,628
	Ethiopia/Cattle/Mixed	2.1%	3,387	30.8%	50,807	26,520
	Ethiopia/S.R./Pastoral	2.6%	18,298	39.2%	274,465	20,823
	Ethiopia/S.R./Mixed	2.9%	8,388	43.2%	125,814	18,927
	Nigeria/Cattle/Pastoral	35.5%	47,005	532.7%	705,082	1,533
	Nigeria/Cattle/Mixed	24.4%	9,054	365.4%	135,807	2,235
	Nigeria/S.R./Pastoral	1.5%	28,107	22.7%	421,611	35,961
	Nigeria/S.R./Mixed	0.8%	7,652	11.9%	114,786	68,614

* A 10% reduction in baseline mortality = 100% of target achieved (the "Necessary" scenario)

Outcomes

- Interventions have variable effectiveness on farm
 - YSM and mastitis workshops have potential for big impact, but scalability challenges
 - Mastitis vaccine is scalable but needs high efficacy
- 10% is a BIG national target
- Efficient and scalable interventions are where gains can be made
 - For training, requires that farmers continually improve AFTER the intervention



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