

Monteverde Roots & Regenerative Agriculture

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The Traditional Dairy Industry

- Industry of scale
- Cows spend little to no time outside
- High rates of disease in cattle
- Greenhouse gas production
- Soil degradation

Regenerative Agriculture

- Reforest area with native growth
- Eliminate synthetic fertilizers
- Switch to renewable energy
- Compost using farm waste
- Minimize tilling
- Landscape field design to optimize water usage

About Monteverde Roots

- Dairy farm founded in 1980
- Carbon neutral since 2020
- Diversity in production
- Education of community

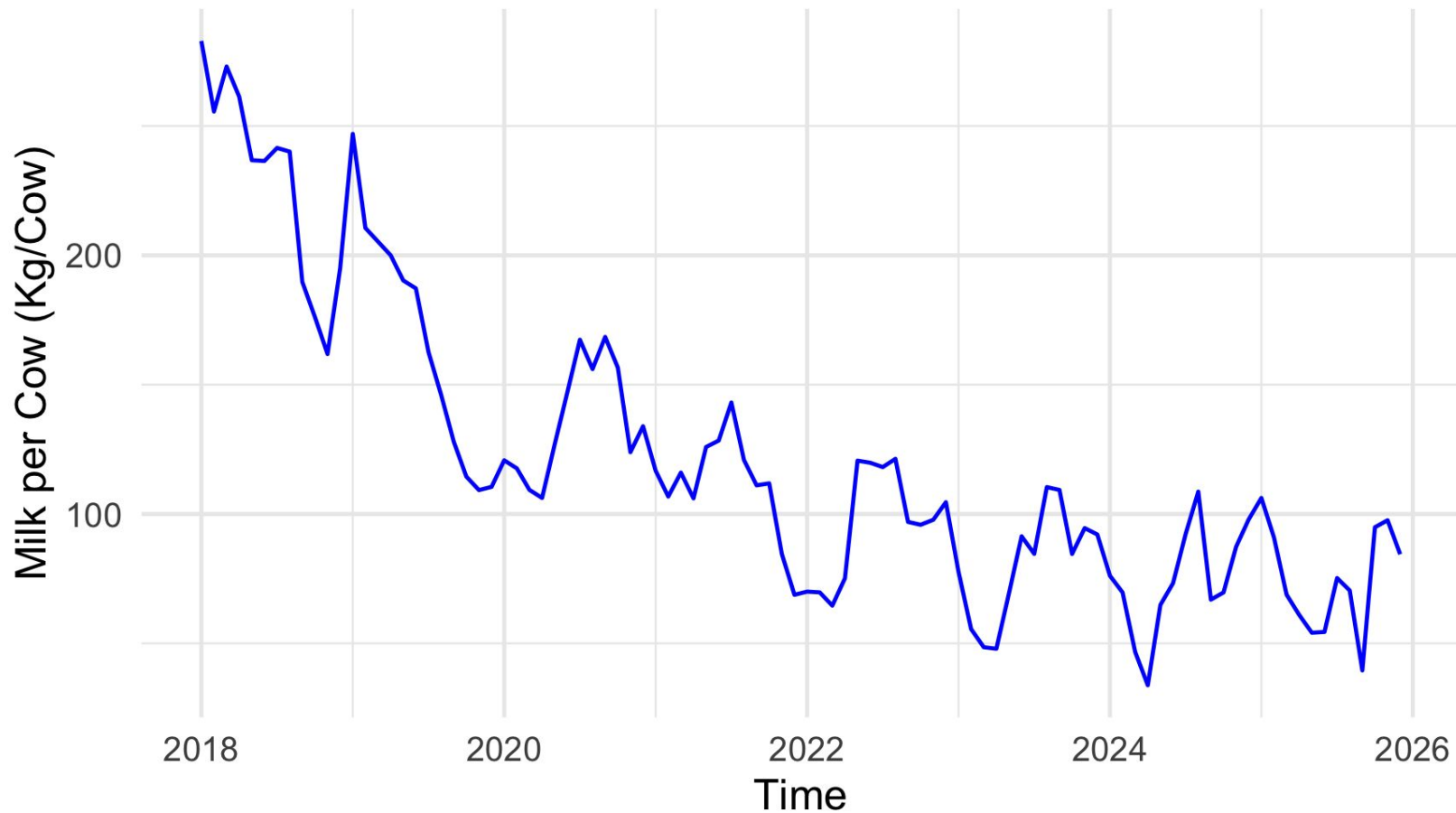
Overview of Data

- 3 sources of information
 1. Milk production & quality
 2. Purchased inputs
 3. Water & electricity consumption

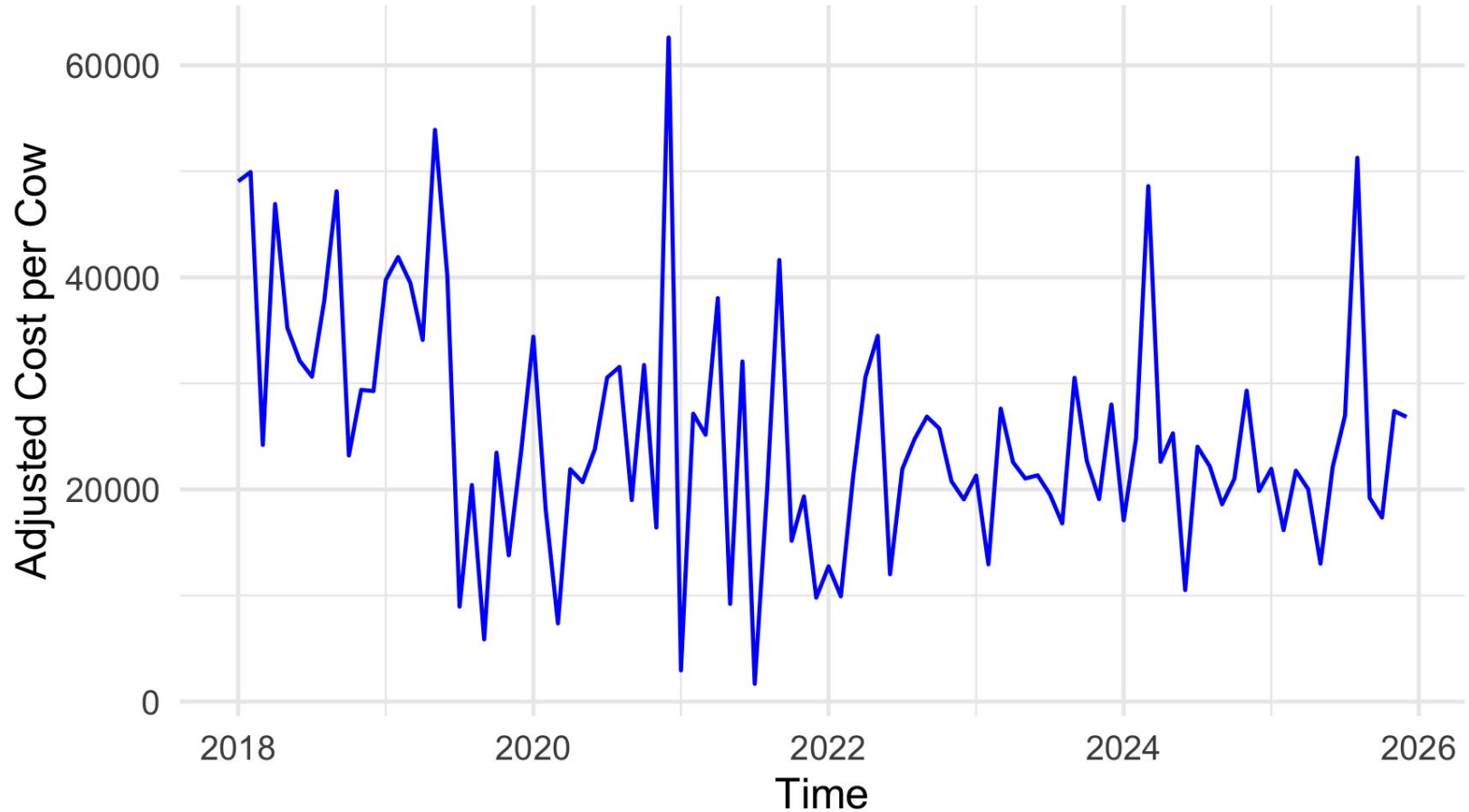
Goals

- Identify trends in milk production
- Explore trends in costs
- Identify factors that are correlated with milk production

Milk per Cow over Time



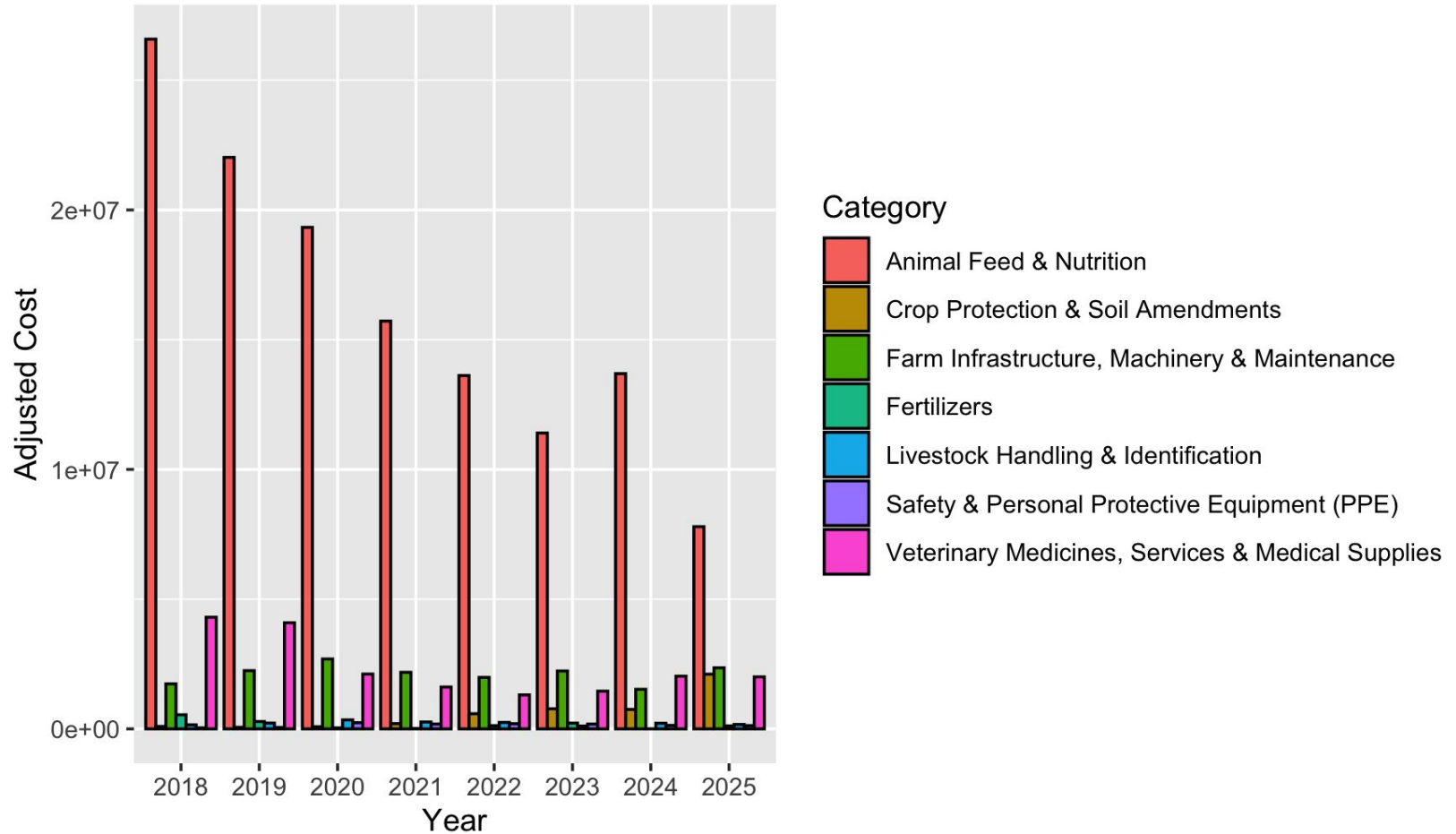
Total Cost per Cow over Time



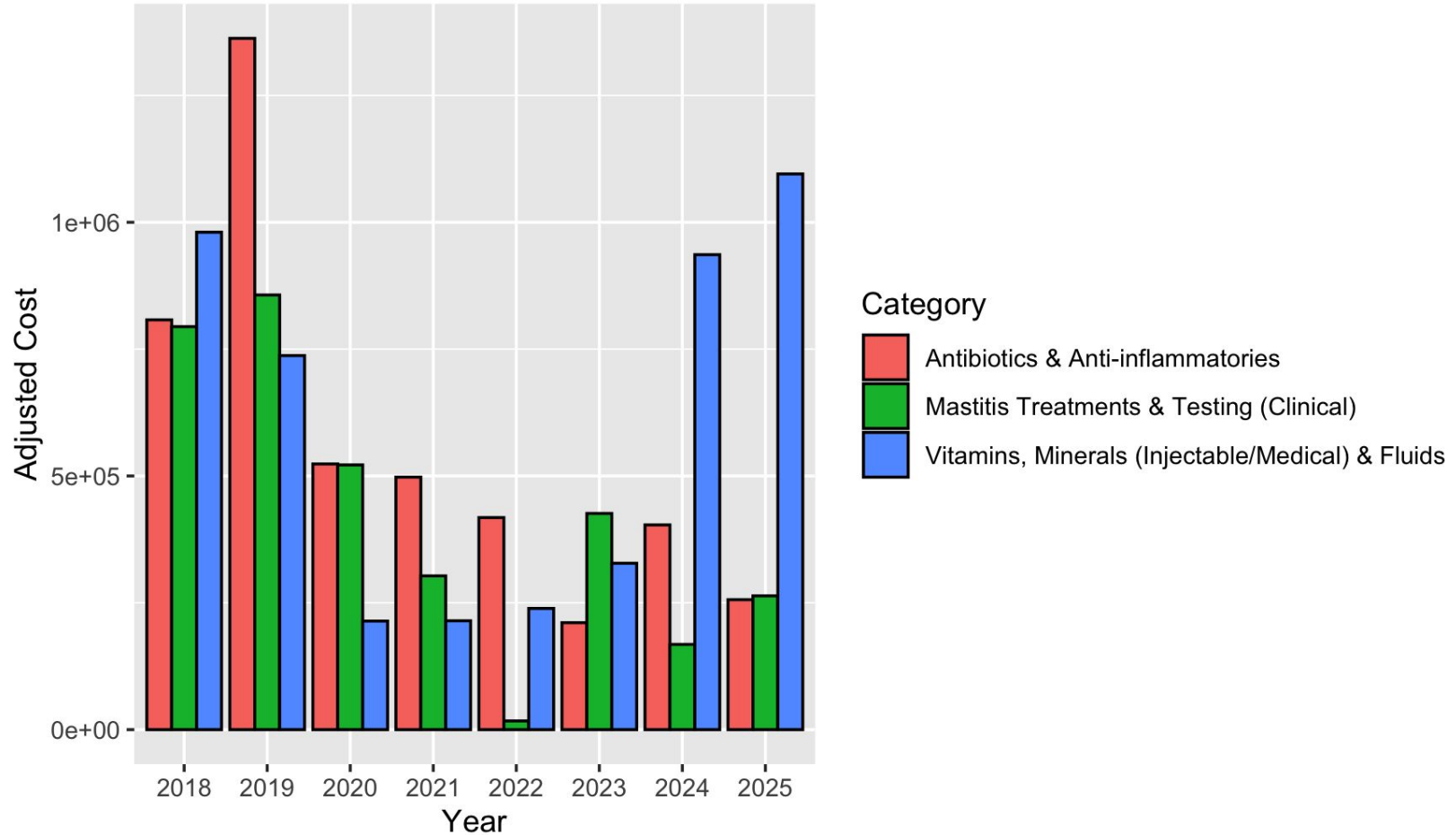
Categorization of Inputs

- 7 categories
 1. Animal Feed & Nutrition
 2. Crop Protection & Soil Amendments
 3. Farm Infrastructure, Machinery & Maintenance
 4. Fertilizers
 5. Livestock Handling & Identification
 6. Safety & Personal Protective Equipment (PPE)
 7. Veterinary Medicines, Services & Medical Supplies

Input Costs by Year



Veterinarian & Medicine Costs by Year



Dairy Production Trends

z test of coefficients:

	Estimate	Std. Error	z value	Pr(> z)	
sma1	4.1939e-01	1.0132e-01	4.1394	3.483e-05	***
Livestock Handling & Identification	1.0373e-02	3.6013e-03	2.8804	0.003971	**
Alive_Count	1.2520e+02	5.0264e+01	2.4908	0.012744	*

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Training set error measures:

	ME	RMSE	MAE	MPE	MAPE	MASE	ACF1
Training set	-100.2874	1227.433	956.7514	-2.363226	13.18522	0.4002585	0.09681432

Main Conclusions

- Overall milk production is decreasing
- Overall costs are decreasing
- Milk production does not depend significantly on any spending category other than Livestock Handling & Identification

**Thank you
for your attention!**