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Supply Chain Analysis for a Thermostable Peste des Petits Ruminants Vaccine in Karamoja, Uganda

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Introduction

- **Peste des Petits Ruminants (PPR)** is a highly infectious viral disease of small ruminants and wildlife in Africa and Asia.
- Morbidity and mortality rates can be up to 80-100%

Objectives

- **Assessment of the logistical perspective of the thermostable PPR vaccination strategy.** Provide a diagnostic of the logistical challenges and ways to improve them for future vaccination programs in the Karamoja.
- **Enhance understanding of the role of community animal health workers (CAHWs) in the vaccination program.** Determine the sustainability of CAHWs in low income settings where there are financial constrictions.
- **Measure performance indicators of the supply chain.** Identify possible bottlenecks, measure lead-time in different levels of the supply chain, determine optimal inventory levels and economic order quantities.

Methodology

Research location: Karamoja, Uganda
(Amudat, Kaabong, Kotido and Moroto districts)
Data collection:

Production and Logistic Analysis	Number of Interviewees
Focus Group Discussions with CAHW	43
Focus Group Discussions with Livestock Keepers	41
Interview with Veterinary Shop Owner	3
Interview with Veterinary Officers	2
Interview with District Veterinary Officers	2

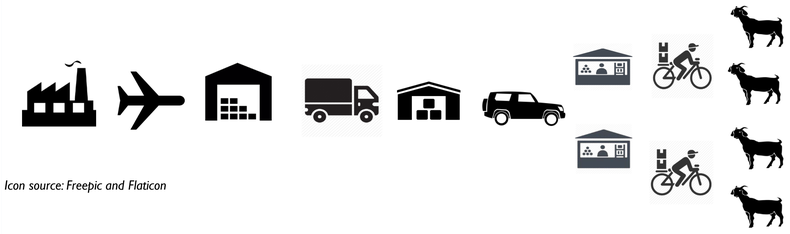
Statistical analysis: Microsoft Excel and Arc GIS

Focus Group with CAHW's in Kaabong

Focus Group with Livestock Owners in Amudat

Results

The scope of this research takes into consideration the portion of the supply chain that starts in the production center of vaccines going downstream to the livestock keeper who buys the vaccine for their livestock.



Icon source: Freepic and Flaticon

----------Level 1---------- ------Level 2------- --------Level 3-------- -----Level 4-----

Levels of the supply chain of vaccines in Uganda is divided for the purpose of this analysis in 4 levels:
Level 1: Production and central storage in Kampala
Level 2: Distribution to and storage in regional facility
Level 3: Distribution and storage at district level
Level 4: Distribution and vaccination at subcounty level.

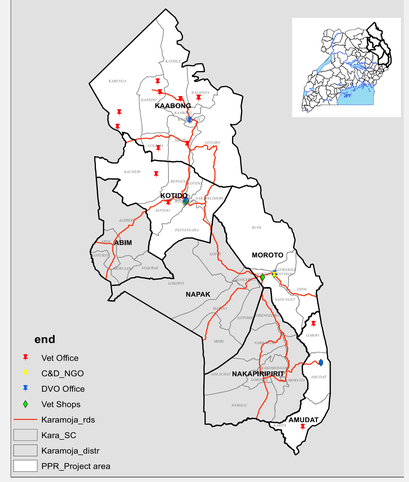
Challenges and Opportunities with CAHWs

1. Positive perception towards having vaccines available for sale in veterinary shops.
2. Strong link with CAHW owned veterinary shops in Kotido and Kaabong, not in Amudat.
3. Distance from veterinary shops directly affects their performance and motivation.
4. Protective gear use varies greatly, some reported not having gumboots and coveralls.
5. Education is needed for livestock keepers on the purpose of vaccines—prevention vs. treatment.

Indicators of the supply chain

- Possible Bottlenecks: Limited number of CAHW's in each district limits the number of animals that could be vaccinated per day. Also, there is a very limited number of veterinary shops that can store and manage the vaccine.
- Lead time is dependent on weather and road conditions (making careful planning of the intervention crucial). Lead times from Kampala is 2-3 days, but during the rainy season, it goes up to 7-10 days. Planning accordingly is crucial.
- Inventory policies and order quantities should be tailored to each region. For Kotido and Amudat a weekly re-order policy maintaining inventory above weekly target average vaccination is recommended.

Cold chain and road infrastructure in the selected districts of Karamoja



Road to Moroto after heavy rain

Production and Logistic Analysis	
Production Cost	$0.2 USD
Total final cost	$0.3046 USD
% of logistical costs	34.337%

Costs at each level for 2 month vaccination program (500,000 doses)		
Level	Cost	%
Level 1	$109,714.8	72%
Level 2	$1,406.17	1%
Level 3	$ 8,276.32	5%
Level 4	$32,894.74	22%

Discussion

- This supply chain strategy relies heavily on community participation in the last levels, which are usually the most challenging.
- Thermostability of the vaccine makes this distribution model possible.
- Approximately 78% of the logistical costs go to veterinary drug shop owners and to CAHW's.
- A business model approach may reduce the dependency on government and NGO led interventions for livestock vaccination.

Research Team

Lead Researcher: Daniel Acosta
Advisory Committee: Saskia Hendrickx and Dr. Sarah McKune (U. of Florida)
Partners: Mercy Corps; Ministry of Agriculture, Animal Industry and Fisheries (MAAIF), Uganda; Tufts University

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