



NAQIA

National Agriculture Quarantine &
Inspection Authority



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Case Control Study of the transmission routes and contributing factors for Lumpy Skin Disease (LSD) in Neverland, 2019 to August 2021

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Investigating the outbreak

1

Determine Outbreak

- Develop budget with potential activities
- Independent disease investigation on field
- Compare to normal baseline level of disease
- Identify preferred diagnostic test and verify diagnosis

2

Develop case definition

- Identify cases (disease, species)
- Location
- Describe clinical signs
- Disease timeline
- Mortality
- Vaccinated/Unvaccinated

3

Identify risk factors

- Possible transmission routes (movement of cattle, vectors, feeding, mating)
- Vaccination schedules, vector control programs
- Susceptible population

4

Develop hypothesis

- Develop case control study design questionnaire

5

Implement survey

6

Analyze findings

7

Confirm hypothesis

8

Report finding

- Write report
- Share findings with relevant stakeholders and report funding- both government, industries, farmer groups

Case definition and define controls

Case Definition

More than 1 unvaccinated cattle and water buffalo in a household that does communal grazing and tested positive on serology test (ELISA Ab) from 2019 to August 2021

More than 1 unvaccinated cattle and water buffalo in a household that either was symptomatic or asymptomatic for LSD and simultaneously tested positive on PCR / VI in September 2021

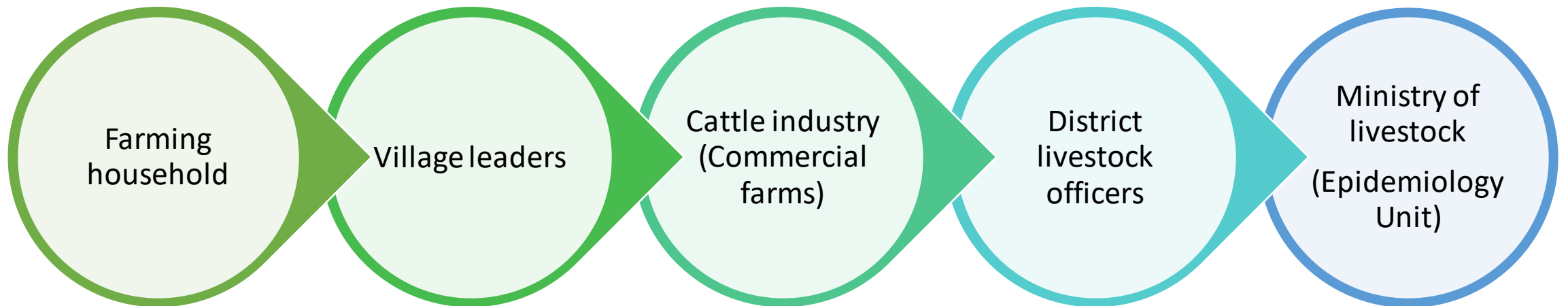
Controls

Unvaccinated cattle or water buffalo within the same sampling frame within the same conditions (communal grazing) that is non-symptomatic and tested negative on ELISA/PCR

Risk Factors

Movement of cattle, vector, mating (semen – natural/AI), contaminated water and feed

Stakeholder involved



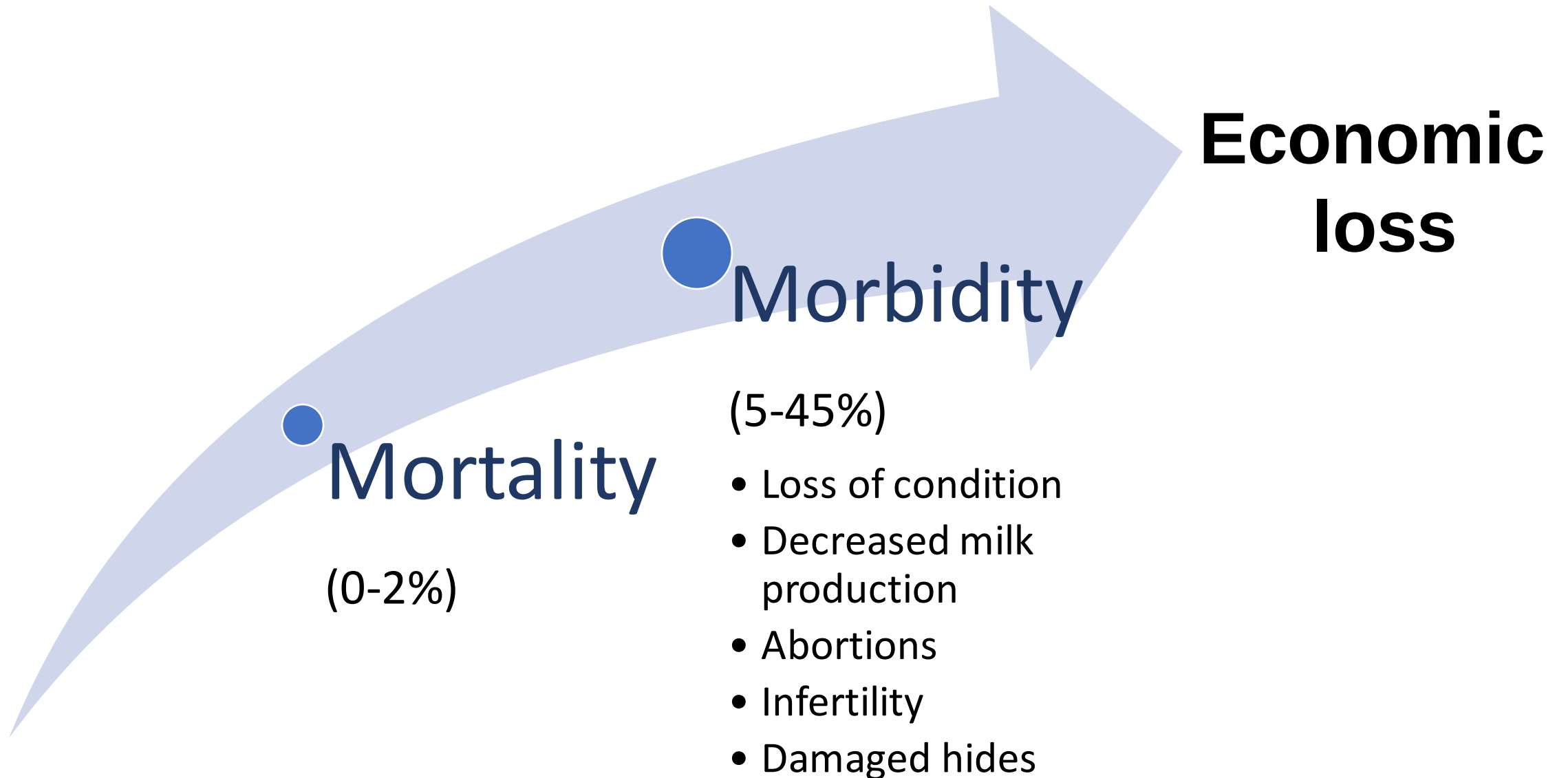
Source and transmission

- Do you practice communal grazing with your cattle herd?
- Has your cattle been communally grazing in the last week?
- Have you seen an increase of the clinical signs on your cattle herd in the last wet season? During the dry season?
- What do you feed your cattle with apart from grazing?
- How do you mate your cattle?
- Where do you get your supplement feed from?
- Do other herds have access to your feeding and water troughs?
- Do you use AI, Natural mating or both?
- Where do you source your bulls from?
- Where do you source your semen from?
- Which animals do you keep on your farm? Cattle/Water buffalo/Sheep/Goats



- First index case is often associated with cattle movements.
- After introduction, LSD virus seems to be spread mainly by blood-feeding insects, such as certain species of flies and mosquitoes or ticks.
- Seasonal transmission along with high insect activity during warm and wet periods.
- Also by contaminated feed or water, through semen by mating or AI and transplacentally

Evaluation



Study size

- **Total Population**= Total Households in Neverland that own cattle and water buffalo
- **Study Population**
 - Random selection from representative villages of households that have experienced outbreak in Neverland.
 - Limitations: Availability of farmers, Budget

Summary /discussion

- **Hypothesis:** Communal grazing increases the risk of cattle developing Lumpy Skin disease in Unvaccinated cattle.
- **Risk Factors:** Movement of cattle, vector, mating (semen – natural/AI), contaminated water and feed
- **Case definition:** Timeline is lengthy and Clinical + serological + molecular Testing needs to be considered.
- **Bias:**
 - selection of households- based on convenience/ people we know
 - Selections of samples only from outbreak areas- miss true prevalence
 - Number of animals may vary per household- influence selection
- **Limitations:** availability of farmers, costs

Budget Example

Key Outputs	Activities	Cost Estimate
1. Initial assessment survey (2-3 day)	- Field investigations	3000
	- Equipment, logistics, allowances, communications	
	- Laboratory diagnosis- PCR	100
2. Follow up investigations	- Risk Factors	5000
	- Disease dynamics	
3. Survey (est. 3 month)	- Survey tools	10000
	- Logistics, equipment, allowances, communications	
	- Diagnostic Tests (PCR, ELISA)	5000
4. Analysis of results/ reporting	-	3000
Grand Total		27,000