

# FR1.2: Women's Empowerment and Livestock Vaccination: evidence from PPR vaccination interventions in northern Ghana

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*Better lives through livestock*

*Immaculate Omondi<sup>1</sup>, Alessandra Galie<sup>1,\*</sup>, Nils Teufel<sup>1</sup>, Agnes Loriba<sup>2</sup>, Eunice Kariuki<sup>1</sup> and Isabelle Baltenweck<sup>1</sup>*

<sup>1</sup> *International Livestock Research Institute*

<sup>2</sup> *CARE International Ghana*

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# Presentation Outline

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Article

## Women's Empowerment and Livestock Vaccination: Evidence from Peste des Petits Ruminants Vaccination Interventions in Northern Ghana

Immaculate Omondi <sup>1,\*</sup>, Alessandra Galie <sup>1</sup>, Nils Teufel <sup>1</sup>, Agnes Loriba <sup>2</sup>, Eunice Kariuki <sup>1</sup> and Isabelle Baltenweck <sup>1</sup>

<sup>1</sup> Policy, Institutions and Livelihood, International Livestock Research Institute, Nairobi 30709-00100, Kenya; a.galie@cgiar.org (A.G.); n.teufel@cgiar.org (N.T.); e.kariuki@cgiar.org (E.K.); i.baltenweck@cgiar.org (I.B.)

<sup>2</sup> CARE International Ghana, Accra CT 2487, Ghana; agnes.loriba@care.org

\* Correspondence: l.omondi@cgiar.org

**Simple Summary:** Small ruminants (goat and sheep) are key livestock species in supporting women's empowerment (WE) in low- and middle-income countries. Animal vaccines are essential for livestock productivity, hence an important means to support WE. WE is, in turn, important for animal vaccine adoption. Little is known, however, of how WE is associated with animal vaccination for women-controlled livestock assets (e.g., goats and sheep). Our analysis explores the link between domains of WE and knowledge of, access to, and use of peste des petits ruminants (PPR) vaccines. Such knowledge can help inform the design of livestock vaccine systems that are better able to reach women and support their empowerment. Using a partial least squares structural equilibrium model (PLS-SEM), we analyzed data collected using the Women's Empowerment in Livestock Index (WELI) tool from goat keepers in Northern Ghana, which included a module on the PPR vaccine. We found a strong direct positive association between women and men's knowledge about animal health and PPR vaccination and a strong indirect positive association between access to PPR vaccines and empowerment. Moreover, women and men goat keepers differed in the dimensions of empowerment that the PPR vaccine facets were strongly associated with—asset ownership and input into decisions concerning livestock was significant for women but not for men. Consequently, policy and actions towards enhancing women's asset ownership, input into decisions about livestock production, knowledge of animal health and vaccines, and access to vaccines are important in designing effective and equitable livestock vaccine systems.

**Abstract:** Healthy livestock provide meaningful opportunities to enhance women's empowerment (WE) in low- and middle-income countries. Animal vaccines are important to keep livestock healthy and productive. However, gender-based restrictions limit women's access to animal health services, thereby affecting the potential of livestock to enhance their empowerment. While growing empirical evidence reveals that women-controlled livestock (e.g., small ruminants) have important implications for WE and support better household nutrition outcomes, little empirical evidence exists from rigorous analyses of the relationship between WE and animal vaccines for women-controlled livestock species. Our analysis explores the relationship between WE and involvement with PPR vaccination in Ghana. Data collected using the Women's Empowerment in Livestock Index (WELI) tool from 465 women and 92 men farmers (who keep goats) from northern Ghana, and analyzed using PLS-SEM, revealed a significant direct positive association between knowledge about animal health and PPR vaccines and a significant indirect positive association between access to PPR vaccines and empowerment. The empowerment of women goat farmers, as revealed by our model's results for the relationship between empowerment and vaccine facets, was significantly represented by asset ownership and input into decisions concerning livestock. These study results reveal important considerations in designing effective and equitable livestock vaccine systems.

**Keywords:** women's empowerment; WELI; PPR; vaccination; Ghana; knowledge



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# Background of the study

- As a store of value and a source of wealth, **healthy livestock** provide:
  - meaningful opportunities to enhance **women empowerment (WE)** in low- and middle-income countries (*Essilfie et al., 2020; Gitungwa et al., 2021*)
- Animal vaccines are important to keep livestock healthy and productive

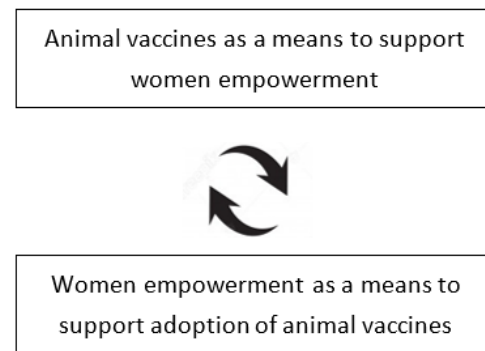


Figure 1. Conceptual association between WE and animal vaccines

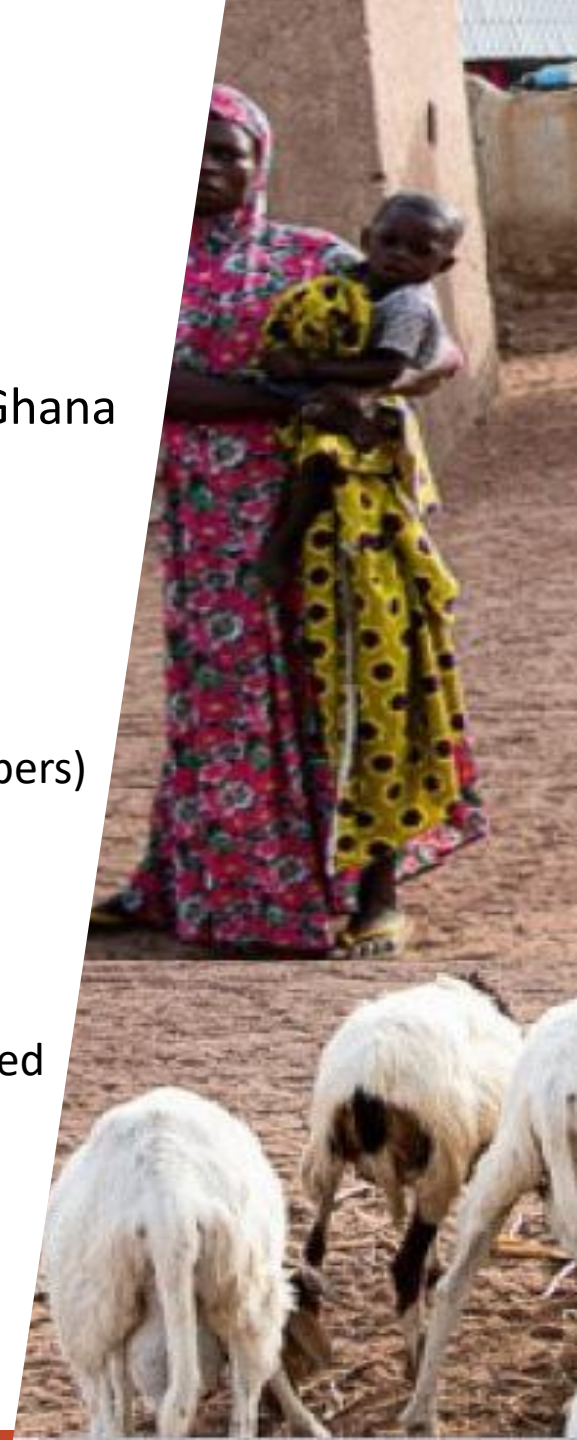
- However, gender-based restrictions limit women's access to animal health services
  - affecting the potential of livestock to enhance their empowerment
- Little empirical evidence exists from rigorous analysis, on the relationship between **WE** and animal vaccines, for women-controlled livestock species



## Background... *contd.*

With the goal of informing the design of equitable livestock vaccine systems

- We explore the relationship between **WE** and involvement with PPR vaccination in Ghana
  - Peste des petits ruminants (PPR) is one of the most devastating diseases
    - » A viral priority animal diseases of shoats that causes high morbidity and mortality
    - » considered important for poverty alleviation in Africa and Southern Asia
    - » causes substantial economic losses to farmers, particularly women (majority goat keepers)
    - » control is only possible through vaccination
  - Yet, the vaccine delivery system in Ghana tend to reach men farmers
    - Women goat keepers' access the animal drugs and related information is constrained
      - » arguably reducing the potential of **WE** through small ruminants



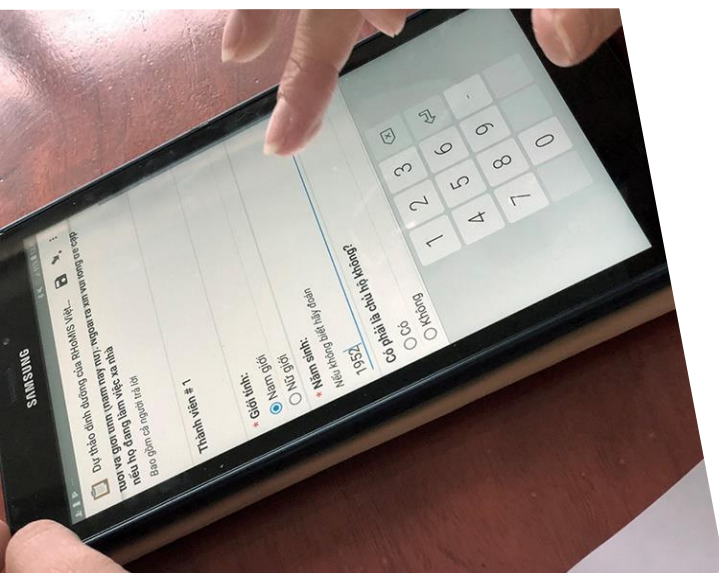
## Background... *contd.*

- **WomenRear Project:**
  - Aim: developing evidence for a gender-responsive animal vaccine system in Ghana
  - Focus on access to vaccines and WE using GTA and GAA approaches
- **This study:**
  - Aims at understanding of the relationship between women farmers' empowerment and their engagement with PPR vaccination
    - Assesses the links between **vaccination facets** (*access to PPR vaccines, knowledge about vaccines and participation in vaccination*) and **dimensions of WE** (indicators of intrinsic, instrumental and collective agencies)
      - (i.e., is there a significant relationship between empowerment/subdimensions of empowerment and different aspects of vaccination)
  - To identify intervention areas that optimize women's (and men's) participation and benefits



# Method

- PLS-SEM - to analyse the relationship between vaccine facets and empowerment
  - PLS-SEM captures the internal relationships within an equation
    - Smart PLS 3 –software was used
- WELI tool - to measure the empowerment of women and men
  - In 444 rural households in two districts in northern Ghana:
  - WELI is a multidimensional weighted empowerment index
    - It is a decomposable structure consisting of many (correlated) indicators
  - Vaccine module added



# Results

## Reliability and validity tests

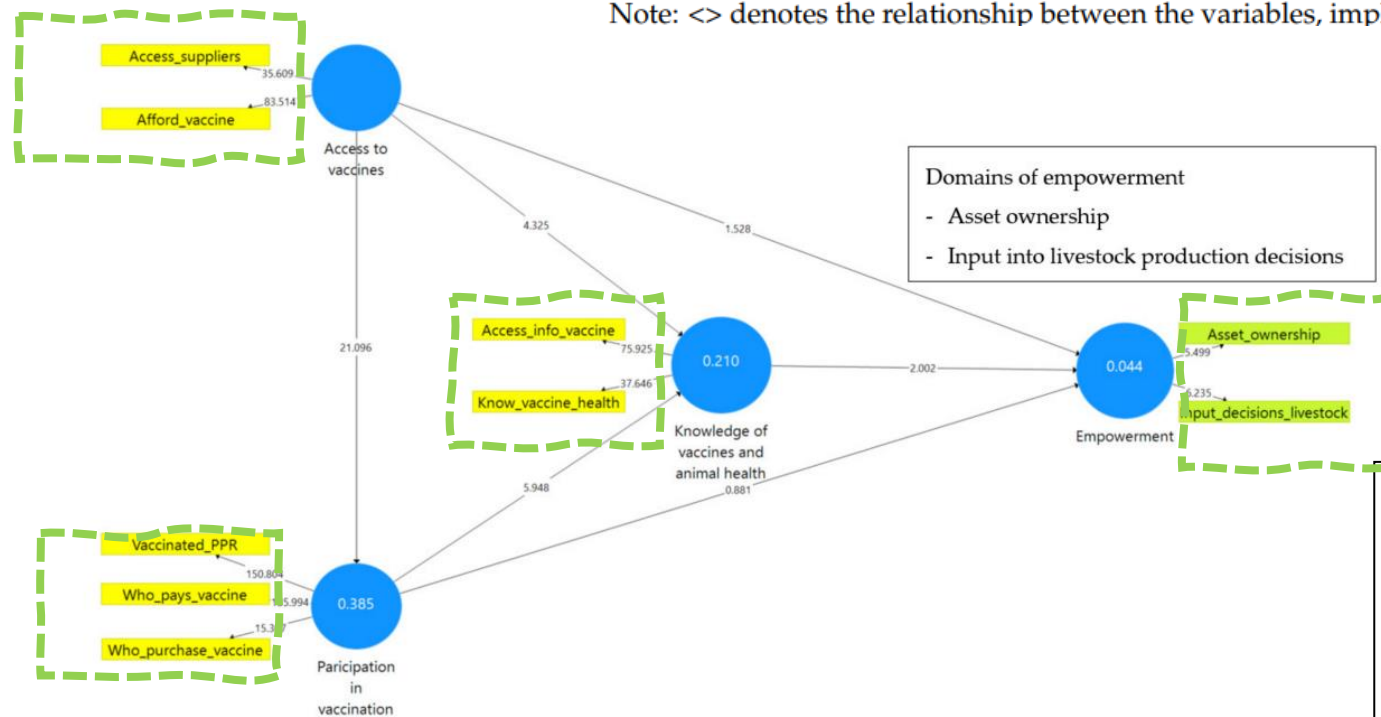
- CA, CRs and raw mean inter-item correlation range acceptable for achieving internal consistency reliability
- Convergent validity assessed by AVE - the values exceed the threshold

Constructs	Variable name in the data	Females					Males				
		$\lambda$	CA	rho_A	CR	AVE	$\lambda$	CA	rho_A	CR	AVE
Access to vaccines	access_g10_ppr_6_suppliers	0.82	0.66	0.70	0.85	0.74	0.81	0.69	0.76	0.86	0.76
	access_g10_ppr_9_afford	0.90					0.92				
Knowledge of vaccines	KnowAccs_g10_ppr_17_acclInfo	0.93	0.74	0.80	0.88	0.79	0.91	0.79	0.79	0.91	0.83
	KnowVac_g10_ppr_14_anhealth	0.85					0.91				
Participation in vaccination	partcp_g10_ppr_1_vaccinated	0.94	0.81	0.89	0.88	0.73	0.92	0.72	0.84	0.84	0.65
	partcp_g10_ppr_vacPurchs_whoPays	0.95					0.92				
	partcp_g10_ppr_vac_whoPurchase	0.64					0.53				
WELI	assetownership_ndepr	0.73	0.26	0.26	0.73	0.57	-	-	-	-	-
	feelinputdecagri_ndepr	0.78					-				
	feelinputdecagri_ndepr	-	-	-	-	-	0.84	0.45	0.46	0.78	0.64
	Incomecontrol__ndepr	-					0.77				

# Results

Hypotheses	Original Sample (O) (n = 465)	Sample Mean (M) (n = 5000)	Standard Deviation (STDEV)	p-Values
Access to vaccines <> knowledge of vaccines and animal health	0.22	0.22	0.05	0.000
Access to vaccines <> participation in vaccination	0.62	0.62	0.03	0.000
Access to vaccines <> empowerment	0.09	0.09	0.06	0.126
Knowledge of vaccines and animal health <> participation in vaccination	0.29	0.29	0.05	0.000
Knowledge of vaccines and animal health <> empowerment	0.11	0.12	0.06	0.045
Participation in vaccination <> empowerment	0.06	0.06	0.07	0.378

Note: <> denotes the relationship between the variables, implying correlation rather than causation.



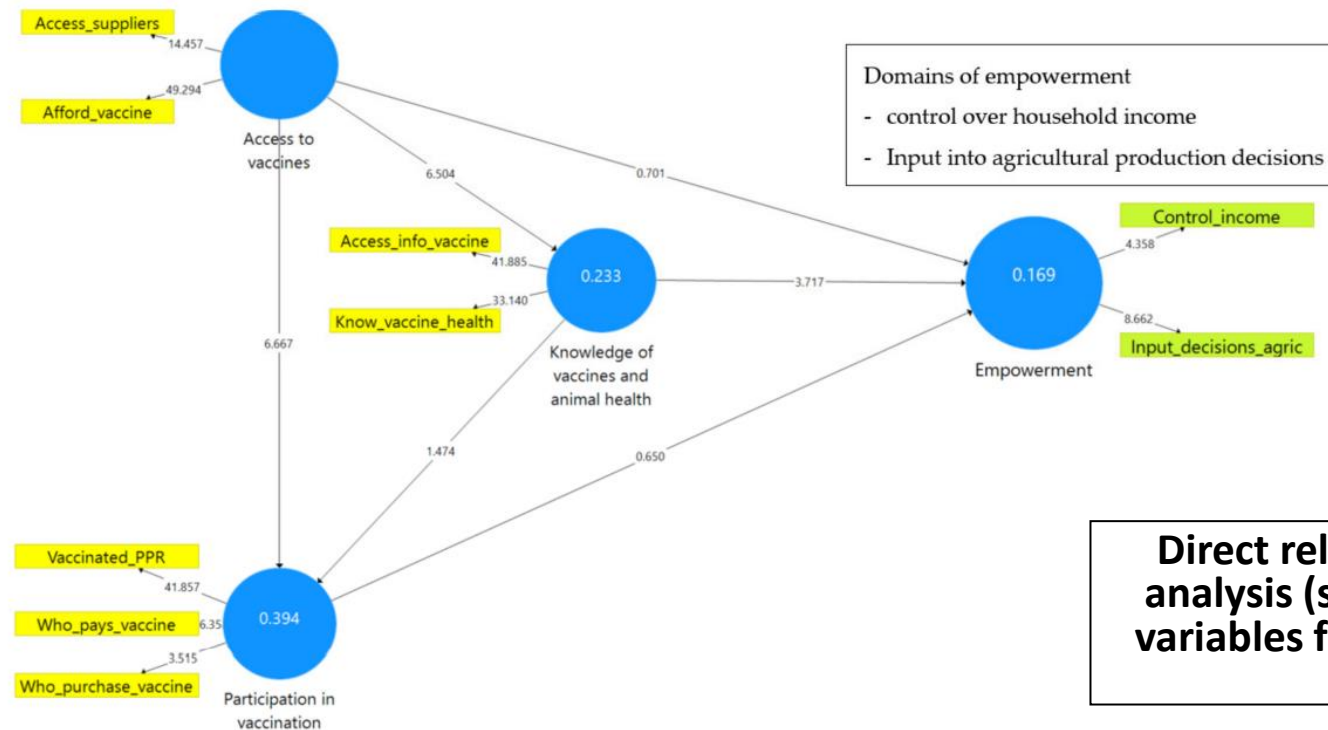
**Direct relationships (hypothesis) and mediation analysis (standardized path coefficients of latent variables for overall sample for **women** goat keepers)**



# Results

Hypotheses	Original Sample (O) (n = 97)	Sample Mean (M) (n = 1000)	Standard Deviation (STDEV)	p-Values
Access to vaccines <> knowledge of vaccines and animal health	0.48	0.48	0.07	0.000
Access to vaccines <> participation in vaccination	0.55	0.56	0.08	0.000
Access to vaccines <> empowerment	0.09	0.10	0.13	0.483
Knowledge of vaccines and animal health <> participation in vaccination	0.14	0.14	0.09	0.141
Knowledge of vaccines and animal health <> empowerment	0.32	0.33	0.09	0.00
Participation in vaccination <> empowerment	0.06	0.05	0.10	0.516

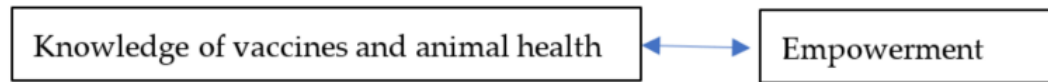
Note: <> denotes the relationship between the variables, implying correlation rather than causation.



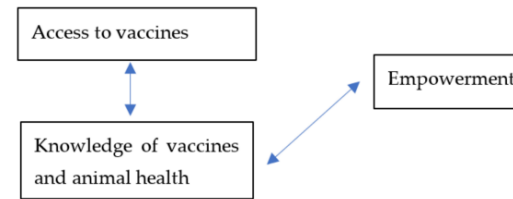
**Direct relationships (hypothesis) and mediation analysis (standardized path coefficients of latent variables for overall sample for **men** goat keepers)**

# Observations from results

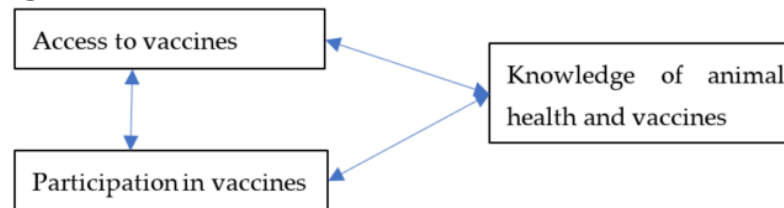
- Strong positive association knowledge about vaccines - empowerment for both women & men



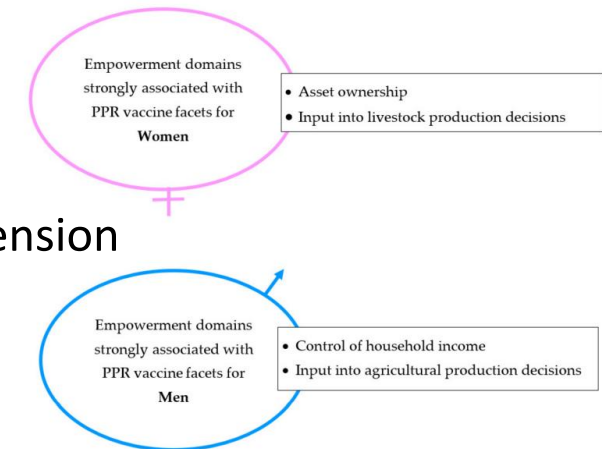
- Knowledge of vaccines and animal health is an intervening facet in the relationship between access to vaccines and empowerment



- Participation in vaccination does not significantly influence empowerment but is it is strongly linked to access to vaccines and knowledge of vaccines and animal health for women



- Significant difference between male and female respondents in empowerment dimension



# Implications on gender-responsive animal vaccine system

Establishing causal-relationship requires further investigation, however:

1. Our study confirms empirically, the intuitive perception of the relevance of:
  - *“knowledge of animal health and vaccines”* and *“access to vaccines”*
2. Empowerment dimensions that are strongly associated with PPR vaccine facets differ for men and women
  - Gender-blind interventions are limited in addressing the gendered constraints embedded in animal health systems
    - Strategies for strengthening veterinary services need to respond to gender-based constraints and opportunities
    - Design of gender-responsive animal health delivery systems needs to consider the effects, ways, and means of supporting women’s:
      - access to household assets (including livestock)
      - involvement in household’s livestock production decisions (while considering men’s control of household income and input into agricultural activities)


Useful in informing GTAs and GAAs for gender-responsive animal health delivery systems





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