



**SUMMARY OF SOCIO ECONOMIC INTEGRATION IN VACCINE  
DEVELOPMENT RESEARCH**

Submitted to the

**International Development Research Centre**

by

Petronella Chaminuka

Ntombizonke Gumede

Mampe Masemola

Mbongeni Maziya

Zimbini Mdlulwa

**September 2018**



Global Affairs  
Canada

Affaires mondiales  
Canada



**IDRC | CRDI**

International Development Research Centre  
Centre de recherches pour le développement international

**Canada**

## AUTHOR'S BIOGRAPHY

This report is the result of a team work with equal contribution from the authors whose biographies are listed below in alphabetical order.



**Dr Petronella Chaminuka** is the Principal Economist in the Agricultural Research Council. She has more than 22 years' experience in agricultural research, lecturing and capacity development. She has supervised more than 30 students at PhD, MSc and Hons level and has published in peer-reviewed journals, book chapters, popular media, and co-edited two books.



**Ms Ntombizonke A. Gumede** is a researcher at the Human Sciences Research Council, Human and Social Development research programme in Pretoria and a PhD candidate at the University of Western Cape. Her areas of research specialisation include issues of the family, gender, sexual and reproductive health, justice and freedom, heritage and redress.



**Ms Mampe Masemola** is a research assistant at the Agricultural Research Council (ARC) and a MSc. Agricultural Economics student at the University of the Free State (UFS). She is currently involved in socio-economic studies at the ARC and her MSc. topic is on farmer preferences and willingness to pay for livestock vaccines.



**Mr Mbongeni Maziya** is a Researcher at the Human Sciences Research Council (HSRC) in Pretoria, South Africa. He holds a Master of Agriculture (Food Security) from the University of KwaZulu-Natal. His research focuses on gender, rural development, food security, smallholder livestock systems and climate change.



**Ms Zimbini Mdlulwa** holds a Master's degree in Agricultural Economics from the University of Pretoria. The focus of her masters was on evaluation of the socio economic impact of the Rift Valley fever outbreaks on livestock farmers in South Africa. She is currently working as an agricultural economist at the Agricultural Research Council (ARC) of South Africa. Her research interests are in Animal Health Economics.

## TABLE OF CONTENTS

<b>1. INTRODUCTION</b> .....	1
<b>2. CONCEPTUAL FRAMEWORK FOR SOCIO-ECONOMIC ANALYSIS</b> .....	2
<b>3. KEY FINDINGS</b> .....	3
<b>4. STAKEHOLDER ENGAGEMENTS, COMMUNICATION AND SCALING UP STRATEGIES</b> .....	5
<b>5. CONCLUSIONS AND RECOMMENDATIONS</b> .....	6
<b>ACKNOWLEDGEMENTS</b> .....	7

## 1. INTRODUCTION

Livestock farming plays a vital role as a source of livelihood for many rural communities and a resource for poor farmers in sub-Saharan Africa. Despite the established importance of livestock to rural livelihoods and household food security, infectious and parasitic diseases remain important constraints that affect the productive potential and profitability of livestock production. Hence, interventions and policies to manage animals and the diseases they suffer from remain critical. Livestock vaccines provide an effective way of managing animal diseases, and have potential to improve productivity and reduce the risks of zoonotic diseases in humans. Increased livestock productivity can also lead to increased household incomes, food and nutrition security and improved livelihoods for vulnerable rural households in sub-Saharan Africa, particularly women and child headed households.

Production of vaccines often requires advanced biotechnological innovations that necessitate collaborative multidisciplinary research, and substantial investments are needed in order to accelerate research and development (R&D), commercialisation and registration of livestock vaccines and scaling up. Given the limited public resources invested in the R&D of livestock vaccines, it is important to facilitate the adoption of such vaccines should they be available in the market. Therefore integration of socio-economic analysis in vaccine development research is paramount to assist in building a business case for development of the vaccine and scaling up plans, policy advice and lobbying as well as marketing the project and work being done by scientists. The overall objective of this report is to highlight the key findings of the socio-economic analysis as well as to showcase the value of integrating socio economic aspects on vaccine R&D for informed justification of use of public resources and R&D investment decisions.

This report is based on the project “Novel livestock vaccines for viral diseases in Africa towards improved food security” which was funded by the Canada’s International Development Research Centre (IDRC), and Global Affairs Canada. The project, led by the Agricultural Research Council’s Onderstepoort Veterinary Institute, sought to develop a multivalent vaccine for Rift Valley fever (RVF) and lumpy skin disease (LSD) (LSD RVF 2-in -1 vaccine) for use in cattle, sheep and goats.

## 2. CONCEPTUAL FRAMEWORK FOR SOCIO-ECONOMIC ANALYSIS

A conceptual framework was developed to highlight the various components of socio-economic analysis required to inform development and scaling up of the vaccine based on the environment into which the LSD RVF 2-in -1 vaccine would enter (Figure 1). The framework, developed by the socio-economic teams from South Africa and Kenya, in consultation with scientists developing the vaccines, informed the data and nature of studies to be undertaken. The studies included the policy and regulatory framework, impact studies (cost-benefit analysis), and stakeholder engagement platforms. The policy and regulatory framework analyses the policies and regulations that the vaccine will have to adhere and also gives an indication of the different role players along the value chain. The Cost Benefit Analysis (CBA) will assist state decision-makers in realizing the cost-savings of the envisaged vaccine to local and national economies. The Willingness to Pay (WTP) and KAPP studies give an understanding of the end-users for the vaccine and the possibilities for uptake given the prevailing attitudes, practices, perceptions, and knowledge, preferred vaccine attributes and willingness to pay for, and affordability of vaccines. Similarly, stakeholder engagement workshops and other communication platforms target an array of role players (vaccine manufacturers, developers, retailers and livestock farmers) in the vaccine value chain to make sure that their views are considered in the development of the new vaccine. Of great importance is gender integration across the socio-economic studies.

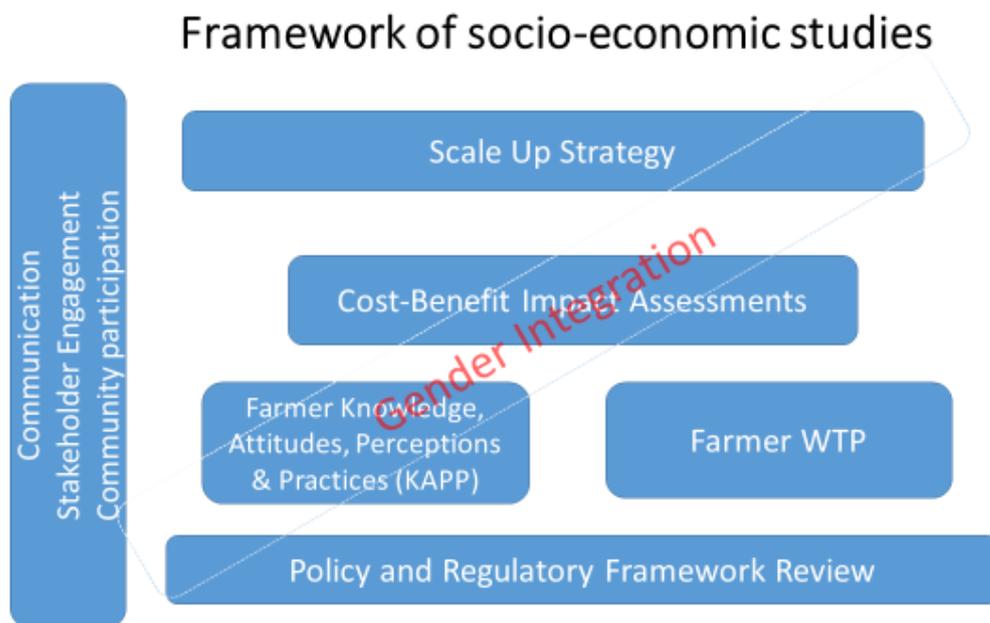


Figure 1: Framework for socio-economic studies

Five provinces that had the prevalence of both diseases were chosen for the studies and the number of provinces used as study sites varied according to the purpose and nature of the study. The provinces included Eastern Cape, Free State, Mpumalanga, North West and KwaZulu-Natal. KAPP and WTP studies also performed sex disaggregated analysis and the analysis revealed that livestock farming in rural South Africa is still predominantly in the hands of male farmers.

### **3. KEY FINDINGS**

**KAPP Results:** Livestock among rural farmers serves primarily as financial security in times of need. Farmers had limited knowledge of RVF, irrespective of individual farmers' educational level while the majority knew LSD. Farmers generally spent a sizable amount (R2272.44 on average) of money on animal healthcare and prevention products (i.e. medicines, vaccines and food supplements). Socio-economic factors such as education level, total household income and number of cattle owned significantly influenced farmers' spending on animal healthcare. Despite the spending on animal healthcare, farmers viewed vaccines as too expensive. Although farmers were able to differentiate between vaccines and medicines, it emerged that they did not know much about vaccines and this was attributed to the lack of training on primary animal healthcare. Overall, the majority of farmers bought vaccines at own cost, however in all five provinces there was a challenge of availability, accessibility and affordability of animal vaccines.

**Gender dynamics within small-scale farming:** Within the agricultural development agenda, women are identified as key to the eradication of global hunger. Results have shown that socio-culturally and historically, livestock ownership in rural areas is skewed in favour of men, especially in smallholder livestock farming systems. Because of inequality in livestock ownership and participation, there is an animal husbandry knowledge gap (especially in larger livestock like cattle) between man and woman and this emanates from the cultural gender roles that are ascribed for man and woman. A number of factors have been identified as having an impact on the females on becoming more effective farmers. Old age creates physical challenges in activities such as livestock herding, collecting and dipping which results in additional cost for hired assistance. Women also have to juggle between household needs vis a vis animal health and also deal cultural mores which limit their involvement in farming. Instances of intimidation, physical violence, and secondary victimisation by people of authority were reported, especially in cases of woman who have inherited their livestock from their deceased

spouses. Although, there was space to negotiate, most of the women experienced limited decision-making power as ultimately that lay with the male counterpart. Participants in the different groups also noted that the communities try to assist their destitute members but this was difficult when most people in these communities were themselves poor. Thus the individual efforts of the communities were not sustainable.

**WTP Results:** To achieve acceptance and widespread use of livestock vaccines by farmers, it is important that information about consumer behaviour which underpins their decisions to purchase vaccines be made available to guide developers and policy makers. This will provide opportunity for vaccine developers to incorporate farmers' preferences in development of the vaccines. Analysis revealed that contrary to the expectation, price and the need for refrigeration were insignificant in influencing the choice of vaccine attributes. Farmers showed preference for a vaccine with high efficacy and that had a multivalent and multi- species nature. Importance of including household socioeconomic characteristics in understanding people's choice behaviour has been widely acknowledged. It was found that factors such as herd size and knowledge of both diseases had an influence on the vaccine attribute. The results showed that with a hypothetical vaccine price of R400/50 doses, respondents were willing to pay R8.01 more for a multivalent vaccine but R13.78 less for the one with an efficacy of 60%. It can be concluded from the study findings that farmers will be interested in purchasing the LSD RVF 2-in-1 vaccine.

**CBA Results:** Analysis of alternative strategies for primary animal health care practices showed that vaccination yielded higher net benefits when compared to non-vaccination. The net present values (NPV) and internal rate of return (IRR) were positive, indicating the positive impact of vaccination. Adoption of the LSD RVF 2-in-1 vaccine could be beneficial and profitable as well as comparatively cheaper for farmers that were buying two different vaccines for prevention of both diseases. Results also showed that low protection levels of the vaccine yielded lesser benefits and that it would take longer for farmers with a small-scale operation to recover from disease outbreaks when compared to large-scale operations. The innovation of developing a multivalent vaccine for prevention of a common disease such as LSD and RVF, which is a sporadic disease, proved to be beneficial for farmers when compared to a situation where farmers only vaccinated for LSD. The study concluded that it is unlikely that farmers would fail to realise any benefits from adopting the envisaged vaccine.

#### **4. STAKEHOLDER ENGAGEMENTS, COMMUNICATION AND SCALING UP STRATEGIES**

The animal health industry in South Africa is worth around R6.8 billion, and vaccines account for one-third of the market value. Stakeholder engagements revealed that there is a practise of rationing of vaccine access by distributors, making some vaccines inaccessible, as they chose which vaccine to sell or not, thus creating an “artificial” vaccine shortage. The distribution of vaccines was concentrated on commercial farmers, and smallholder farmers struggled to access them (vaccines). Most users of animal health products were commercial farmers who contribute more than 80% of revenue to companies while emerging or small-scale farmers contributes less than 20% of the total revenue. Thus, most companies/distributors focussed only on the lucrative commercial market. To improve access of vaccine to rural communities, state owned entity, Onderstepoort Biological Products (OBP) recruited Black Economic Empowerment (BEE) partners who are distributing vaccines directly to smallholder livestock farmers.

The distributors are trained on how to handle vaccines and are given discounts. Findings regarding the policy framework around the development of vaccines revealed that the registration process and approval timelines are too long and cumbersome. The state is responsible for the development of strategies and legislative framework that guides the manufacture, registration of new vaccines, including access of these vaccines to small-scale farmers. The state is therefore accountable for the implementation of the relevant control measures. The tensions lie in diseases that are important at the farm or village level but not prioritised for state intervention. Stakeholders along the vaccine value chain also lamented that the system for veterinary public health services was fragmented and divided among a largely uncoordinated multitude of government agencies. This then created challenges along the value chain. Hence, access to vaccines at the end-user level remained a challenge.

## **5. CONCLUSIONS AND RECOMMENDATIONS**

Based on the socio-economic studies, we conclude that there is justification for scaling up the LSD RFV 2-in -1 vaccine. To ensure the uptake of the envisaged vaccine, innovative ways to deliver affordable vaccines should be explored. There should be closer collaboration between livestock vaccine developers, producers and farmers so that real, not perceived needs of farmers are addressed through innovative products. Similarly, use of vaccines must be considered in a holistic approach that takes into consideration the aspirations of all stakeholders along the value chain including the farmers. Furthermore, understanding the consumer market before development of vaccines is important as attributes play a significant role in adoption of livestock vaccines. Targeted interventions, driven through bottom up approaches that are gender sensitive and inclusive should be implemented.

Overall, the results suggest that given the potential of vaccines to mitigate production losses, efforts to facilitate commercialisation of livestock production in the small scale agricultural sector, and maintenance of current large scale production should include programmes to make vaccines more accessible to farmers. To facilitate the scaling up and uptake of the envisaged vaccine, it recommended that the state foster synergies among livestock value chain actors through establishment of innovation platforms for information sharing and learning. To enhance efficiency of vaccine delivery, government should identify entry points or key leverage points to improve the value chain.

This in addition will enhance efficiency along the vaccine value chain. Furthermore, farmers should also be shown the real impact of vaccination to motivate them to vaccinate their animals (farmer-to-farmer influence, creating suitable media material). In addition, there is a need for capacity building to equip women farmers with primary animal health care skills, create awareness of the cultural taboos as barriers to livestock production, and also getting females involved in all the processes of livestock production from early ages. Socio-economic studies add value to research on vaccine development and should be encouraged through multidisciplinary research collaboration.

## **ACKNOWLEDGEMENTS**

The authors wish to thank the following people and institutions that made this work possible;

- Smallholder farmers who participated in the different studies and extension officials and animal health care professionals who facilitated engagement with the community.
- Funding from the IDRC and Global Affairs Canada for the New Vaccines to Combat Livestock Diseases in Sub-Saharan Africa project.
- Collaboration and support from the ARC-Onderstepoort Veterinary Research.
- The Provincial Departments of Agriculture and smallholder livestock farmers of KwaZulu-Natal, Eastern Cape, Mpumalanga, North-West and Free State provinces.
- All enumerators and field guides for their assistance during field surveys.