Market Development & Adoption: Lessons learned and observations during Phase 1 of Protecting Livestock, Saving Human Life (PLSHL-1) programme

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Table of Contents

Acronyms and abbreviations

AI	Avian Influenza
AU -PANVAC	African Union Pan African Vaccine Centre
BMGF	Bill & Melinda Gates Foundation
BOC	Bottom of the value chain
CAHW	Community Animal Health Worker
CBPP	Contagious Bovine Pleuropneumonia
CCPP	Contagious Caprine Pleuropneumonia
CDC	Centre for Disease Control
CSF	Classical Swine Fever
CTTBD	Centre for Ticks and Tick-Borne Diseases
CVO	Chief Veterinary Officer
DFID	UK Department for International Development
DNDi	Drugs for neglected diseases initiative
DVS	Director Veterinary Services
ECF	East Coast Fever
FAO	Food and Agriculture Organisation of the United Nations
FIND	Foundation for Innovative New Diagnostics
GAVI Alliance	formerly The Global Alliance for Vaccines and Immunisation
LL	Lesson learned
LSD	Lumpyskin Disease
M&E	Monitoring and Evaluation
MD&A	Market development and adoption
ND	Newcastle Disease
NGO	Non-Governmental Organisation
OFZ	Oxfendazole
OIE	World Organisation for Animal Health - Office International des Epizooties
PC	Porcine Cysticercosis
PLSHL 1-2	Protecting Livestock Saving Human Life 1-2 (Programmes funded by BMGF and DFID)
PM	Project managers
PPP	Public Private Partnerships
PPR	*Peste des Petits Ruminants*
QA	Quality Assurance
QC	Quality control
R&D	Research & Development
REC	Regional Economic Community
RVF	Rift Valley Fever
SACIDS	Southern African Centre for Infectious Diseases
SHG	Self-help groups
ToT	Training of trainers
VACNADA	Vaccines Against Neglected Animal Diseases in Africa Programme
WHO	World Health Organisation

Executive Summary

GALVmed's aim is to make livestock vaccines, medicines and diagnostics accessible and affordable to the millions of individuals in developing countries for whom livestock is a lifeline. To achieve this, GALVmed works through partnerships to promote sustainable adoption systems involving private and public sector partners in the delivery of needed animal health products. The present report was generated in order to collate lessons learned during the execution of PLSHL-1 (Protecting Livestock Saving Human Life 1, GALVmed's first large-scale programme), which could subsequently be applied to future GALVmed market development and adoption activities.

PLSHL-1 ran for 4 years, from September 2008 to December 2012, during which time GALVmed piloted a range of models for the sustainable delivery of East Coast Fever (ECF) and Newcastle Disease (ND) vaccines to livestock keepers, through a range of service providers and agricultural input delivery systems. GALVmed also started exploring and developing models for the adoption of Rift Valley Fever (RVF) vaccines, Porcine cysticercosis (PC) vaccines and PC specific medication.

Terminology

There are many different interpretations of terms like adoption and availability. GALVmed definitions can be found in section 1.2.1.

Methodology

Due to the intrinsic characteristics of the control for each disease, and country-specific differences (in human resources, political environment, and market structure in the livestock health sector) flexibility in programming was a prerequisite. GALVmed's approach involved first identifying livestock keepers' needs and gaps in livestock health, analysing the market and the different stakeholders of the vaccine value chain, and then working with local stakeholders on a model adapted to each particular context, taking into account specific challenges and opportunities but also key principles, like Global Access and long term sustainability.

Five models were explored and applied in the field for the delivery of ND and ECF vaccines, which are products considered to be private goods, (i.e. products that can effectively be delivered through the private sector to meet demand from livestock keepers who directly benefit from the good); in contrast to those that are public goods (detailed description in section 1.2.2), such as RVF vaccine, that are government controlled for their delivery, or neglected due to their very limited benefit to the livestock keeper themselves (such as PC), or have a strong public health component. The models used for the private goods included:

1) Model led and facilitated by an NGO (the "NGO Facilitator" model)
2) Model led and facilitated by and NGO, as a precursor to transfer to the Private Sector (the "NGO-to-Private" model)
3) Model led and facilitated by an independent field veterinarian (the "Private Veterinarian" model)
4) Model led by a private distributor, with in-kind support to decrease project risk (the "In-Kind support" model)
5) Model led by an already established franchise (the "Private franchise" model)

The details for each model (all designed with sustainability in mind) are described in section 2. The models used for the different ND and EC projects, as well as the outcomes for those projects are found in section 3.

ND vaccine delivery, targeting village poultry, was implemented through 8 pilot projects in 5 African and 2 South Asian countries, using 3 models, namely the NGO Facilitator model, NGO-to-Private model and the Private Veterinarian model.

ECF distribution was complicated by technical and political challenges, including the need for liquid nitrogen supply, the management by a qualified veterinarian and the local requirements additional to the registration process. In all three ECF programmes established in Kenya, Tanzania and Malawi, the partner was a highly-trained veterinarian who would organize the distribution chain. The models applied were varied – including the In-Kind support model, the NGO-to-Private model, and the Private franchise model.

Steps were taken to evaluate the opportunities and models for the adoption of public goods (RVF vaccine, and PC vaccine and medication). These are still at early stages, but implementation is ongoing and important lessons are being learned.

Summary of Lessons Learned

Lessons have been learned from all levels of the project. They have been organised by the different stakeholders and also links in the supply value chain. The most critical lessons, the "Top 20", are found in the Annex. Analyses of the lessons learned covers the tangible (financial, physical), intangible (reputation, culture) and human skills (capacity, collaboration, systems and processes) that impact on the successful delivery of animal health products to poor livestock keepers.

Stakeholders, resources and capabilities

- All stakeholders have an important role to play, but they need to focus on their strengths. Supply of private goods tends to be more successful if handled commercially, while NGOs can be a valuable community mobilisation resource, and government is needed for setting regulations, monitoring compliance with the law, and awareness raising. Each actor must be free to play their respective roles. A key requirement is that vaccinators be allowed to vaccinate – in many cases there is not an adequate policy framework to support them, and they are very much needed as veterinarians are scarce in rural and remote areas.
- Activities that will increase the chances of sustainability should be incorporated early in the project at all levels of the value chain: business skills are important for manufacturers and vaccinators and all members of the value chain, and should be incorporated very early in the project, the pricing structure should be advised on accordingly, and the range of products should cover the needs of the poor livestock keepers.

Supply chains and partnering models

- Strategies are needed not only for the different products and locations, but also at the different levels of the value chain. At the bottom of the chain, integrated approaches, need to offer solutions (represented by a range of products and basics of livestock management) to the livestock keepers.

- Availability of appropriate products is still a challenge that cannot be underestimated; but equally important is the appropriateness of the delivery systems of those products (for example vaccine droppers for intra-ocular vaccines). These must be easily accessible and fit for purpose.
- In order to develop a sustainable and scalable delivery of inputs, it is critical to establish the demand from the livestock keeper him/herself. If that demand can be created first and foremost, then the rest of the supply chain has a chance of working sustainably.
- Finding the right combination of partners and correctly aligning responsibilities and incentives can be the difference between a time-bound "project" approach and the development of a sustainable supply chain.

Other factors

- Product characteristics and cold chain are essential for the appropriate delivery of animal health products and need to be considered in detail. Innovation plays a very important role.
- Human capacity (capacity building, Training of Trainers), finances at all levels of the value chain and a conducive policy environment are all important factors for sustainable livestock health product delivery.

Public goods

- For this specific type of products, regional approaches are a better way to incentivise adoption; strategic reserves should be promoted when appropriate, and the product should be made as attractive as a private good as possible (if the product can become a private good instead of a public good, it will increase the likelihood of sustainable adoption).

Conclusions

The compilation of lessons learned above is not exhaustive and is meant to highlight some of the most salient points resulting from the implementation of PLSHL-1. The Lessons Learned analysed and described in this report are of great value for the success of current activities and will be critical in shaping future projects. The work conducted to date reveals that complex systems such as vaccine supply chains demand flexibility and dynamism to incorporate modifications; it is important to learn from the challenges and incorporate the learnings, if mass adoption of these critical livestock health products is to be achieved.

A full list of the conclusions can be found in section 5, of which the key ones are:

- GALVmed has gone a long way since its inception, and there are many lessons learned, covering many aspects of the supply chain: GALVmed should reflect on them, and apply them in current and future projects.
- Building capacity at all levels of the supply chain is a key component that should be continuously emphasised and fits well with GALVmed's mission.
- GALVmed's focus is on the sustainability of the actions. It is still too early to make firm conclusions on sustainability, but at least, there are some issues that we know need to be addressed from the start, to give real sustainability a chance.
- Flexibility and dynamism based on constant monitoring, coaching and learnings are essential to allow modifications to be incorporated at project level as needed.

1. Introduction

This report incorporates the observations and learning from the GALVmed "*Protecting livestock, saving human life – 1*" (PLSHL-1) projects in order to try and identify best practices and improved models for subsequent market development and adoption work. PLSHL-1 was GALVmed's first large programme, which ran from 2008 until 2012.

For successful market development, activities must be tried, tested, and evaluated; only models that further the GALVmed objectives should be retained and/or adapted for future implementation cycles. This process of reviewing, learning and adapting is captured in Figure 1. It depicts a cycle of innovation that GALVmed has committed to work with, and is the foundation of this report.

Figure 1: GALVmed Market Access and Development Cycle

1.1. Objectives of PLSHL-1

Using partnership as the mode of operation, GALVmed aims to make livestock vaccines, medicines and diagnostics accessible and affordable to the millions of individuals in developing countries for whom livestock is a lifeline. In the initial phase, PLSHL-1, GALVmed piloted models for the sustainable delivery of East Coast Fever (ECF) and Newcastle Disease (ND) vaccines to livestock keepers through a range of service providers and agricultural input delivery systems. GALVmed also started exploring and developing models for adoption of Rift Valley Fever (RVF) vaccines and Porcine Cysticercosis (PC) vaccines and medication. The goal of the next phase (PLSHL-2) is to build on lessons learned from the pilot experiences, refining the models and scaling up, such that the most appropriate interventions aimed at sustainable delivery of animal health products to poor livestock keepers are developed and implemented.

It is important to emphasise that a key focus has been to ensure sustainability of the delivery systems to livestock keepers. Vaccination campaigns are relatively easy to organise and can reach large numbers of

livestock keepers, but can be little more than a one-off exercise if supply/demand linkages are not solidly established. The objective has been to develop sustainable models, even if it implies taking larger risks, starting at a smaller scale, and working all along the vaccine supply chain. In this way, learning from experience with different models can be incorporated before scaling or adapting the most suitable ones.

1.2. Key Concepts

1.2.1. Product Adoption: definition and components

GALVmed aims to have the animal health products ***adopted*** by the livestock keepers who need them. The term adoption includes availability, access and demand, and is the preferred term as it can refer to both public and private goods. All three components (availability, access and demand) are necessary to achieve adoption.

- **Availability** refers to the "existence" of the product. For example a vaccine developed by a research institute is not "available" until it is routinely produced at large scale and is commercially available. It refers to the product itself. It therefore includes the development of suitable products that meet the needs of the target market, i.e. poor livestock keepers.
- **Access** refers to livestock keepers having access to the product. This includes supply and logistics (for example the vaccine being accessible at a nearby agro-shop or via the local veterinarian or vaccinator) and other characteristics of the product such as affordability.
    - Affordability from the point of view of poor livestock keepers is considered to be an intrinsic component of access: if the products are not affordable, they are not accessible. However, affordability is not always the same as low price. The important element for the livestock keeper is the value of the product.
    - Affordability takes into account cost-effectiveness for the whole value chain. For sustained delivery of products, all levels of the value chain must find value in and benefit from the product as it makes its way to the livestock keeper.
- There is not always a clear distinction between availability and access. For example, product presentation (pack size, cold chain requirements) can be both an access and an availability issue. A shop may stock an ND vaccine in 1000 dose vials, but vaccinators needing fewer than 200 doses may not purchase it. In this scenario, livestock keepers have no access to ND vaccine even though it is available in nearby shops.
- **Demand** refers to the livestock keepers being aware of, valuing and wanting the product. Awareness is needed for the sensitisation of livestock keepers to understand the disease control tools (i.e. vaccines, medication and diagnostics in terms of their existence, function and usage). But demand also implies that livestock keepers want the product because they see the products' value which is essential for the adoption of any new product or service.

1.2.2. Private and Public goods

- **Private goods**: in the context of GALVmed work, private goods refer to products that can be delivered through commercial/private distribution channels, where government interventions are very limited and focused on aspects such as registration. Private goods are products for the control of diseases such as ND, ECF, clostridial diseases and other production diseases.

- **Public goods**: in the GALVmed context, these are products that are usually distributed by government services because they are linked to notifiable controlled diseases, they have a public health component or they are neglected by the private sector. Note that not necessarily all tools for the control of notifiable diseases, all diseases with public health component or neglected diseases are public goods. This will vary depending on the interest, priorities and resources of the different governments. In some instances, government might use the commercial sector for certain components of the distribution and supply chain
- The justification for an animal health control tool to be considered a public good, and some examples, can be seen in Table 1 below.
- When working on adoption of animal health products, it is important to note that private goods products will require different or additional considerations and adoption mechanisms as compared to public good products. For PLSHL-1, ECF and ND are considered private goods, while RVF and PC are considered public goods.

	Justification as Public Good *	**Characteristics**	**Example**
1	Government controlled	Notifiable controlled disease; vaccination controlled by state (even though some components like importation for example, can be given to the private sector)	Contagious Bovine Pleuropneumonia, *Peste des Petits Ruminants*, Rift Valley Fever
2	Public health component	Zoonotic nature Sometimes no obvious benefit to livestock keepers	Rift Valley Fever, Porcine cysticercosis
3	Neglected by the private sector*	No obvious benefit to livestock keepers No commercial market	Porcine cysticercosis

Table 1: Justification for animal health products to be considered public goods and examples.

* Not all government controlled diseases, diseases with a public health component or neglected diseases are necessarily a public good; this depends in part on government policy, priorities and resources

1.3. Structure of Report

Section 2 describes the partnerships formed to link ND and ECF vaccines to sustainable supply chains, and an explanation of the distribution models employed. Section 3 briefly reviews the pilot project strengths, weaknesses and outcomes by country and product. Section 4, the focus of this report, identifies key issues encountered during PLSHL-1, and details the observations and lessons learned in four broad categories:

Part a: Stakeholder Resources and Capabilities
Part b: Developing Supply Chains and Partnering Models
Part c: Knowing the External Environment
Part d: Public goods

2. Partnership Models of PLSHL-1

The strategy for PLSHL-1 was to initiate and implement, through different forms of partnerships, a range of models designed to deliver animal health products to poor livestock holders rather than confronting each situation with a preconceived approach. Because of the intrinsic characteristic of control for each disease, and since each country has different human resources, policies, political environments and market structure in the livestock health sector, flexibility in partnering was a prerequisite. As a result, five general distribution models for private goods have emerged from the many countries in which PLSHL-1 took place. Those models are different, but they are all based in a set of principles including Global Access and sustainability. They lie along a continuum from partnering with 100% Non-governmental organisations (NGO) managed to 100% private sector managed, and while each has its benefits, none is perfect. Lessons can be taken from all of them which will be elaborated in the next section.

It is important to note that the models are dynamic: adaptation and innovation was needed to address the challenges faced, and in some cases the initial model was changed as the project progressed.

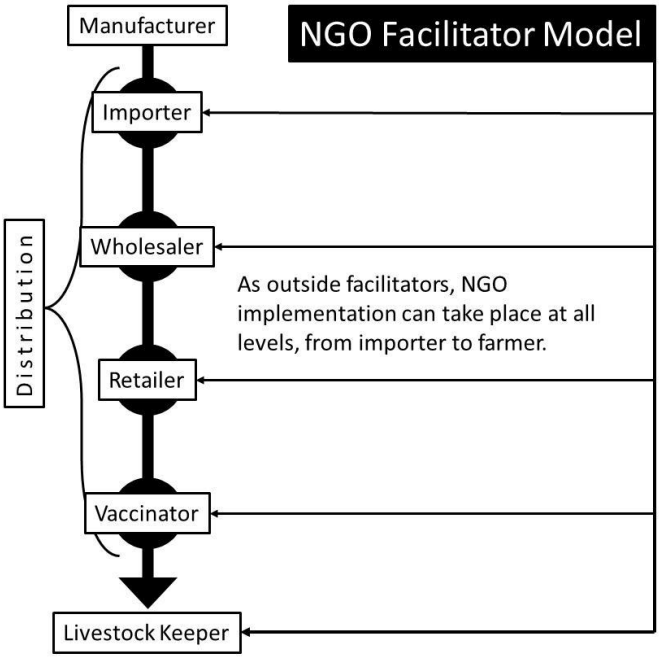
2.1. NGO Facilitator Model

In some areas, partnerships with development NGOs already involved in the livestock sector and working in an area of high need were identified as a direct entry point to the farmer. This is the traditional way donor funding is channelled to rural areas. NGOs often have experience and social capital in the community, useful for creating farmer awareness and gaining trust. Some NGOs work with self-help groups and have piloted development of small-medium enterprises. A significant number of NGOs have a "project mentality" which does not emphasise the development of the distribution chain or long term sustainability. They tend to procure the goods needed for the project directly rather than facilitating the supply chain. Where the NGO usually intervenes depends upon the project and its scale (for example for a large scale project, they might tender for a vaccination campaign and procure the vaccines directly from the manufacturers, or at small scale they may purchase from a local shop).

GALVmed has worked with a number of NGOs to develop an NGO Facilitator model, in which the NGO (as Figure 2 indicates) connects with the distribution chain (at different levels depending on the local circumstances), facilitating communication, providing skills, training and, in some cases, establishing small businesses. This method has proven to be challenging. In many cases, it has required moving NGOs outside their comfort zone, requiring expertise in commercial approaches that were beyond the capacity of their staff. The NGOs themselves might have been using different models, for example Cooperatives, or Self-help groups to set up distribution systems, but without creating linkages to the rest of the value chain.

A further challenge has been to ensure that the NGO does not become too involved in the distribution of the vaccine so that, as the project comes to an end, the connections established in the commercial sphere remain. In order to achieve this, the NGO must, from an early point, clearly plan their exit strategy. In some cases, NGOs proved reluctant to do this because it does not fit with their traditional way of operating. Handover of responsibility to private-sector players such as shopkeepers may prove difficult as NGOs remain active in a particular area for long time.

Examples: ND distribution in India and Nepal with local NGOs



Strengths	Weaknesses
• Community organization • Rural presence • Familiarity with local government • Training & facilitation skills • Experience with development objectives and reporting	• Lack of business acumen and familiarity with supply chains • No expertise dealing with the top end of the chain • Tendency to become overly involved • Project mentality
Opportunities	**Threats**
• Scaling up to other areas in which NGOs are active should be relatively easy • Partnering with private sector as awareness creation and community organisation and training experts	• Inability to scale beyond replication of existing project • Dependency on donor funding can lead to biased self assessments • NGO's presence may interfere with private sector if working in the same area

Figure 2: NGO Facilitator Model

2.2. NGO-to-Private Model

In this model, the project begins in the same way as the NGO Facilitator Model above, but with the predefined goal of eventually handing over part of the distribution chain (for example, the importer or distributor role) to those involved in project facilitation (who may come either from the NGO or from the private sector). This concept is appealing because it can potentially create or strengthen the private sector business and (in the case of transitioning to someone formerly involved in the NGO), it imparts direct ownership of the NGO phase of the project to the person who will eventually be part of the vaccine supply chain. For this person, the expectation of greater future benefit depends upon success of the project which can be a powerful incentive to perform.

In some cases, GALVmed was able to design such an approach from the start (for example to overcome difficulties linked to the legal status of the NGOs that prevent them to conduct commercial activities), or in other cases it was a measure implemented to overcome challenges faced by the local NGOs (for example, closure of the local branch of the NGO). In places where the local private sector did not show interest in the work, it was a way to initiate the project and demonstrate the tangible benefits – the private sector then became interested and a transition plan could be developed.

Examples: ECF distribution in Kenya, ND distribution in Cameroon.

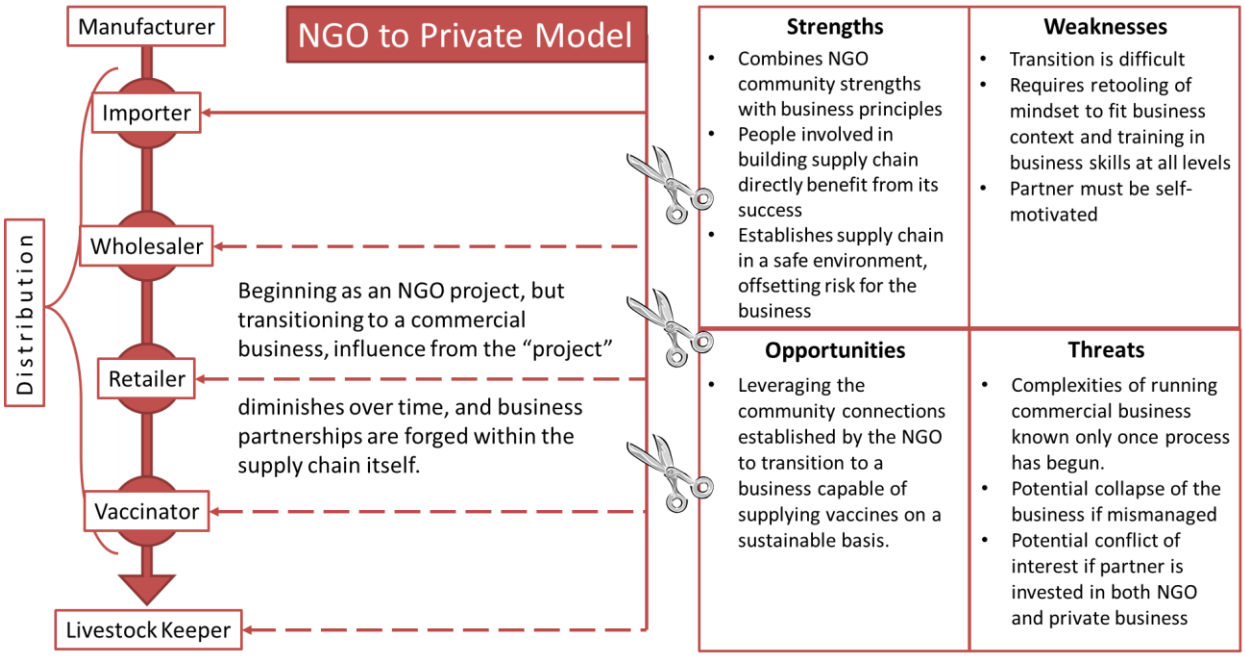


Figure 3: NGO to Private Model

It is critical to ensure that the person who will take over the project on a commercial basis has the interest and capability to do so and understands the demands of running a private business in which both costs and revenues are recorded. This, of course, requires significantly different skills to managing an NGO project in which expenditure is the only concern. It is likely that during the progression from project to sustainable business, continued assistance in the form of business capacity building will be required. The project funders should not assume the NGO has all the skills required to develop sustainable ventures.

2.3. Private Veterinarian Model

In cases where a functioning private sector veterinarian was found to be successfully engaged in the sale of vaccines and other animal health products to the backyard sector or in remote areas, partnerships were arranged directly. Grant assistance in this case was used to offset the risk of entering into a new product (say ECF) or market (for example, reaching the poorest poultry keepers in distant areas vs. targeting commercial or large poultry producers) with the intention of convincing the commercial partners that the targeted products are profitable and ensuring that margins in the business are adequate incentive to continue the investment beyond the end of the contract period.

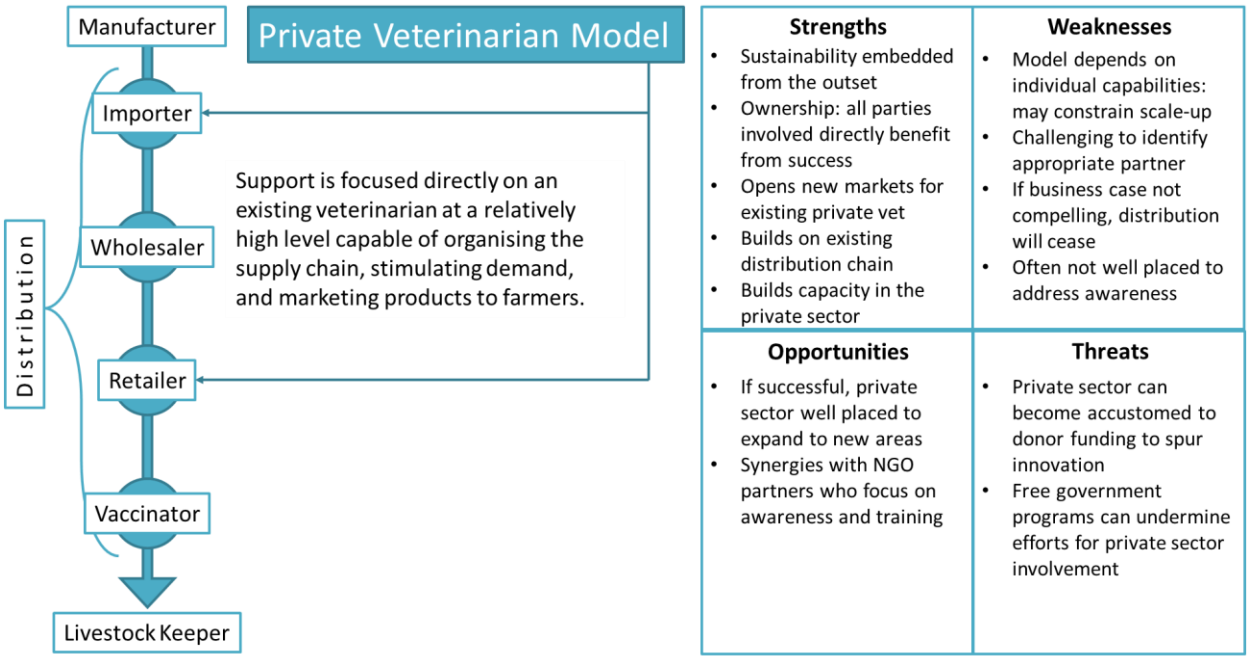


Figure 4: Private Veterinarian Model

In this model, the private sector partner is responsible for making all the connections needed to deliver the vaccines to the farmer. This includes working with local government extension agents, identifying shops and vaccinators, and sensitizing and creating awareness among livestock keepers to increase demand. Because each link in the chain is directly involved in the distribution of the vaccines, there is built-in ownership of the process. Since many of the links in the chain have some commercial experience, there are higher chances of sustainability. However, in most project countries, the private sector's capacity with regard to proper business management is low, and often the largest client is the government or other donors who work on a tender basis. As a result, strengthening the business and management skills of the private sector partners, will be beneficial to adapt them to the continuous or cyclical needs of commercial vaccine distribution.

Example: ND distribution in Burkina Faso and Lesotho.

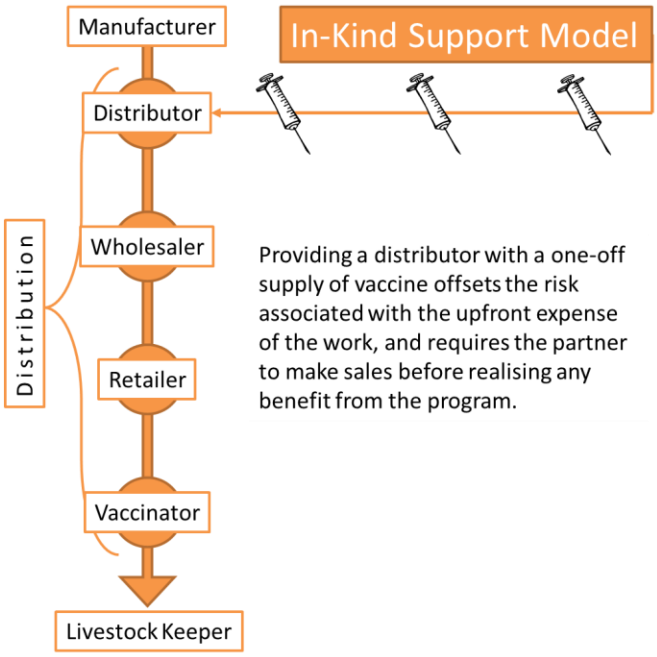
2.4. In-Kind Support Model

In a variation on the Private Veterinarian Model, the In-Kind Support Model works directly with private sector veterinarians, but in place of grant assistance, the partner receives a one-off supply of product as an alternative form of working capital investment. Prior to the delivery of the product, a legally binding contract is agreed incorporating the GALVmed principles of Global Access, and stipulating number of animals vaccinated, where vaccines can be sold (specifying pro-poor areas), for what range of prices, and via which channels. Once the vaccines arrive, the distributor is responsible for all of the costs of distribution, partnering with and training vaccinators, and working with local government to create awareness and demand among livestock keepers.

The in-kind donation effectively offsets the distributor's risks associated with the up-front costs of procuring large quantities of expensive vaccine, but forces them to sell the vaccine – using their own resources – before generating any revenue from the contract and to use higher margins initially towards setup and marketing/awareness costs. The need to use their own resources in order to profit from the

partnership closely aligns the objectives of the partner and donor, confirms the partner is serious, and has the potential to create long lasting downstream distribution linkages. In this model, net revenues from sales of vaccine are retained by the distributor, with the stipulation that he/she uses them to expand the distribution of the vaccine in the future. If the business is profitable, an outcome the distributor has a hand in determining, this model has good chances of sustainability, and demonstrates that non-traditional incentives can spur innovation in the private sector.

Example: ECF distribution in Tanzania.



Strengths	Weaknesses
• Sales required before benefits accrue to partner • Offsets risk to allow private sector to explore new markets • No cash funding requires partner to use own resources, hence to seek most efficient solutions	• Requires strong private partner with ample cash resources to enable distribution • Risk of loss of vaccine if mishandled • Private partners often not well suited to awareness raising
Opportunities	**Threats**
• Alternative to grant funding that stimulates private sector involvement • Builds private sector capacity and makes the case for the smallholder sector as a viable market	• Poor business plan or execution could lead to failure • No need to buy products may lead to lack of commitment initially • Free or subsidised government or donor programs can undermine private sector initiative

Figure 5: In-Kind Support Model

2.5. Private Franchise Model

The final model type explored in PLSHL-1 more formally controls the levels of the distribution chain through franchise agreements between independent veterinarians in the field and the main national level company. As with the other commercially-led models, GALVmed funding is used to offset risk for the expansion of the business model into new areas in order to encourage the franchise to explore marketing vaccine products to the bottom of the value chain (BOC). The franchises themselves are a risk-deferral strategy in that much of the capital burden of establishing stores, supply chains and marketing by the upcountry veterinarians is shared and coordinated by the larger company.

This type of distribution model requires high level business management experience, including well-functioning stock keeping and accounting control systems. If successful, however, partnering with a franchise can leverage larger scale investment and can extend the reach of needed health products into rural areas through the franchise's extension network of animal health services outlets. As with the other models, guidance and management of the partnership is essential, as is business training at lower levels to boost the commercial viability of the franchisees. Where they are available then working through established franchises significantly boosts GALVmed's ability to scale distribution of new

products and reduces risks of poor administration and governance at the partner level, therefore enabling GALVmed resources to be more focused on last mile issues at BOC level.

This model would also be applicable to local chain of shops, with similar structure to a franchise.

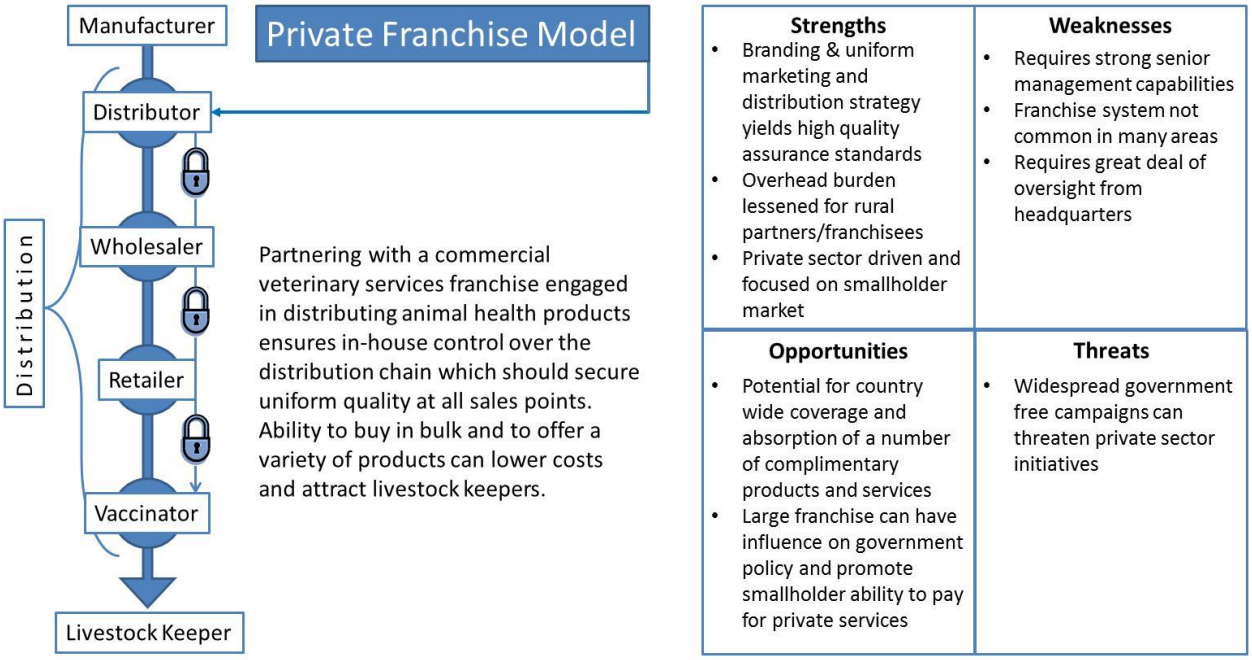


Figure 6: Private Franchise Model

3. PLSHL-1 Outcome Summary

This section will examine the outcomes of the ECF and ND pilots in the various countries in which GALVmed worked in PLHSL 1. The tables below (Tables 2 – 4) provide a snapshot of the ND pilots and ECF programmes for comparison.

Outcomes for RVF and PC are not included in this section, as the work on these diseases within PLSHL-1 was focused primarily on R&D activities and not on adoption. However, PLSHL-1 included preliminary adoption activities for RVF and PC, in preparation for the next phase, when the products will be available.

3.1. Newcastle Disease Outcomes

The three model types in the ND pilots were the NGO Facilitator, NGO-to-Private and the Private Veterinarian Models (see Tables 2 & 3 for details). Because GALVmed Newcastle Disease vaccine projects target backyard poultry keepers (FAO poultry sectors 3 and 4), the focus of the NGO-facilitated pilots has been to ensure access to the last mile of the distribution chain, although in some particular cases, availability of the vaccine was a major challenge, requiring deals with the top of the chain and/or importation of the vaccines. The emphasis on reaching livestock keepers living in remote areas has meant that development of the chain began at the bottom and worked upwards, establishing small shops and vaccinators in extremely rural areas and then linking them with larger retailers and distributors. The system worked best in locations that already had a retail system in place to which the last mile players linked, but in some cases lack of capacity (for example cold chain capacity) or tenuous supply links threatened the existence and sustainability of the project.

The Private Veterinarian Models in ND began with an established link in the chain, either a distributor/importer or a regional retailer. These partners were tasked to develop the downstream linkages in the best way possible to reach smallholder poultry livestock keepers with whom to partner in order to sustain the ND supply business. One challenge with this model was to link the primary partner with a reliable source of vaccine.

In the future, GALVmed hopes to implement other ND adoption models, for example models driven by small private manufacturers or government manufacturers. Thus far, this has not been possible as small private manufacturers were lacking the appropriate products and government manufacturers were lacking marketing experience or business capabilities. Work conducted during PLSHL-1 (and through other GALVmed programmes like VACNADA), have laid out the necessary foundations which might make it possible to develop and implement such new models during PLSHL-2.

Table 2: ND Pilot Summary for Africa (results up to February 2013)

	BURKINA FASO	CAMEROON	D.R.C.	LESOTHO	TANZANIA
Partner Model	Private Vet Model	NGO-to-Private Model	NGO Facilitator Model (trying to evolve to Private Model)	Private Vet Model	NGO Facilitator Model
Choice Decision	Identified a dynamic, private sector partner already working in rural areas and eager to expand into backyard poultry. GALVmed tried to include a local NGO in the partnership, but the NGO was not willing to cooperate with the private sector.	Local branch of a large and reputable NGO, already working in the local area. Initially failed to partner with private sector who did not show interest until seeing results of the first campaign.	Local NGO with years of experience in the agricultural sector, supported by the Belgian Cooperation Agency.	Baseline phase was conducted with a local NGO that was not keen to implement the pilot. There are very few private vets (<5), but attempts to engage them as a group were unsuccessful. Proposals were requested from the few vets who demonstrated interest.	GALVmed was already working with partner in other areas. Promising supply linkages available and large numbers of poultry
Strengths	Private business is lead partner, has scope for growth and sustainability	Strong community organization skills; well established in the community	Government appears eager to privatise the veterinary sector, and are keen to see the progress of this project.	Private veterinarian is lead partner with importation experience	Presence of "Senior Vet Catalyst" + some strong private-sector shop keepers, and clusters of vaccinators
Weaknesses	Dependence on one individual. This implies that for expansion and scale up, new partners (associated to that individual) are needed.	Initially, NGO was too involved in the distribution chain and not well connected to wider private sector.	NGO faced internal governance issues (now resolved) that hindered progress of the project. Project manager was not dynamic and has been replaced.	All lower levels are government partners, inadequate management and project mentality	Very long chain, but relying on already existing structures. NGO with very good field experience, but limited business/commercial knowledge.
Opportunities	Management capacity and business skills need improvement.	Links with private sector are strengthening.	A private partner has now been identified who is keen to participate.	Management capacity and business skills need improvement.	Management capacity and business skills need improvement.
External Challenges	Vaccine availability (there is no local production).	Very remote area. Availability of the vaccine was a challenge, although there is a local manufacturer.	DRC is an abnormally difficult work environment, with high levels of need.	Vaccine availability (there is no local production)	Official recognition of vaccinators
Project Timeline	1- Baseline Study: Sept. 2011 2- Vaccinations: • First vaccination: Jan- Feb. 2012 • Second vaccination: June 2012 • Third vaccination: August 2012 • Fourth vaccination: November 2012 3- Final evaluation: Dec. 2012	1- Baseline Study: March 2011 2- Vaccinations: • First vaccination: May- Jun 2012 • 2nd vaccination: Oct.-Nov 2012 3- Final evaluation: Dec. 2012	1- Baseline Study: April 2011 2- Vaccinations: • First vaccination: Oct. 2012 • Second vaccination: Jan. 2013 3- Final evaluation: Upcoming	1- Baseline Study: May 2011 2- Vaccinations: • First vaccination: August 2012 3- Final evaluation: Dec 2012- Jan-2013	1- Baseline Study: Dec. 2010 2- Vaccinations: • First vaccination: Feb-Mar 2012 • 2nd vaccination: Jul- Aug 2012 • 3rd vaccination: Feb-Mar 2013 3- Final evaluation: Dec. 2012
Project Results	Number vaccinators trained: 50 Number households: 8,861 Number ND vaccinations: 404,500	Number vaccinators trained: 85 Number households: 6,608 Number ND vaccinations: 122,327	Number vaccinators trained: 70 Number households: 4,316 Number ND vaccinations: 69,242	Number vaccinators trained: 44 Number households: 4,270 Number ND vaccinations: 47,592	Number vaccinators trained: 164 Number households: 13,138 Number ND vaccinations: 411,250
Outlook for Sustainability	Good - though requires further work on building business skills for main partner, links to reliable source of vaccine and solutions for scale up	Poor as-is - but potentially positive with a shift in focus from NGO to private vet model to connect project to distributors	Questionable - it will depend on the outcome of the negotiations with the private sector and the new Project Manager.	Good - Partner needs continued non-financial support to tie in private sector CAHWs, and links to reliable source of vaccine.	Good - Partner moving away from NGO umbrella to become private consultant connecting and expanding the supply chain.

Table 3: ND Pilot Results Summary for Asia (results up to February 2013)

	INDIA I	INDIA 2	NEPAL
Partner Model Type	NGO Facilitator Model	NGO Facilitator Model	NGO Facilitator Model
Choice Decision	Request for proposals was made to local NGOs. This NGO is one of the largest agricultural NGOs in India.	Request for proposals was made to local NGOs. Chosen partner is a small local NGO, that has worked very efficiently with milk producers.	Local branch of a large international and reputable NGO
Strengths	Large Indian NGO covering several regions. Potential for scaling up. Good communication with the community. Strong emphasis on poultry management.	Flexibility to adapt to the local challenges. Very good relations with livestock keepers. Strong emphasis on poultry management.	Built on existing women self help groups and trained CAHWs. Strong emphasis on poultry management.
Weaknesses	Too focused on their cooperative structure and project mentality. Attempt to work with local medical shop was not successful and the model is using now the entrepreneur managing the accounts for the SHGs.	Small NGO, might be difficult to scale up.	Small project, but with good prospects.
Opportunities	Scale up based on incorporating poultry into already existing programmes	Highly motivated management	Scale up based on incorporating poultry into already existing programmes
External Challenges	Avian influenza badly affected the project area and many birds died. It was difficult for the farmers to see the benefits of ND vaccination and for CAHW to continue when poultry population declined drastically.	Elephant migration means that government cuts electricity for extensive periods. Avian influenza was near the pilot project.	Avian influenza was near the area, but additional biosecurity measures decreased the risk.
Project Timeline	1- Baseline Study: May 2011 2- Vaccinations: • First vaccination: July- Aug 2011 • Second vaccination: Nov-Dec 2011 • Third vaccination: May-Jun 2012 • Fourth vaccination: Aug-Sep 2012 • Fifth vaccination: Nov -Jan 2013 3- Final evaluation: November 2012	1- Baseline Study: May 2011 2- Vaccinations: • First vaccination: July-Aug 2011 • Second vaccination: Nov-Dec 2011 • Third vaccination: April-May 2012 • Fourth vaccination: July-Aug 2012 •Fifth Vaccination Nov- Jan 2013 3- Final evaluation: Oct 2012	1- Baseline Study: May 2011 2- Vaccinations: • First vaccination: June-July 2011 • Second vaccination: Sept - Oct 2011 • Third vaccination: Dec 11 - Jan 12 • Fourth vaccination: April - May 12 3- Final evaluation: June 2012
Project Results	Number vaccinators active: 66 Number households: 7,587 Number ND vaccinations: 189,055	Number vaccinators active: 22 Number households: 9,000 Number ND vaccinations: 283,494	Number vaccinators active: 5 Number households: 2,300 Number ND vaccinations: 60,152
Outlook for Sustainability	Good assuming links with the private sector are strengthened.	Good as links with private sector strengthened	Very good -as ND vaccinations are continuing 1 year post project and there are no ND outbreaks

3.2. ECF Outcomes

Due to the technical challenges of the ECF-ITM vaccine, with the requirement for storage in liquid nitrogen and handling and administration by qualified veterinary personnel, it was necessary to consider distribution channels from a higher vantage point, at the level of the distributor. In all ECF programmes, the partner was a highly-trained veterinarian who would organize the distribution chain or would hire that expertise. The models applied were varied – including the In-Kind Model, the NGO-to-Private Model, and the Private Franchise Model – but all private-sector driven.

Table 4: East Coast Fever Pilot Summary (results up to February 2013)

	KENYA 1	KENYA 2	TANZANIA	MALAWI
Partner Model	NGO-to-private model	Private Franchise model	In-Kind support model (private distributor)	Public-Private Model
Choice Decision	Long history with ECF in NGO sector + interest in moving ECF into the private sector with network of qualified vets	Dynamic new franchise approach to delivering vaccine + extensive experience in livestock in East Africa	Has presence and experience in ECF and is trusted by livestock keepers	Future vaccine manufacturer. Selected to pilot the distribution of ILRI ECF stock within Malawi to build up their internal marketing and distribution capacity.
Strengths	Wide network of quality vaccinators, excellent training and technical skills, known and respected by livestock keepers.	Strong business focus, aggressive and unique approach to animal health service provision	Commercial business well connected with government, able to cover wide area, compliant with suggestions to improve business after weaknesses were identified, not asking for more grant funding	Strong veterinary training and technical skills and cold chain facilities. Distribution partner is a commercial business with a strong presence and an eager young management team that seeks new opportunities to expand veterinary services in the country.
Weaknesses/ Internal Challenges	Uncertain transition plans from NGO to private business, weak commercial accounting	Unanticipated costs associated with franchise (balancing between building brand recognition and keeping products affordable), and lower than expected vaccinations.	Book keeping and reporting skills required updating, training of staff necessary to properly account for stocks and cash flows	Must strengthen senior management to build commercial experience and develop accounting and reporting skills. Lack of capital for expansion.
External Challenges	Vaccine registration, government interference, drought, illness of vaccinators	Vaccine registration, government interference, drought	Government mandated eviction of cattle, need for vaccinator finance.	Market dynamics not yet well developed. Frequent fuel shortages, lack of vaccine awareness, and few veterinarians in the country. Difficulties with the retailers down the chain.
Project Timeline	1. Vaccinator Training: Dec 2011 2. Start of vaccinations: Dec 2011	1. Vaccinator Training: Dec 2011 2. Start of vaccinations: Dec 2012	1. Vaccinator Training: Jan 2012 2. Start of vaccinations: Jan 2012	1. Vaccinator Training: March 2011 2. Start of vaccinations: April 2011
Project Results	Number vaccinators trained: 5 Number vaccinations: 39,120	Number vaccinators trained: 9 Number vaccinations: 7,320	Number vaccinators trained: 54 Number vaccinations: 22,400	Number vaccinators trained: 47 Number vaccinations: 2,080
Outlook for Sustainability	Good - Transition from NGO to commercial enterprise requires additional business assistance and follow up	Good - Franchises building their name in rural areas, focus on selling multiple services positive step for continuous cash flow	Good - Existing network of vaccinators reaching targets, plan in place for expansion, no additional assistance requested	Good, with medium to long term support to build capacity of senior management, and to improve marketing and distribution skills

4. Lessons Learned & Observations

The section on Lessons Learned raises issues, provides brief examples, and offers observations and lessons to be taken from each. It is composed of the following main parts:

Part a: Stakeholder Resources and Capabilities
Part b: Developing Supply Chains and Partnering Models
Part c: Other Factors
Part d: Public goods

- All of the lessons learned are tied to the goal of sustainability. This requires a solid understanding of the nature of the product, people, partnerships, incentives, policies and technologies that must work together for the delivery of products to poor livestock keepers.
- The focus of this report is on field project implementation, and not in generic organisational learning (which are covered in other GALVmed reports).

The observations/lessons learned are summarised in the Tables 5 – 21 below. Each table includes a column named "Relevance" which covers Relevance and Category:

Relevance: These are subjective criteria measured on a scale of 1-2, in order to prioritise the relevance of the different Lessons learned for GALVmed to achieve its goal:

L1: Lessons of high relevance – critical for the successful implementation of adoption projects. If not implemented, these may become a limiting factor

L1*: (L1 plus lessons) – These are a sub-category of L1 lessons, and include the KEY L1 lessons that have more impact on project success. They can be seen together in Annex 1.

L2: Medium relevance – Important lessons, but not critical for project success, or alternatively, critical to success, but outside GALVmed control

Obs: Observation - there is very little GALVmed can do about it at project implementation level, besides recognising its presence and being aware.

Category:

Str: Strategic– Relevant at strategic level when designing the intervention

Imp: Field Implementation – Relevant for field implementation

Part a: Stakeholder Resources and Capabilities

Part a focuses on what has been learned working with the people involved in animal health. It explores the tangible (financial, physical), intangible (reputation, culture) and human skills (capacity, collaboration) the key people involved in market access possess that can be tapped to successfully deliver animal health products to poor livestock keepers. Figure 7 below depicts the relationships between the various players from those who facilitate to the manufacturers, distribution chain and livestock keepers who produce, sell and use the products.

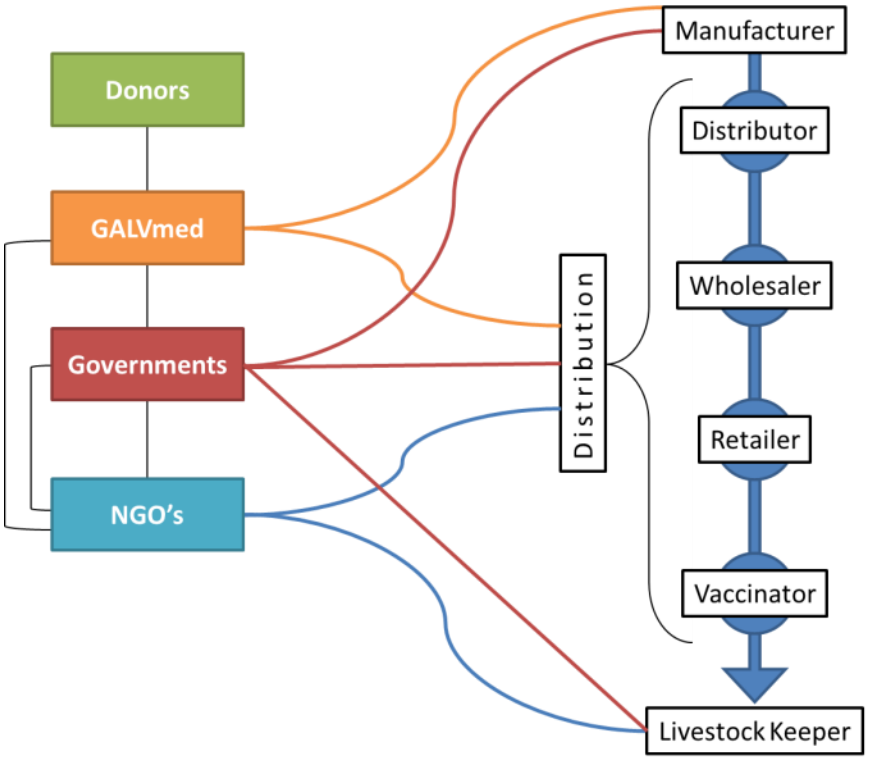


Figure 7: Stakeholder Diagram for Private Goods in relation to GALVmed interventions

Each of the stakeholders in the diagram above is examined in this section, and the relationships between the partners are discussed in the subsequent section. It is important to remember that managing this complex web of interrelationships is a means to an end: the goal is sustainable access and adoption of livestock products by poor livestock keepers.

4.1. Donors

GALVmed seeks to maintain a mutually beneficial relationship with donors that matches sponsorship with specific GALVmed identified objectives.

Table 5

LL	Rel	Topic	Example/Description	Observations & Lessons Learned
1	L2 Str	Multiple donors with different strategies and goals can effectively partner with GALVmed	PLSHL-1 could synergise well with market development activities conducted under other programmes like the GALVmed component of VACNADA which included management and business training of African vaccine manufacturers (funded by the European Commission).	Different donors contribute to different aspects of GALVmed's work, fulfilling their objectives and supporting GALVmed strategy at the same time.

2	L2 Str	Competing donor ideology and/or objectives	Well intentioned donors can sometimes disrupt markets by intervening with charitable donations. For example: free distribution of vaccines through public channels brought into a market where private sector is being established can hamper the efforts. For example the VACNADA component that delivered free vaccines hampered efforts to establish sustainable vaccine distribution and affected GALVmed ND projects.	1- Need to involve other donors and be aware of projects happening in target countries to avoid them adversely affecting GALVmed market development projects. 2- Advocate that donors not provide aid that hinders the sustainable distribution of products. 3- Work with government (and other organisations working in the field) to discourage free distribution by providing evidence of success from ongoing programmes or redirect efforts to other areas.

4.2. GALVmed

GALVmed's roles in livestock product distribution are those of catalyst and facilitator. Internal teams and consultants work together in this capacity in order to cover different areas and create synergies.

Table 6

LL	Relevance	Topic	Example/Description	Observations & Lessons Learned
3	L1* Str & Imp	Flexibility in project design – Constant Monitoring &Evaluation	Changes have been necessary in all market development and adoption projects to various degrees, from minor adjustments, to major design changes.	Due to the ground breaking nature of the market development and adoption projects and the high degree of innovation and risk required, constant monitoring is needed (not only baseline and final project evaluation) in order to identify changes, and incorporate modifications as early as possible. Flexibility and dynamism to address the changes is essential for project success.
4	L1* Str & Imp	Flexibility in resourcing	Negotiations with ECF distributors were protracted. Contracting local consultants, who could provide immediate guidance and support quickly concluded the contracting.	Due to the different levels of interventions through the value chain (from top to bottom), and the variety of geographies covered, a broad range of capability is required. Therefore it is important to have multiple resources that can provide (ideally locally) the expertise needed.

5	L1 Str	Area selection	Areas that are extremely poor have proved more challenging than neighbouring areas that are slightly better off but still very poor. For example one of the ND projects in India started in an extremely poor area, but when it expanded to an adjacent area just slightly better off (but still very poor), the implementation was easier and facilitated the progress in the original area by being used as an example for the livestock keepers and vaccinators.	Proper analysis of the area and a detailed analysis of the beneficiaries are required at the start of the project, to give it the best chance of success. When starting a project covering a wide area, it is better to start in areas that are slightly better off. These areas are in a better position to make investments in livestock and can act as examples for the poorer livestock keepers. Poorer areas can be introduced later when the local partners have more experience, and the vaccinators and livestock keepers have seen results and learned from the initial area.

4.3. Government

Relationships with government at all levels need to be forged in order to succeed. This includes gaining the trust and approval of local officials, and working with them to further the programme. (Note: discussion of policy will be addressed more fully in Part c)

Table 7

LL	Relevance	Topic	Example/Description	Observations & Lessons Learned
6	L1 Str	Role of Government	Government should play a very important role in areas such as policy framework, regulation, disease surveillance, monitoring, awareness creation and emergency relief, and should always be involved. It is important that government focus on areas which do not hinder private enterprise. E.g. Government setting up free ND vaccine campaigns (or at the wrong times of the year and / with not enough frequency) interfere with the development of sustainable ND vaccine distribution systems.	It is important to work with government to clarify roles and expectations from the inception of the project. The role of Government as "provider" is deeply entrenched in some government officials, but there is increasing acceptance of private-led service provision, and can be spurred on with evidence gathered from successful market led projects.

LL	Relevance	Topic	Example/Description	Observations & Lessons Learned
7	L1 Str & Imp	Involvement of relevant and different government agencies	Regulatory agencies are not always under the same government department as the Director of Veterinary Services (DVS) and might be difficult to address regulatory issues working with only one of them.	1- It is important to involve not only the Director of Veterinary Services (DVS) office, but also regulatory agencies when applicable. 2- Keeping in regular contact with the different agencies helps build relationships that facilitate high-level acceptance of novel ideas. 3- When regulatory agencies exist, is important to work with them and strengthen their capacity if necessary.
8	L1 Imp	Local officials awareness and acceptance of programme	Government officials in the areas where programmes are happening may not have been briefed by National-level officials or vice versa.	Involving district level and local government official facilitators in trainings and discussions helps ensure smooth delivery of products.
9	L1 Imp	Unfair competition by local government veterinarians	In some cases there is unfair competition with the private sector – e.g. Government veterinarians in rural areas providing services only for large ruminants where attractive margins exist, making it difficult for independent private veterinarians to establish themselves and creating an environment in which small livestock is neglected.	Involvement of local official veterinarians (or official animal health technicians) is very important from the inception of the project to clarify the different roles, and ensure there are synergies. Official veterinarians can be used in many instances as backstopping for private animal health technicians.
10	L2 Str	Misalignment between government services and other stakeholders for good policy making	Government officials might prefer vaccination campaigns or other activities due to a variety of reasons that are not understood the same way by the private sector or other stakeholders. Stakeholder meetings in Tanzania and Uganda, facilitated the distribution of ECF vaccine by aligning the different stakeholders needs and understandings.	1. Continue to advocate within government institutions for better understanding of these issues in order to work towards a more efficient and liberalised livestock health sector where private sector can also thrive. 2. Holding one big stakeholder meeting in which issues are openly debated and roles are clearly defined for the various stakeholders has proved extremely useful.

4.4. NGOs

NGOs have long been a favourite access route to poor livestock keepers. They often have strong connections to rural communities and skills that are unmatched in terms of awareness creation and trainings for those at the field level. However, NGOs may not always be the best partners for stimulating sustainable commercial distribution channels. Note that the lessons learned in the table below are based in GALVmed experiences while implementing the market development and adoption activities with a limited number of development NGOs involved in the livestock sector, and they might not apply to many other NGOs.

Table 8

LL	Relevance	Topic	Example/Description	Observations & Lessons Learned
11	L1 Imp	NGO project mentality - misaligned economic incentives for creating sustainable distribution	Working on a primarily grant-based project-to-project basis, NGOs often do not fully understand the real meaning of sustainability. NGOs make money and pay their wages by running projects. Therefore if they are genuinely successful in creating a sustainable distributor, they are also out of work on that project. In some instances they see themselves as a component of the value chain.	1- Emphasise from the inception of the project, the "temporary facilitation" role of the NGO in the value chain. 2- Follow up closely on the design and implementation of the project, to ensure this is fully understood not only by the NGO management, but also by the NGO project implementers.
12	L1 Imp	Lack of business understanding	1- NGOs have great strengths in dealing with the community, but have proven to generally be weak partners in many pilots, with little understanding of how markets and business works. 2- The nature of GALVmed projects is a new experience to them, and need to be open to new concepts.	1- Play to NGOs strengths, usually at the bottom of the chain: • Community mobilization • Awareness raising • Group formation e.g. self help groups 2- Projects led or coordinated by NGOs need special support in order to incorporate business skills. 3- It takes time for attitudinal change to take place in the NGOs 4- Choosing the most appropriate GALVmed like minded NGO is critical where there are several on the ground.

13	L1 Str	NGOs as "risky" partners	1- Unfortunately many small/ local NGOs have inappropriate governance measures in place. 2- Even international large NGOs are at risk of closing programmes if they don't fit with current donor priorities.	1- GALVmed should carry out thorough checks on partners before contracting, to include registration, references from other funders, governance structure and ability to manage and report on use of funds. 2- Involve international NGO Headquarters to understand the future of the local branches during the existence of the project.
14	L2 Str	Relation with private sector: fear and crowding out	1- Some NGOs are afraid and/or sceptical of the role of the private sector. 2- If not market focused, "successful" NGO projects can hamper sustainability by pushing out private investment.	Advocate within NGOs working in the sector/area for better understanding of the role of the private sector issues in order to work towards a more efficient livestock health sector where private sector can thrive.

4.5. Manufacturers

At the top of the distribution chain is the product manufacturer. Decisions made in the production of a product (e.g. dose size or vaccine type), have consequences down the distribution chain and ultimately impact the end user: the vaccinators and the poor livestock keepers. Sometimes manufacturers are wholly or partially managed by local governments (especially in Africa), and do not work on a cost-recovery basis. Often manufacturers do not have a commercial marketing strategy, relying instead on tenders from government and donors to determine timing and extent of production runs. This can lead to inconsistent supply of needed products at prices that vary widely between manufacturers, with generally large pack sizes, which can negatively affect commercial distribution downstream.

Table 9

LL	Relevance	Topic	Example/Description	Observations & Lessons Learned
15	L1 Str & Imp	Local manufacturing capacity is limited	1- Often local manufacturers are partly government owned and have sporadic production patterns linked to government or donor-funded campaigns. 2- Quality issues often arise that impact the efficacy of the product. 3- Limited to non-existent private sector involvement in the manufacturing of veterinary products.	1- Maintaining continuous flow of quality vaccines and other products requires manufacturers to strengthen their business focus • Support manufacturers to conduct Cost of Goods analysis to determine accurate price • Connect manufacturers to wholesale and retailers to gauge demand • Provide capacity building support to strengthen the Sales & Marketing department of the manufacturers

				• Support manufacturers on QA and QC issues, and encourage them to work with AU-PANVAC. 2- Promote private sector involvement on the manufacturing of veterinary products
16	L2 Imp	Imports can be unreliable	Pricing, quality and reliability of imported products often varies from manufacturer to manufacturer.	Map the procedures for procuring different products from manufacturers 1- Scrutinize sales agreements and conditions of sale if possible. 2- Ensure that vaccines and all related products meet specifications in terms of expiry and functionality 3- Support improvements in cold chain handling across borders and ports.
17	Obs Str	Production self-sufficiency and national pride	Many governments believe they need to produce all vaccines locally. This might lead to inefficient production. Although in most developing and emerging economies vaccine production has moved to the private sector, in Africa and South Asia, veterinary services still feel that they should produce vaccines.	1- Promote work with regional trade groups, AU-PANVAC and others to facilitate regional cooperation, relying on comparative advantage of different manufacturers to efficiently broaden access and improve quality and availability for a variety of vaccines. 2- The importance of the work done on facilitation of harmonisation of vaccine registration in Africa is crucial to promote regional cooperation.
18	Obs Str	Importance of both private and government owned manufacturers	Government manufacturers might be necessary to produce neglected but important products that might not be attractive to the private sector.	It is important to work with private manufacturers to ensure the needed quantity and quality, but recognising that there is an important role for the government manufacturers, that will always be there.

4.6. Importer/Distributors & Wholesalers

The importer/distributor or wholesaler will be the first point of sale after a product leaves the manufacturer. Many have developed successful, national-level distribution systems that can be built upon to deliver new products and services. Although the goal is to reach the poorest livestock holder, a market often overlooked by players highest up the chain, distributors must be included in discussions about how best to achieve the goal.

Table 10

LL	Relevance	Topic	Example/Description	Observations & Lessons Learned
19	Obs Str	Donor/Government is largest client	Many distributors are accustomed to working on a case-by-case basis when government or donors pledge project funds for a vaccination campaign. They may not be well set up for sustained delivery of major animal health products.	Government and donor contracts are lucrative, but don't help distributors develop business skills needed to procure, store and distribute a product sustainably. Need to re-orient distributor outlook so that the farmer is the target client. This is closely related to regulation and policy issues in some markets.
20	L1 Imp	Lack of business skills for sustainability	Although a distributor may run a reasonably successful small business, they may lack skills in budgeting, cash flow analysis, and other basic skills required to partner with GALVmed or for expansion without support.	When partnering with any business, gauge the level of business acumen and build contracts to include scope for auditing and business training.
21	L1 Imp	Working with existing distribution networks	Some distributors have existing, functioning, nationwide distribution networks for other animal health products, or reaching other markets, but not addressing the poor livestock keepers.	1- Interest the existing distributors by showing them the potential as niche market of the poor livestock keepers. 2- Approach distributors at the top of the supply chain at initial project stages. Learn from them how to incorporate a new product into their already functioning distribution network. 3- Grant funding may not necessarily be the method that has the best results. 4- Project managers (PM) need different skills to engage this calibre of business at senior levels and develop projects with them. PM skills need to be developed by training, coaching and support by the senior management and market development consultants.
22	L1 Imp	Multiple products are essential	Animal health businesses need a diversified basket of products to remain commercially viable in almost all cases.	Combining new targeted products with existing complimentary products can increase profitability and interest among private distributors. For new distribution chains funded as 1-2 year projects, contracts can expire before multiple products have been

				incorporated. Therefore either run and continue to fund programmes with longer time horizons, or start with multiple products from the beginning if not linking with established distribution networks.
23	L1 Imp	Need to stimulate supply	Distributors may need convincing that the target group of interest to GALVmed is a viable, lucrative market for animal health products.	Offering to partner with private distributors to offset the risk of exploring a new market can be very persuasive. If the market is well developed, they reap future benefit from it. In this regard GALVmed can work as catalyst.
24	L2 Str & Imp	Lack of capital	1- To grow their business, even larger veterinary product distributors may not have access to the needed capital for stocks (Working Capital from banks) or for infrastructure (such as for transport and storage). 2- In some cases, grouping distributors to increase capital and purchasing power should be considered (under evaluation for ECF).	1- In the short term, partnering with GALVmed serves this need, but establishing long-term relationships with private sector funding sources such as banks, government (PPP) or capital investors is a key step to sustainable scale up of activities. 2- At the BOC end of the chain, key to this is finding a solution for financing cold chain, without which vaccine distribution is not scalable. 3- Grouping importers or distributors to increase the purchasing power needs to be considered.

4.7. Rural retailers

In many areas, small retailers in regional, district and sub-district towns already exist that sell a range of products and services. They are positioned in rural areas, often in the heart of livestock production zones, but for these entrepreneurs, there are limitations like the existence of a reliable cold chain, and the risk of taking on a new product – such as a vaccine which requires refrigeration – can be too great to attempt without assistance.

Table 11

LL	Relevance	Topic	Example/Description	Observations & Lessons Learned
25	L1 Str & Imp	Lack of capital	Many small shops lack capital to purchase costly items which may limit their capacity to grow.	Continue to develop financial mechanisms and partnerships to cater to these groups.

LL	Relevance	Topic	Example/Description	Observations & Lessons Learned
26	L1* Imp	Lack of business skills	Retailers often only stock vaccines during a government subsidized campaign and are not accustomed to monitoring cash flows or establishing sustainable pricing.	Plan to train in business skills along with technical/cold chain. Follow up sessions are likely to be beneficial. To improve sustainability, focus on training of trainers (ToT) programmes rather than direct intervention at village level.
27	L1 Imp	Need to cooperate with vaccinators on pricing and marketing	Both shops and vaccinators need to make adequate margins on sales to continue selling products. It is a symbiotic relationship.	Connecting shop keepers and vaccinators is a start, but they must maintain the relationship and work together to determine pricing and to sell other products to livestock keepers.
28	L1* Imp	Need broad inventory of stock covering products and species important for the poor livestock keepers	Diversifying the range of appropriate products at shop level maintains cash flow during seasonal dips in sales and helps veterinarians/ vaccinators maximize their returns from trips to visit remote livestock keepers. Products should cover the needs of the poor livestock keepers in terms of health control tools and species.	Plan to include multiple products: 1- Learn what is needed and accepted /wanted by poor livestock keepers (in terms of products and species). 2- Begin with complementary products (such as ND vaccine and poultry dewormer) that can help boost sales of the target product 3- GALVmed and partners need to clearly understand the system and what vaccinators need to remain motivated to continue beyond the project. This differs widely between markets.
29	L2 Imp	Shops may be owned by government veterinarians	The owner of a local shop may be a government extension officer doubling as a private veterinarian.	1- Ensure that partnering with government veterinarians who run private business is acceptable in the country, and explore viability of a transition to purely-private shops where feasible. 2- Work with government veterinarians so they not only cover the more lucrative species (usually large animals) and products, but also neglected diseases and species. 3- Establish systems so government veterinarians can reach poor livestock keepers when they have difficulties in doing so. For example creating links with vaccinators to serve as mentors and resource for backstopping.

4.8. Vaccinators

For many livestock products, vaccinators (here a broad term including extension workers, Community Animal Health Workers (CAHW), trained community vaccinators, and others) are a vital link in the distribution chain from shop to livestock keeper. A group of well-trained vaccinators can cover a larger territory in a short timeframe than if livestock keepers were left to visit shops, collect products, and administer them themselves. In many cases the livestock keepers do not have the skills to administer those products or might not be allowed by legislation. Vaccinators can make use of larger package sizes (500 dose ND vaccine vials for example), and become resources for other veterinary services and trusted sources of information for livestock keepers. However, the legal status of vaccinators differs in different countries, as do their levels of training and motivation. One key aspect of maintaining a functioning distribution chain is to ensure that vaccinators receive adequate compensation for their work at the last mile. Without them, the system cannot function in many cases, especially for private good products such as ECF and ND vaccines.

Table 12

LL	Relevance	Topic	Example/Description	Observations & Lessons Learned
30	L1 Imp	Existence of vaccinators	One of the main limitations in the delivery of animal health products is the lack of human resources to deliver them: veterinarians are scarce in rural areas, and animal health technicians/ vaccinators often do not exist because of lack of training, capital or regulatory framework.	One of the key starting points when introducing a product is to understand who will be administering the product: the livestock keeper, the vaccinator or animal health technician or a veterinarian? There is need to evaluate if they are present in quantity and quality with enough resources (capital, training, etc.) and have support from the regulatory framework.
31	L1* Str & Imp	CAHW and /or Vaccinators not able to vaccinate	1- In many countries, there is not a legal framework allowing "vaccinators" to vaccinate. 2- In many countries, veterinarian associations are opposed to "Community Animal Health workers" as they fear competition or have concerns regarding capabilities. In some instances the word "vaccinators" (as opposed to CAHW) might be a better choice as the name already limits the activities and decreases fears from veterinarians.	There is a major need to bring the vaccinators under a legal framework. It can be a lengthy process – however it should be initiated and GALVmed should support the initiatives to achieve this, for example: 1- Support governments to consider adopting a phased approach to vaccinator training which builds private sector capacity in stages. As training is accumulated, vaccinators could be legally recognized as capable to handle and sell a wider range of products. 2- Maintain a dialogue with the local veterinary associations and related stakeholders (for example local Veterinary Faculty) to engage their support. They can help design

			3- Vaccinators might not have the necessary skills	curricula and conduct training courses. • Modular courses could be designed for the vaccinators covering different species for example, and providing a certificate at the end of each module. 3- Share the lessons learned from countries where vaccinators are recognised with policy makers in countries where they are not recognised. 4- Vaccinators need: • Initial Training • Refresher courses • Backstopping options so they know what to do when they observe something beyond their capabilities • Links to official government so they can report anything unusual
32	L1 Imp	Selection methodology and criteria	• Vaccinators are the last link in the supply chain, and often the only group who interact directly with livestock keepers. Proper selection of vaccinators who will remain active is very important to minimise turnover. • Young educated single men for example, tend to be very enthusiastic at the start, but they would be the first to leave when other opportunities appear in town. Married persons especially women tend to stay. • Women can be very good vaccinators, and usually are well received and have better communication with the women poultry keepers, but they might need special considerations, for example they might not	There are many ways to select vaccinators, some successful characteristics on the methodology are 1- Self selection by the community (but ensuring there is no negative influence by the village leaders) 2- Selection from self-help groups 3- Selection from previous agricultural/livestock projects The criteria used should consider: 1- Acceptance by community 2- Gender 3- Level of education 4- Marital status 5- Age 6- Ability to do the work 7- Complementarity with other work

			be able to travel alone, or at night. They might also not be able to cover as long distances as men. In the other hand, many women vaccinators conduct these activities as a supplementary activity (not as major source of income) so they might be content (and more likely to continue in the job) with smaller margins. • A minimum level of education is required. The project in India that started in a very poor area had more difficulties that in the area with a slightly higher level of education (this also applies to the livestock keepers).	
33	L2 Str	Lack of distinction between regulators and business: Government veterinarians/ technicians compete unfairly with private veterinarians/ technicians	1. Often, government veterinarians or technicians also work as private sector vaccinators (See LL9 in Table 5). They sometimes use government facilities and transportation without incurring the full costs and they can use their authority to compete against private 'competitors'. 2. In many cases public veterinarians only cover the most lucrative sector (i.e. large ruminants), neglecting other species but making it difficult for other vaccinators to succeed as the most lucrative sector is already covered. 3. Government veterinarians sometimes receive politically- motivated	In many cases, the situation is tacitly accepted. Often, government veterinarians or technicians are the only available partners and need the additional income to make ends meet due to low salaries. There may not be anything that can be done to rectify the inequality in the short term, but as demand for products grows, private sector vaccinators may be able to compete on service quality. GALVmed and partners can continue to advocate for improved policy and regulations that better align the interests of public and private sector actors.

			subsidies that private veterinarians do not, which leads livestock keepers to reject the pricing of the private sector veterinarian.	
34	L2 Imp	Government veterinarians/ technicians have divided loyalty	Government veterinarians or technicians may be required to leave their area to attend meetings or events, potentially disrupting planned vaccination campaigns.	Work with the government veterinarians to identify potential conflict times and organize work around them.
35	L1 Str	Private veterinarians/technicians can be difficult to manage	Private sector veterinarians/ technicians are not necessarily better businessmen.	Developing private sector vets is important, and linking them to steady financing to remove the risk burden from the shops/distributors is one part of the solution.
36	L1* Imp	Importance of steady income for the vaccinators	As many vaccinations or health control activities are seasonal, it is important to develop a portfolio of products/activities to ensure constant income to make the job attractive to the vaccinators - Note that this might be less relevant where vaccinators are part time, or vaccinations are not the main source of income.	Alternatives for achieving a relatively steady income for vaccinators: 1- Cover different areas in rotation (if disease epidemiology and control measures fit with this approach) 2- Have a portfolio of products/ activities to cover all year. This can include different species (poultry, small ruminants, pigs), and different type of products (for example vaccines and dewormers). 3- Provide training in poultry/ smallstock management to build animal numbers and grow their business. Vaccinators can serve as model farmers in their areas, showcasing new technology such as vaccinations, and alternate feed and husbandry resources
37	L1* Imp	Pricing should be set up for sustainability	So far, price has not been a limitation for adoption of animal health control products. The most important factor is demand and perceived value for money. Cash is often in short supply, but where livestock keepers see the benefit they will sell livestock/produce to raise cash for inputs.	Pricing must be set to ensure vaccinators make margins high enough to continue the work, rather than basing prices on perceived farmer ability to pay. This is the only way sustainable systems can be developed for private good products.

38	L1 Imp	Wide training will have added benefits	Training of vaccinators should be comprehensive (for example ND projects that also included poultry management had a bigger impact) and adapted to the needs of each project.	Training of vaccinators should include: 1- Technical aspects of the product and its delivery 2- Cold chain 3- Basics of livestock management 4- Basics of economics of livestock keeping 5- Assets maintenance (for example bicycles maintenance) 6- Basic business skills.

4.9. Livestock keepers

The goal of all the market access and development work is to reach livestock keepers who rely on livestock as part of their livelihood. Working with livestock keepers is essential to create awareness for the veterinary products being introduced and to learn about the local situation on the ground.

Table 13

LL	Relevance	Topic	Example/Description	Observations & Lessons Learned
39	L1 Imp	Start the distribution projects by livestock keepers paying for the products from the start	In some instances, local NGOs insisted on starting the projects by livestock keepers not paying for the vaccines, for example one of the ND vaccine distribution projects in India. Transition to payment (even if it was compounded by other external factors) proved difficult but expansion in similar areas with payment from the start, proved more successful.	1- Value for money is key for the livestock keepers. 2- If livestock keepers are not willing to pay, is usually because they are not aware of the value or they don't trust the vaccinator. 3- Livestock keepers benefit from seeing a vaccine's use, but free trials should be avoided to prevent further expectation of hand-outs. 4- If the full price of the product is not paid by the livestock keepers from the beginning of the project (used to subsidise prices to show value), livestock keepers should be made aware what the final price will be very early in the project.
40	L1 Imp	Awareness & Sensitisation: Livestock keepers don't always have the facts	1- Often livestock keepers are risk adverse, and reluctant to try new products, especially if they haven't seen the value. 2- In many instances, they are not aware that "solutions" like vaccines for such diseases exist or could be available to	1- Sensitisation and awareness cannot be overlooked in the initial phases. 2- Local radio campaigns, road side billboards, street plays and mobile theatres work very well (compared to newspaper advertisements). 3- Awareness should be comprehensive and also include aspects like the economics of livestock keeping.

			them. 3- Some of the poorest livestock keepers are not aware of the basic economics of poultry keeping i.e. it is a good source of income. 4- Rural retailers often do not have resources and expertise for awareness and sensitisation: NGOs and private sector can play an important role.	4- Awareness to stimulate demand can be undertaken by NGOs, but also the private sector. The private sector (at distributor level) can bring effective marketing expertise and skills to create awareness at farm level.
41	Obs Str	Poor livestock keepers have potential for development	Like everyone else, livestock keepers learn, make decisions and respond to incentives.	Although it may take time to introduce a new product or change long held beliefs, livestock keepers are constantly seeking ways to improve themselves and if approached as partners rather than beneficiaries, they will respond rationally and have proven to adopt new technologies over the decades.
42	L1 Str	Livestock keepers know their preferences	Cultural and experiential preferences can have an impact on the success of an intervention. Example: clear vaccines seen to be ineffective because they look like water.	Information must be gathered in each country to match farmer preferences with project goal. As in any business it is important to know your market and remember that the customer is king.

Part b: Developing Supply Chains and Partnering Models

In *Part a,* lessons learned were clustered around individual groups involved in the distribution of animal vaccines in PLSHL-1. *Part b* focuses on partnering models and distribution chains and explores how GALVmed works with groups to help achieve mass access for needed veterinary products. This section analyses how the links discussed above are brought together to form a chain.

4.10. Supply Chain Systems

Supply chain systems refer to the groups of people involved in the buying and selling of a product from manufacturer to the end user and/or beneficiary (the vaccinator or the livestock keeper). These are the groups that, if a programme is truly sustainable, will be able to continue to function after an initial support phase from an outside entity such as GALVmed. In Figure 7, these are the partners depicted on the right hand side. Those on the left, GALVmed, donors, NGOs and governments (though this last category overlaps a bit as has been seen above) are in the role of facilitating the supply chain/system and should not be included directly in it. These systems are complex and adaptive and smart interventions will need to first map the problems and attempt to unpick underlying causes before designing successful interventions.

Table 14

LL	Relevance	Topic	Example/Description	Observations & Lessons Learned
43	Obs Str	There are challenges and opportunities at all levels – GALVmed should not only focus on the last mile	Delivering veterinary products sustainably requires working with a number of very different partners, each of whom faces unique challenges.	It is not enough to focus only on the last mile. It can simplify things and improve sustainability if partners at distributor level and public sector stakeholders are also approached and involved from the beginning. In this sense a platform 'soft systems[1]' approach can be a powerful agent for change.
44	L1* Str & Imp	Top and Bottom of the chain require different strategies	The top of the chain is generally product focused and the bottom of the chain usually requires more focus on logistics. Single product focus at the bottom level is unlikely to unlock solutions for sustainable delivery.	While focusing on a single product is possible for manufacturers and importers, it is necessary to identify synergies at the BOC; to look beyond a single product focus at rural level to ensure enough income is made to continue to drive demand up the chain (see LL28).
45	L1* Str & Imp	At the bottom of the chain, better results are achieved with a holistic approach	1- The final evaluations of the ND projects indicate that projects that included basic poultry management had a greater impact (in terms of Cost Benefit Analysis) than the ones that focused more narrowly on vaccinations. 2- Management solutions can be very simple (for example how to protect chicks at night) and should be based on local resources and knowledge (for example the use of white ants collected in the forest or raised for feed) as used in the ND projects in India.	For improving livelihoods through livestock at BOP level, evidence shows that vaccines and medicines (inputs) need to be considered within a more holistic approach that also looks at nutrition, extension support and linking to output markets. 1- Including broader aspects of poultry management for example, shouldn't be an extensive or difficult exercise. Sometimes it might only require an extra half day of training for the vaccinators. 2- So far, the markets for the final products (for example poultry markets) haven't been a major barrier in Asia or East Africa, but might be a barrier to uptake in weaker livestock markets in other areas.

[1] Soft Systems Methodology is one way to tackle complex problems by breaking them down into manageable actions:
The seven stages are: (1) Entering the problem situation. (2) Expressing the problem situation. (3) Formulating root definitions of relevant systems. (4) Building Conceptual Models of Human Activity Systems.(5) Comparing the models with the real world.(6) Defining changes that are desirable and feasible. (7) Taking action to improve the real world situation.

				3- Increases in poultry production has been absorbed by increased home consumption 4- In some instances traders have learned of the increased supply, and have started to frequent the area.
46	L1* Str & Imp	Livestock keepers do not need vaccines: they need *solutions*	1- If ND vaccinations are successful, but chickens die of fowlpox instead, the livestock keepers still have problems. 2- If ND vaccinations are successful, but the livestock keepers struggle to feed the extra chickens, the original problem has evolved into a different problem.	1- It is important for the vaccinators to offer "solutions". Therefore having a portfolio of products is important not only for steady income and sustainability of the chain (see LL36), but to provide real solutions for livestock keepers. 2- Local solutions should be considered (for example the use of ants for chicken feed as described above).
47	L1 Str & Imp	Think broadly about distribution chain solutions	In any country, there are products being delivered to the farthest corners and sold to the poorest consumers (eg. Coca-Cola, beer, President butter, bar washing soap, oil, human medicines). 1- Use of human medicine shops have been successfully used in the ND distribution projects in India. Originally the owners were reluctant, but later they were happy to be involved in the project and appreciated the benefits of training on cold chain for example.	1- Explore what successful distribution chain systems exist for other products, and work on ways to emulate or learn from them or tie in. • Be aware of the limitations of other distribution chains: for example a Coca-cola does not need constant cold chain, and marketing (awareness) is already in place. There is also no limitation to who can serve a Coca-cola (no training or legal framework required). 2- Establish a new system only as a last resort having fully analysed the existing interrelated systems in a given market and clearly examined and developed a theory of change, including a clear exit strategy from the start. Perhaps rank plans based on sustainability feasibility, acceptability, scalability.

LL	Relevance	Topic	Example/Description	Observations & Lessons Learned
48	L1* Imp	Product availability is still a challenge	1- Product availability in quantity and quality, at the required times has proved an issue in many projects. Plans to address availability were in place, but in some cases, due to a variety of reasons the plans didn't work. 2- Production capacity and quality of national/state vaccine manufacturers is still not satisfactory.	1- Product availability should be a priority. Contingency plans should be in place.
49	L2 Str & Imp	Problematic importation: various issues from ensuring constant supply to monopoly	1- There can be issues around vaccine availability in different countries that can stall projects due to lack of supply for various reasons, such as registration or undeveloped rules and regulations around importation 2- When vaccines need to be imported, the country agents (because of country legislation or perceived private interests) might develop a monopoly that is not in the benefit of the small livestock keepers	1- Need to identify barriers to importation and search for ways to streamline in future. 2- Harmonisation of vaccine registration (at least at regional level) can help overcome some of the importation issues. 3- Work with local manufacturers to develop their regional export capabilities. 4- Identify very early in the project, if there is a risk of monopoly by country agents, and work with them from the start to find solutions to overcome it. Solutions in this case can be very varied, depending on the grade of cooperation from the agent.
50	L1* Imp	Supply of accessories for product delivery	Delivery of a vaccine without the needed accessories renders the vaccine ineffective. For example, eye droppers are needed for ND ocular vaccinations, oxytetracycline for ECF vaccinations. Identifying the correct accessories has been a key challenge for project success (LL 70).	1- Work with manufacturers, distributors and retailers to ensure that the products are always delivered with the right accessories, accompanying products or materials that should be used with the product such as droppers and diluent. 2- Work with manufacturers and independently to identify the best accessories for given environments and products. 3- Stress the importance of correct accessories to supply chain partners

				in terms of cost and benefit.
51	L1 Str & Imp	Pricing	The supply chain only continues if prices are acceptable from the top to the bottom of the chain in order that sufficient margins are made to cover overheads and provide motivation in the form of profit for stakeholders to continue the work.	Even if the supply chain is private-sector led, it is beneficial to help establish pricing mechanisms that ensure adequate margins for all involved, especially where business skills are weak at all areas in the chain and where vaccine is being produced by public or quasi-public bodies with little or no commercial foundation.
52	L2 Str & Imp	Length of value chains	Price will increase with the length of the supply chain. In cases such as the ND project in Tanzania, the supply chain is very long, but logistics make difficult to find shorter chains.	Supply chains should be as short as possible in order to minimise the costs. Nevertheless because of the nature of the objectives (reaching remote and poor areas), it is not always possible to find shorter alternatives. Understanding these chains in detail is the first step to analysing how to make them shorter.
53	L1* Str	Need to stimulate demand	Where there is strong enough farmer demand, availability of the product, and not too much political interference, then in many cases the market will respond by itself without need for GALVmed / NGO intervention in the supply chain. In some cases NGOs have been trying to stimulate a supply chain in which the product is not yet available in country, and these projects have been sub-optimal in the first year in terms of sustainable impact.	1. Market-led solutions will invariably be more efficient and more sustainable if they can be triggered. Key to this is availability of the target product in country (registration, importer identified and contracted), enabling environment (workable policies and regulations) and livestock keepers demand (marketing and awareness). 2. Demand should be created not only at retailer level, but also at the level of the livestock keeper. 3. Demand and awareness should be created not only by NGOs, but also by the private sector (mainly distributors) that can bring marketing skills depending on the particular circumstances of each market. 4. Innovations around re-packing and bundling products for farmers could be useful to increase demand, for example a 10 bird pack containing dewormer, vaccine and vitamins.

4.11. Partnering Models

GALVmed works with partners in order to work efficiently in many countries on many products at the same time. PLSHL-1 piloted a number of partnering models that were described in Section 2 above. The choice of partner has an impact on the effectiveness of the supply chain. Some partners are directly involved in the supply chain while others are facilitators. Finding the right combination of partners and correctly aligning responsibilities and incentives can be the difference between a time-bound "project" approach and the development of a sustainable supply chain.

Table 15

LL	Relevance	Topic	Example/Description	Observations & Lessons Learned
54	Obs Str	*Model selection*: Underperform-ance of the traditional poverty relief focused NGO model	Traditional NGO led models for connecting smallholder livestock keepers to needed inputs in a sustainable way often under perform. • All GALVmed ND vaccine distribution NGO led projects in Africa had critical internal issues that hindered the success of the project (from local branch closing to serious internal governance issues), and alternative models and solutions had to be sought.	The distribution of vaccines can be approached from any number of different angles, and all should be explored. Choice of supply chain model is partly determined by the potential partners (see LL 55 below). Models should be chosen based on thorough analysis of options, including the ones described in Section 2 above: 1. Identify a "Senior Veterinarian" catalyst (familiar with the area, the community, with experience and well respected) who may be able to effectively facilitate supply chain linkages. This could be a private veterinarian, or a veterinarian previously linked to a NGO or government but with a genuine interest in the backyard sector. 2. Search for unconventional solutions such as in-kind donations to catalyse distribution of new products through buying down some initial risk 3. Explore franchise-based operations 4. Work with Clusters of shops Explore working through social investors to target equity/debt into the sector as opposed to traditional grant funding of private sector to reduce risk.

LL	Relevance	Topic	Example/Description	Observations & Lessons Learned
55	L1* Str & Impl	*Partner selection*	1- Potential partner can be limited with few options from which to choose. Some reasons include: a) Nonexistence or very limited private sector b) Over dominance of some local organisations/NGO c) Lack of willingness from local NGOs to cooperate with the private sector d) Corruption e) Potential partners having competing interests. 2- When appropriate and possible, a "Request for proposals" should be made, in order to open the scope of potential partners.	In some cases, partner selection is limited – flexibility and an open mind is needed: 1- Partners do not always have to be "ideal", and room for flexibility should be considered, including capacity building. 2- If a partner is not working as expected, GALVmed should not be afraid of incorporating new partners, changing partners or even stopping the project. 3- Partners should be selected with a minimum criteria (established for each component of the chain) and due diligence should be performed.
56	L1 Str	Inputs into model design	Some partners designed models based on their own experiences, but the design had to be changed as it was not realistic. For example, one implementing partner wanted to establish a ND vaccine distribution system in India based on cooperatives (as that is their area of expertise), but they realised that the model didn't work and the model had to be changed using already existing cooperatives (focused on marketing and inputs for poultry FAO sector 3, but incorporating new services) and incorporating human medical shops.	GALVmed should not impose a model, but provide some principles (i.e. Global access, long term sustainability) so the partners can take ownership on model design. 1- It is important to listen to local partners as they have the local knowledge even if they do not have the experience in setting sustainable delivery models. 2- Constant monitoring should be in place to change direction if necessary. 3- Sometimes it is necessary to allow partners to make mistakes to learn from them. 4- Local government should be made aware of the model design early in the project.
57	L1 Imp	Lack of capacity	Building technical/veterinary skills along with business, social and management skills is required to scale distribution.	Training is needed at all levels. As with the distribution chain, facilitation partners also benefit from technical veterinary, business training and cold chain training.

58	L1 Imp	Build in strong business and financial controls	Partnerships are necessary but carry a level of risk. 1- Some partners might not have the right business experience, or have the right control measures in place. • When partners understand that audits and extra controls are for their benefit and strengthen their business, they have been thankful for the support and opportunity, even if that meant extra work and exposure, as it happened with a local distributor in Tanzania.	1- Include the option for strong controls (such as audits) in contracts, and enforce the controls if needed. 2- Note that some partners might not fully comprehend the need to look at the books to check cash flows and proper use of the money and can feel exposed. Detailed explanations from the start should help to avoid misunderstandings. 3- Carry out thorough checks on partners before awarding contracts.

4.12. Scaling up

The focus of PLSHL-1 was to start exploring and setting up sustainable animal health products targeting the poor livestock keepers. The focus was on a cautious start, learning the lessons before starting scaling up. Although scaling up hasn't been the focus, important lessons have been learned in this area that should be implemented in PLSHL-2.

Table 16

LL	Relevance	Topic	Example/Description	Observations & Lessons Learned
59	L1 Str & Impl	Start small – importance of the pilot projects	Pilot projects have proved to be crucial in order for GALVmed to get a better understanding of what works well in different settings.	Start small: understand the problems, make mistakes, find the solutions. Then move to the next step. Working in phases and piloting is critical.
60	L1 Str & Impl	Work in clusters	Build on previous pilots, either with more of the same product or with new products. For example add small ruminant or pig products to the ND projects.	Work with existing organised groups of livestock keepers, or distributors, or local groups and/or regions own communication channels.

61	L1* Str & Impl	Work with the private sector	1. Hester (ND vaccine manufacturer in India) has agreed to hire a salesperson dedicated to the backyard business. This commitment from the private sector opens real opportunities for scaling up. 2. Some private distributors have expressed interest in the backyard sector after having seen results obtained at small scale via NGOs or other models.	1. The private sector has an important role to play by considering the backyard sector or small livestock keepers a niche sector. - For many products there are few competitors (ND) - For other products, fakes and counterfeits might detract the private sector (trypanocides). 2. The private sector can be included at different levels of the supply chain (manufacturers, importers, distributors, etc.) and bring valuable experience that can be applied to the backyard sector as a niche market. - Private manufacturers can more sustainably scale up production and use their sales and marketing experience - Private distributors familiar with commercial supply can bring their marketing and logistical experience to bear on distribution to small scale sector
62	L1 Str & Impl	Work with local NGOs	Once a pilot has proved successful, in theory it should be easy and attractive for the NGO to transfer the learning to other areas. 1. In practice this might prove more challenging, as usually there are different regional offices involved. 2. NGOs are more used to replicate than scaling. For example in Nepal, the NGO is struggling to think out of the box in order to cascade the training to other CAHW working in different areas and would rather replicate the original project. 3. Also each NGO has its core activity and to include	Working with an already established local NGO in a specific area with a validated system can be easily cascaded in theory. 1. Headquarters of the local NGOs should be involved from the beginning, as regional offices do not have the decision making power.

			animal health needs paradigm shift	
63	L1 Str	Policy interventions	The official curriculum for CAHW training in Nepal does not include training on backyard poultry and ND vaccination. A change in the curriculum can greatly facilitate scaling up ND vaccinations in village poultry. The same can be applicable to the currirculum of veterinarians in the developing countries.	Policy interventions can play a big role in scaling up. There is a need to engage positively with Policy makers and technical people from the beginning, and win their support towards development and implementation of supportive policies.
64	L1 Imp	Scaling training[2]	Technical, cold-chain and business trainings have proven essential in the pilot projects, along with awareness creation among livestock keepers. ND projects: ToT has been provided on the technical side and to some extent on business training.	1. In order to scale work, trainings must also be scalable. This should involve training of trainers (TOTs) where possible to facilitate the spread of management and technical know-how at local rates. 2. Material for training should be appropriate, with many pictures and only few words (in the local language if possible). 3. Involve government to help with curriculum building and the private sector upstream partners (such as local colleges) for delivery.
65	L1 Str	Transition period after GALVmed intervention	All ND pilot project managers have requested support (business support, financial, management, etc.) in the transition period after the pilot completion, as they become independent.	When a pilot project finishes, it is important to consider a transition period to provide backstopping while the project reaches maturity

Part c: Other factors

This section explores the wider environment that affects the introduction and sustained delivery of animal health products. Issues here are broad and wide-reaching and form the foundation for the success of the market access partnerships discussed above.

4.13. Human Capacity

The success or failure of any programme is built on human resources as is evidenced by the emphasis put on people and relationships detailed in *Part a* and *Part b* above. There is a wealth of competent

[2] This point is repeated in LL 66 as it has direct relevance to both scaling up and increasing human capacity.

human capital in every country that, when carefully selected and strengthened, can be used to help achieve GALVmed's goals. However, as with any resource, there are ways in which to maximize its benefits.

Table 17

LL	Relevance	Topic	Example/Description	Observations & Lessons Learned
66	L1 Imp	Scaling Training	Technical, cold-chain and business trainings have proven essential in the pilot projects, along with awareness creation among livestock keepers. ND projects: ToT has been provided on the technical side and to some extent on business training.	1. In order to scale work, trainings must also be scalable. This should involve training of trainers (TOTs) where possible to facilitate the spread of management and technical know-how at local rates. 2. Material for training should be appropriate, with pictures and few words in the local language if possible. 3. Involve government to help with curriculum building and the private sector upstream partners (such as local colleges) for delivery.
67	L1 Imp	Pricing and general business training	In a functioning supply chain, prices are a key factor in sustainability.	The price structure must be based on an analysis of needs at each level of the supply chain and not based on a qualitative affordability perception. Training on pricing might be required at different levels of the chain to ensure the right price structure is in place. Get buy-in from local government and ensure transparency in pricing between links in the supply chain.
68	L1 Str	Developing quality partners	At every level, partnerships are strengthened by working together to improve capacity.	Training and mentoring should be an on-going process at all levels.

4.14. Product characteristics, technical issues and cold chain

The need to maintain the cold chain in the delivery of veterinary vaccines and all accompanying materials (syringes, droppers, etc.) will continue to make up a large portion of the cost of delivering vaccines to rural livestock keepers, and poses one of the greatest challenges to sustainability and scale up.

Table 18

LL	Relevance	Topic	Example/Description	Observations & Lessons Learned
69	L1* Imp	Pack size and in-use stability	ND vaccines in 500 doses are cheaper than 100 or 200 doses. Sometimes large dose packs are the only option: • Vaccinators can group together to reconstitute and split a vial, but this can create complications, as for example the need to get together at specific times and it might jeopardise vaccine integrity and quality.	Pack size is very important, and it is dependent on in-use stability: a vaccine that still can be used 24hours after first use will allow for bigger pack size than a vaccine that needs to be used 2 hours after first use. GALVmed R&D and its partners should put emphasis not only on shelf life, but also in-use stability.
70	L1 Imp	Accessories (e.g eye droppers, needles, syringes) suitability	1. Eye droppers (used for ND vaccination), syringes and needles need to be appropriate for the context (see LL50). 2. Some eye droppers did not dispense the expected number of drops, and when margins are tight, this can negatively influence profits. 3. Some vaccinators (especially in the poorest areas) had difficulty managing syringes to reconstitute the freeze dried vaccines.	1. It can't be taken for granted that an eye dropper will dispense the appropriate dose for poultry. 2. Need to establish a reliable source of accessories and ensure that manufacturers, distributors and retailers dispense these with vaccines when appropriate (e.g eye droppers). 3. Wastage: Ensure that the vials and accessories minimise the wastage a. Discuss with manufacturers the option to incorporate some extra drops in the vials: it has little impact for the manufacturer, but would be beneficial to the vaccinator. 4. Ease of use: R&D and the partners should emphasise the ease of use (for example not having to use syringes to reconstitute a vaccine).
71	L1 Imp	Type of vaccines used should be minimised	In India, traditional ND vaccination at village level uses 2 types of vaccines: one for chicks and one for adults. This creates confusion: one is used every 3 months and the other every 6 months. It is not always clear how to vaccinate multi age flock. It also creates more wastage, as vaccinators should carry the 2 types, and	1. It seems to be more appropriate in the village poultry conditions to use one type of vaccine for ND to facilitate the use and minimise wastage. 2. Combination vaccines should be used when appropriate.

			need to find enough birds for each category after opening the vials.	
72	L1 Imp	Vaccine diluent: should be supplied with the vaccine, and should be kept simple.	1. In many cases, vaccines are supplied without the appropriate diluent (very common in ND imported vaccines for example). Also in some cases the diluent supplied was inadequate for the number of vaccines needed. 2. In some cases the diluent is complex (ECF): a simpler (and cheaper) composition might be used, and it might not require freezing (which would simplify the cold chain).	1. Availability of the appropriate diluent might be a constraint. a. Might be cheaper to have the diluents produced locally instead of being imported. This option should be explored by the manufacturer and/or distributor. b. But in any case, the vaccine should **always** be distributed along the supply chain with the right diluent in quality and quantity 2. Diluent should be easy to handle, store and use. GALVmed R&D should work with the partners in this area.
73	L1 Imp	Cold Chain: set up costs and scalability	Purchasing cold chain equipment on behalf of retailers/vaccinators can be used to test a pilot distribution concept, but cannot be easily scaled up and may not be sustainable.	Invest in new cold-chain solutions in partnership with financing companies and manufacturers and explore solutions in human health distribution chains.
74	L1 Imp	Cold chain size: thinking long term	Cold chain should be set up thinking on the long term. For example ND vaccinators in India were supplied with some flasks, that were appropriate for ND vaccines. When vaccinators tried to incorporate goat vaccines, the flasks were too small.	Setting up the cold chain should consider the needs in the medium and long term. 1. Fridges and coolers should be big enough not only for the ND vaccine, but also for other vaccines that might be used in the medium/long term. 2. Different types of fridges should be evaluated to identify the most suitable type of fridge for each environment: a. Maintenance costs need to be considered b. Possibility of repairs should be considered.

LL	Relevance	Topic	Example/Description	Observations & Lessons Learned
75	L2 Imp	Cold chain training	1. Shop owners are not usually the ones that are in the shop on a daily basis, but they need to understand the importance and relevance of the cold chain. Shop keepers might not be empowered to do the improvements, if the owner is not on board. 2. It is not uncommon that veterinarians and government extension personnel become complacent with the cold chain.	1. Training should include not only shop owners, but also shop keepers at all levels of the chain. 2. Training should include veterinarians, staff handling government vaccines and extension officers – many will be aware but might have become complacent with time, so a refresher course is very useful.
76	L1 Str & Imp	Other externalities: influence of other diseases	The ND projects in India and Nepal were at risk of Avian influenza (AI): In Nepal, the extra biosecurity measures in place (like warning livestock keepers not to visit the bird flu affected areas or bring birds from the market) might have been of some help. AI did not affect the project even if it was extremely close. In India, one of the areas was badly affected, and that hindered the project as livestock keepers could not see the benefit of vaccinating for ND, if the animals were to die of AI.	1. It is important to be aware of concomitant diseases and have a contingency plan if required. 2. Vaccinators should be made aware not to vaccinate animals that are showing concomitant diseases, and inform the government officials if they suspect a notifiable disease.

4.15. Finance

During PLSHL-1, the need for financing and type of financing available for both partners and those in the supply chain became apparent. Although the pilots have managed to work without extra financing from banks, in some cases this has put pressure on distributors, shop keepers, and even vaccinators to extend credit down the line. While this informal system of credit is common in rural settings, it increases the risk that the supply of vaccines could be disrupted or collapse, especially as distributers expand their geographical coverage into new areas where trusted associates are not known. Formalising finance for all levels of the supply chain would be a step toward maturing and legitimizing the system that would boost chances of sustainability and offer options for scale up without further GALVmed intervention.

Table 19

LL	Relevance	Topic	Example/Description	Observations & Lessons Learned
77	L1* Str	All levels need financing	Financing is needed for both high-level partners such as manufacturers and importers and last-mile BOC partners such as vaccinators.	In some cases, the high-level partners are able to access financing, but in most rural areas small loans are not available or affordable at rates commensurate with agricultural returns. There is a need to explore and develop creative financing solutions and incentives in these areas.
78	L1 Str	Choosing appropriate funding mechanisms	There are a number of ways to support partners besides grant funding.	Other types of funding may yield better results and be more easily scalable. For example where debt or equity risk investments can be made, even if 30-40% of these go bad, the reflows from the successful ones can be used to help new businesses in the value chain. This form of investment ensures partners are more accountable and lowers cost/beneficiary for the donor. The right investors will also provide the much needed management support.
79	L1 Str	Creative products can improve uptake of vaccine	Bundled services have proven to make new agricultural technologies more popular with livestock keepers, especially where insurance is included.	Explore working with insurance companies to offer insurance products at lower rates for vaccinated animals and/or to allow companies to access credit lines from banks at lower rates.
80	L1 Imp	Distribution and management of project assets	In some of the projects due to diverse constraints, project assets were given quickly to the beneficiaries without agreement, and without any partial payment.	Project assets (like fridges and bicycles): 1- Ideally the beneficiaries should pay for part of them (even if it is a small part), to increase the sense of ownership. 2- Should be given on a temporary basis to the beneficiaries until they show they are taking care and are maintaining them. 3- Depending on the asset, an agreement should be signed, with the beneficiary committing to its maintenance and good use.

4.16. Policy environment

Knowing the laws and working with the regulators in each country is essential. Building relationships with key officials helps avoid missteps in the registration and importation of a product, and can open avenues to addressing structural issues that impact its sustainable distribution, especially where public and private roles are blurred, whether they are parastatal or private entities. The goal must be to help governments to create an enabling environment for private sector livestock health service provision and healthy PPP models where appropriate.

Table 20

LL	Relevance	Topic	Example/Description	Observations & Lessons Learned
81	L1* Str	Understanding Roles of government and different government agencies	1. Government must play a very important role in key issues such as providing a supportive policy framework for market development and product adoption. 2. The roles of the different government agencies (Department of Veterinary Services, Regulatory Agency, etc.) should be understood in order to work with them as appropriate.	1. Importance of having formal meetings with government (different agencies) to address the issues mentioned in Table 7. • Quality, wide representation in these meetings is essential. • The conclusions and outputs of the meetings should be disseminated as appropriate. 2. Show case studies from other countries/regions: successful examples from other regions might help governments to have a more open mind to new ideas.
82	L1 Imp	Bringing stakeholders together might be helpful	The stakeholder meeting conducted in Tanzania was crucial to clarify roles of the different stakeholders involved in ECF distribution.	Stakeholder meetings (including stakeholders from public and private sector) can be very useful to clarify roles and misunderstandings. They facilitate transparency and inclusiveness between the players. Recommendations from such meetings are also more valued by policy makers than if made by GALVmed alone.
83	L2 Str	Implementation of country policies	Understanding the local policies might prove a challenge, as the written regulations might be interpreted in different ways by different people.	The use of tools such as comprehensive policy landscaping using document analysis and interviews (not only with government representatives, but also practitioners) could be a useful exercise to understand how the different regulations are being implemented.

84	L1 Str	Local rules and regulations with regard to vaccinators	In some cases, vaccinators are not allowed to give injections or sell products because of local regulations (see LL31). This is one of the key constraints to set up new supply chains in remote areas.	Often, laws are overlooked by government in recognition of the shortfall in qualified personnel, but this is a short term solution. Support governments to consider adopting a phased approach to vaccinator training which builds private sector capacity in stages. As training is accumulated, vaccinators are legally recognized as capable to handle and sell a wider range of products.
85	L1 Str	Barriers to importation of certain products	Importation of a product can be prohibited for a number of reasons.	Work with government to understand the reasoning behind the import barrier and provide information and facts to help inform policy.
86	Ob Str	Changing government practices	In some cases, a government programme designed to address a specific goal may not be as successful as an alternative approach.	Influence, using evidence from projects, to steer government can produce change (evidence-based policy making). For example, state-backed insurance may be more beneficial in terms of economic and social returns than other uses of public funds such as free animal distribution programmes.

Part d: Public goods

This section explores some of the key considerations when dealing with public goods which will require different or additional considerations and adoption mechanisms as already mentioned in section 1.2.
In this report, Public goods are those that are government controlled, that have a public health component, or are neglected by the private sector. For PLSHL-1, this applies mainly to RVF and PC.

The distribution chain for public goods is different to the one for private goods in that the distribution chain for public goods is usually government controlled (Figure 8). However, in some instances, government may make use of the commercial sector for certain components of the distribution and supply of livestock health products.

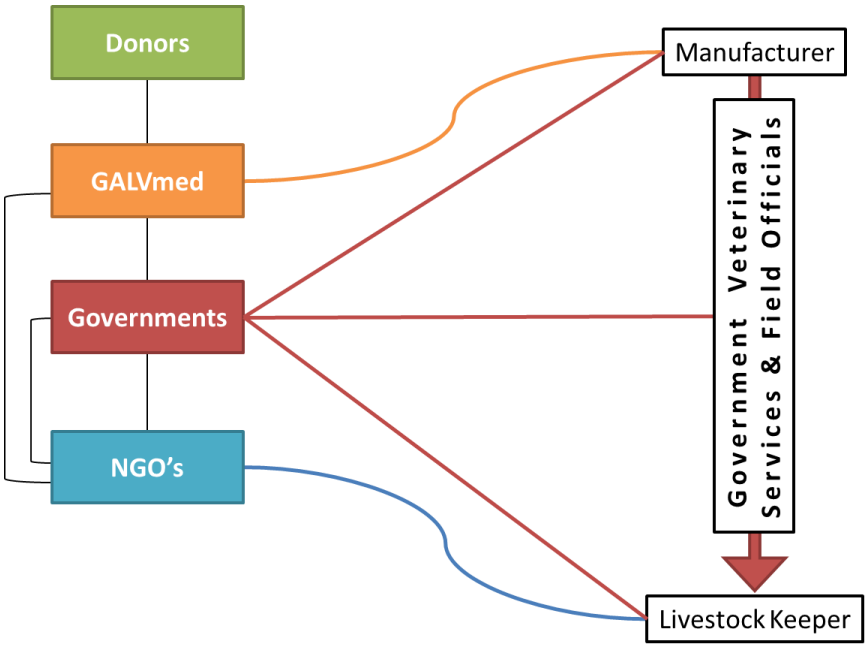


Figure 8: Stakeholder Diagram for Public Goods in Relation to GALVmed

Table 21

LL	Relevance	Topic	Example/Description	Observations & Lessons Learned
87	L1* Str	Insufficient volumes in storage: Use of vaccine or antigen banks (Strategic reserves)	Manufacturers will not stock products that have a low turnover because they are fearful that the products will expire, and holding stocks immobilises their cash. If turnaround is reasonable (there is a reasonable demand, even if not constant), and margins are acceptable, manufacturers will tend to stock the vaccine, for example for PPR.	1. The use of vaccine or antigen banks can be considered for vaccines that are not required on a routine basis and have sporadic demand (for example Rift Valley Fever which appears every 5 – 10 years) and will only be used when there are outbreaks or indications of outbreaks. Predictions based on GIS and rainfall patterns do not give enough lead time to produce the required quantities of vaccine.

			But storing products that are public goods, especially the ones that have a public health component or are controlled diseases that have sporadic demand (at the time of outbreaks or emergencies), might need a strategic reserve solution.	2. Strategic reserves are also useful for emergency situations when suppliers do not have enough notice to produce vaccine (due to technical reasons, or even commercial reasons like having enough time for payments to go through, especially for a private manufacturer when procured by government).
88	L1 Str & Imp	Measure the scale of the problem	The use of tools like Risk mapping which are being used for RVF helps estimate the size of the vaccine bank.	Having technical facts will ease the negotiations with the policy makers, as they can take decisions based on sound reasoning and facts.
89	L1 Str	Use of Regional approaches	1. In the case of RVF, working at regional level has proved more beneficial and engaging than working with individual countries. Using regional bodies like SACIDS (Southern Africa Centre for Infectious Disease Surveillance) has helped the region take ownership. 2. For RVF strategic reserves, countries or regions like USA or the Middle East might be considered for inclusion, as they might want to participate due to their own circumstances (stockpile or emergency preparedness) .	1. In order to share the risk, the use of regional approaches can be extremely useful. –They should include the use of regional bodies. 2. However it is important that "distant" regions can have other interests that might make it attractive for them to participate in such initiatives.
90	L1 Str	Use of medical partners/ agencies	1. For Porcine cysticercosis, it is very difficult for GALVmed to work on the human component, so working in synergy with programmes already ongoing like the Mass Drug Administration programme in Uganda is essential. 2. Agencies like CDC in Kenya are quite interested and have active work on RVF.	1. For zoonoses, approaching medical organisations (from international organisations (WHO) and NGOs, to local associations) might facilitate awareness and implementation. They might also prove to be very good partners. 2. Organisations with a similar mission to GALVmed but on the human side (GAVI Alliance, DNDi, Diagnostics for All, FIND), might be very valuable resources for GALVmed on setting up distribution for public

			3. Links with DNDi have proved extremely useful on the GALVmed Tryps programme (even if focused on R&D aspects) and there is a need to explore on market development and adoption areas.	goods. Links need to be strengthened with such organisations.
91	L1 * Str	Increase product benefits to make it attractive as a private good to the livestock keepers	GALVmed is currently exploring various options: 1- A combination vaccine RVF + LSD, might increase the uptake of the RVF vaccine, as LSD vaccine is more frequently used. Similarly, a combination of Classical Swine Fever (CSF) and PC vaccines might increase the uptake of PC vaccine in South Asia and Latin America where CSF is a problem. 2- Expansion of the label claims of the Oxfendazole (PC medication) to cover not only PC but other parasites that are more "visible" to the livestock keepers and have production benefits. 3- Bundling the PC medication with the vaccine: if the medication has other benefits, livestock keepers might buy the medication, and get the vaccine included in the package.	Several options could be considered, depending on the specific disease, regulations and circumstances: 1- The use of multivalent vaccines: combining a public good vaccine for which the livestock keepers struggle to see the real value, with a vaccine that has more visible value, might help with the uptake of the public good vaccine. 2- Expanding the label claims of the products. 3- Bundling products to make them more attractive for the poor livestock keepers.

5. Conclusions

The compilation of lessons learned above is not exhaustive and is meant to highlight some of the most salient points resulting from the implementation of PLSHL-1. Most of the lessons learned do not come with hard and fast solutions to problems because GALVmed does not intend to approach a new situation with a preconceived plan, but rather listens to local partners, applies some principles based on the objective of sustainable product adoption, and makes use of the learning from previous experiences to new situations. Indeed, some of the lessons learned relating to people are really observations that serve to better understand the motivations for the behaviours observed in the field.

1. GALVmed has gone a long way since its inception, and there are many lessons learned, covering many aspects of the supply chain: GALVmed should reflect on them, and apply them in current and future projects.
    a. Lessons learned on Market development and adoption cover all areas of GALVmed work: R&D, Policy, Communications, etc. It is very important that all departments work together to address the barriers and implement programmes based on the lessons learned.
2. There are areas that have not been explored with enough depth in PLSHL-1. Many of these are planned to be covered under PLSHL-2, for example:
    a. Financial mechanisms to incentivise and scale up product adoption
    b. Cold chain solutions
3. Building capacity at all levels of the supply chain is a key component that should be continuously emphasised and fits well with GALVmed's mission.
4. Finding the right combination of partners and correctly aligning responsibilities and incentives can be the difference between a time-bound "project" approach and the development of a sustainable supply chain.
5. GALVmed's focus is on the sustainability of the actions. It is still too early to make firm conclusions on sustainability, but at least, there are some issues that we know need to be addressed from the start, to give real sustainability a chance.
6. Flexibility and dynamism based on constant monitoring, coaching and learnings is essential to incorporate modifications at project level as needed.

6. Acknowledgements

This report is a compilation of lessons learned through the hard work of many people – the many and valued GALVmed partners that work alongside the livestock keepers, the GALVmed Project Managers and the rest of the GALVmed team who supports all of us in our daily tasks. We would like to express to all of them our sincere appreciation and thanks for having the opportunity to work alongside them and learn while trying to improve the livelihoods of the poor livestock keepers.

We also want to thank all the people who have provided inputs to this document: their contributions have been very valuable and are very much appreciated. Special thanks to Hunter Nielson for his assistance on the preparation of this document.

Annex: Top 20 Lessons Learned

Note: Depending on the interest of the reader, the 20 Top lessons might vary. Below is a general selection to represent different interests.

STAKEHOLDER RESOURCES AND CAPABILITIES			
	Issue	**Example/Description**	**Observations & Lessons Learned**
1 (LL3)	Flexibility in project design – Constant Monitoring & Evaluation	Changes have been necessary in all market development and adoption projects to various degrees, from minor adjustments, to major design changes.	Due to the ground breaking nature of the market development and adoption projects and the high degree of innovation and risk required, constant monitoring is needed (not only baseline and final project evaluation) in order to identify changes, and incorporate modifications as early as possible. Flexibility and dynamism to address the changes is essential for project success.
2 (LL4)	Flexibility in resourcing	Negotiations with ECF distributors were protracted. Contracting local consultants, who could provide immediate guidance and support quickly concluded the contracting.	Due to the different levels of interventions through the value chain (from top to bottom), and the variety of geographies covered, a broad range of capability is required. Therefore it is important to have multiple resources that can provide (ideally locally) the expertise needed.
3 (LL26)	Lack of business skills	Retailers often only stock vaccines during a government subsidized campaign and are not accustomed to monitoring cash flows or establishing sustainable pricing.	Plan to train in business skills along with technical/cold chain. Follow up sessions are likely to be beneficial. To improve sustainability, focus on training of trainers (ToT) programmes rather than direct intervention at village level.
4 (LL28)	Need broad inventory of stock covering products and species important for the poor livestock keepers	Diversifying the range of appropriate products at shop level maintains cash flow during seasonal dips in sales and helps veterinarians/vaccinators maximize their returns from trips to visit remote livestock keepers. Products should cover the needs of the poor livestock keepers in terms of health control tools and species.	Plan to include multiple products: 1- Learn what is needed and accepted/wanted by poor livestock keepers (in terms of products and species). 2- Begin with complementary products (such as ND vaccine and poultry dewormer) that can help boost sales of the target product

			3- GALVmed and partners need to clearly understand the system and what vaccinators need to remain motivated to continue beyond the project. This differs widely between markets.
5 (LL31)	CAHW and /or Vaccinators not able to vaccinate	1- In many countries, there is not a legal framework allowing "vaccinators" to vaccinate. 2- In many countries, veterinarian associations are opposed to "Community Animal Health workers" as they fear competition or have concerns regarding capabilities. In some instances the word "vaccinators" (as opposed to CAHW) might be a better choice as the name already limits the activities and decreases fears from veterinarians. 3- Vaccinators might not have the necessary skills	There is a major need to bring the vaccinators under a legal framework. It can be a lengthy process – however it should be initiated and GALVmed should support the initiatives to achieve this, for example: 1- Support governments to consider adopting a phased approach to vaccinator training which builds private sector capacity in stages. As training is accumulated, vaccinators could be legally recognized as capable to handle and sell a wider range of products. 2- Maintain a dialogue with the local veterinary associations and related stakeholders (for example local Veterinary Faculty) to engage their support. They can help design curricula and conduct training courses. • Modular courses could be designed for the vaccinators covering different species for example, and providing a certificate at the end of each module. 3- Share the lessons learned from countries where vaccinators are recognised with policy makers in countries where they are not recognised. 4- Vaccinators need: • Initial Training • Refresher courses • Backstopping options so they know what to do when they observe something beyond their capabilities • Links to official government so they can report anything unusual

6 (LL36)	Importance of steady income for the vaccinators	As many vaccinations or health control activities are seasonal, it is important to develop a portfolio of products/activities to ensure constant income to make the job attractive to the vaccinators - Note that this might be less relevant where vaccinators are part time, or vaccinations are not the main source of income.	Alternatives for achieving a relatively steady income for vaccinators: 1- Cover different areas in rotation (if disease epidemiology and control measures fit with this approach) 2- Have a portfolio of products/ activities to cover all year. This can include different species (poultry, small ruminants, pigs), and different type of products (for example vaccines and dewormers). 3- Provide training in poultry/ smallstock management to build animal numbers and grow their business. Vaccinators can serve as model farmers in their areas, showcasing new technology such as vaccinations, and alternate feed and husbandry resources
7 (LL37)	Pricing should be set up for sustainability	So far, price has not been a limitation for adoption of animal health control products. The most important factor is demand and perceived value for money. Cash is often in short supply, but where livestock keepers see the benefit they will sell livestock/produce to raise cash for inputs.	Pricing must be set to ensure vaccinators make margins high enough to continue the work, rather than basing prices on perceived farmer ability to pay. This is the only way sustainable systems can be developed for private good products.
DEVELOPING SUPPLY CHAINS AND PARTNERING MODELS			
	Issue	**Example/Description**	**Observations & Lessons Learned**
8 (LL44)	Top and Bottom of the chain require different strategies	The top of the chain is generally product focused and the bottom of the chain usually requires more focus on logistics. Single product focus at the bottom level is unlikely to unlock solutions for sustainable delivery.	While focusing on a single product is possible for manufacturers and importers, it is necessary to identify synergies at the BOC; to look beyond a single product focus at rural level to ensure enough income is made to continue to drive demand up the chain.

9 (LL45)	At the bottom of the chain, better results are achieved with a holistic approach	1- The final evaluations of the ND projects indicate that projects that included basic poultry management had a greater impact (in terms of Cost Benefit Analysis) than the ones that focused more narrowly on vaccinations. 2- Management solutions can be very simple (for example how to protect chicks at night) and should be based on local resources and knowledge (for example the use of white ants collected in the forest or raised for feed) as used in the ND projects in India.	For improving livelihoods through livestock at BOP level, evidence shows that vaccines and medicines (inputs) need to be considered within a more holistic approach that also looks at nutrition, extension support and linking to output markets. 1- Including broader aspects of poultry management for example, shouldn't be an extensive or difficult exercise. Sometimes it might only require an extra half day of training for the vaccinators. 2- So far, the markets for the final products (for example poultry markets) haven't been a major barrier in Asia or East Africa, but might be a barrier to uptake in weaker livestock markets in other areas. 3- Increases in poultry production has been absorbed by increased home consumption 4- In some instances traders have learned of the increased supply, and have started to frequent the area.
10 (LL46)	Livestock keepers do not need vaccines: they need *solutions*	1- If ND vaccinations are successful, but chickens die of fowlpox instead, the livestock keepers still have problems. 2- If ND vaccinations are successful, but the livestock keepers struggle to feed the extra chickens, the original problem has evolved into a different problem.	1- It is important for the vaccinators to offer "solutions". Therefore having a portfolio of products is important not only for steady income and sustainability of the chain, but to provide real solutions for livestock keepers. 2- Local solutions should be considered (for example the use of ants for chicken feed).
11 (LL48)	Product availability is still a challenge	1- Product availability in quantity and quality, at the required times has proved an issue in many projects. Plans to address availability were in place, but in some cases, due to a variety of reasons the plans didn't work. 2- Production capacity and quality of national/state vaccine manufacturers is still not satisfactory.	Product availability should be a priority. Contingency plans should be in place.

12 (LL50)	Supply of accessories for product delivery	Delivery of a vaccine without the needed accessories renders the vaccine ineffective. For example, eye droppers are needed for ND ocular vaccinations, oxytetracyclines for ECF vaccinations. Identifying the correct accessories has been a key challenge for project success. (LL70)	1- Work with manufacturers, distributors and retailers to ensure that the products are always delivered with the right accessories, accompanying products or materials that should be used with the product such as droppers and diluent. 2- Work with manufacturers and independently to identify the best accessories for given environments and products. 3- Stress the importance of correct accessories to supply chain partners in terms of cost and benefit.
13 (LL53)	Need to stimulate demand	Where there is strong enough farmer demand, availability of the product, and not too much political interference, then in many cases the market will respond by itself without need for GALVmed / NGO intervention in the supply chain. In some cases NGOs have been trying to stimulate a supply chain in which the product is not yet available in country, and these projects have been sub-optimal in the first year in terms of sustainable impact.	1- Market-led solutions will invariably be more efficient and more sustainable if they can be triggered. Key to this is availability of the target product in country (registration, importer identified and contracted), enabling environment (workable policies and regulations) and livestock keepers demand (marketing and awareness). 2- Demand should be created not only at retailer level, but also at the level of the livestock keeper. 3- Demand and awareness should be created not only by NGOs, but also by the private sector (mainly distributors) that can bring marketing skills depending on the particular circumstances of each market. 4- Innovations around re-packing and bundling products for farmers could be useful to increase demand, for example a 10 bird pack containing dewormer, vaccine and vitamins.
14 (LL55)	Partner Selection	1- Potential partner can be limited with few options from which to choose. Some reasons include: a) Nonexistence or very limited private sector b) Over dominance of some local organisations/NGO c) Lack of willingness from local NGOs to cooperate with the private sector d) Corruption e) Potential partners having competing interests.	In some cases, partner selection is limited – flexibility and an open mind is needed: 1- Partners do not always have to be “ideal”, and room for flexibility should be considered, including capacity building. 2- If a partner is not working as expected, GALVmed should not be afraid of incorporating new partners, changing partners or even stopping the project. 3- Partners should be selected with a minimum criteria (established for each component of the chain) and due

		2- When appropriate and possible, a "Request for proposals" should be made, in order to open the scope of potential partners.	diligence should be performed.
15 (LL61)	Work with the private sector	1. Hester (ND vaccine manufacturer in India) has agreed to hire a salesperson dedicated to the backyard business. This commitment from the private sector opens real opportunities for scaling up. 2. Some private distributors have expressed interest in the backyard sector after having seen results obtained at small scale via NGOs or other models.	1. The private sector has an important role to play by considering the backyard sector or the small scale livestock keepers a niche sector. - For many products there are few competitors (ND) - For other products, fakes and counterfeits might detract the private sector (trypanocides). 2. The private sector can be included at different levels of the supply chain (manufacturers, importers, distributors, etc.) and bring valuable experience that can be applied to the backyard sector as a niche market. - Private manufacturers can more sustainably scale up production and use their sales and marketing experience - Private distributors familiar with commercial supply can bring their marketing and logistical experience to bear on distribution to smallscale sector
OTHER FACTORS			
	Issue	**Example/Description**	**Observations & Lessons Learned**
16 (LL69)	Pack size and in-use stability	ND vaccines in 500 doses are cheaper than 100 or 200 doses. Sometimes large dose packs are the only option: • Vaccinators can group together to reconstitute and split a vial, but this can create complications, as for example the need to get together at specific times and it might jeopardise vaccine integrity and quality.	Pack size is very important, and it is dependent on in-use stability: a vaccine that still can be used 24hours after first use will allow for bigger pack size than a vaccine that needs to be used 2 hours after first use. GALVmed R&D and its partners should put emphasis not only on shelf life, but also in-use stability.

17 (LL77)	All levels need financing	Financing is needed for both high-level partners such as manufacturers and importers and last-mile BOC partners such as vaccinators.	In some cases, the high-level partners are able to access financing, but in most rural areas small loans are not available or affordable at rates commensurate with agricultural returns. There is a need to explore and develop creative financing solutions and incentives in these areas.
18 (LL81)	Understanding Roles of government and different government agencies	1. Government must play a very important role in key issues such as providing a supportive policy framework for market development and product adoption. 2. The roles of the different government agencies (Department of Veterinary Services, Regulatory, etc.) should be understood in order to work with them as appropriate.	1. Importance of having formal meetings with government (different agencies). • Quality, wide representation in these meetings is essential. • The conclusions and outputs of the meetings should be disseminated as appropriate. 2. Showcase studies from other countries/regions: successful examples from other regions might help governments to have a more open mind to new ideas.
PUBLIC GOODS			
	Issue	**Example/Description**	**Observations & Lessons Learned**
19 (LL87)	Insufficient volumes in storage: Use of vaccine or antigen banks (Strategic reserves)	Manufacturers will not stock products that have a low turnover because they are fearful that the products will expire, and holding stocks immobilises their cash. If turnaround is reasonable (there is a reasonable demand, even if not constant), and margins are acceptable, manufacturers will tend to stock the vaccine, for example for PPR. But storing products that are public goods, especially the ones that have a public health component or are controlled diseases that have sporadic demand (at the time of outbreaks or emergencies), might need a strategic reserve solution.	1. The use of vaccine or antigen banks can be considered for vaccines that are not required on a routine basis and have sporadic demand (for example Rift Valley Fever which appears every 5 – 10 years) and will only be used when there are outbreaks or indications of outbreaks. Predictions based on GIS and rainfall patterns do not give enough lead time to produce the required quantities of vaccine. 2. Strategic reserves are also useful for emergency situations when suppliers do not have enough notice to produce vaccine (due to technical reasons, or even commercial reasons like having enough time for payments to go through, especially for a private manufacturer when procured by government).

20 (LL91)	Increase product benefits to make it attractive as a private good to the livestock keepers	GALVmed is currently exploring various options: 1. A combination vaccine RVF + LSD, might increase the uptake of the RVF vaccine, as LSD vaccine is more frequently used. Similarly, a combination of Classical Swine Fever (CSF) and PC vaccines might increase the uptake of PC vaccine in South Asia and Latin America where CSF is a problem. 2. Expansion of the label claims of the Oxfendazole (PC medication) to cover not only PC but other parasites that are more "visible" to the livestock keepers and have production benefits. 3. Bundling the PC medication with the vaccine: if the medication has other benefits, livestock keepers might buy the medication, and get the vaccine included in the package.	Several options could be considered, depending on the specific disease, regulations and circumstances: 1. The use of multivalent vaccines: combining a public good vaccine for which the livestock keepers struggle to see the real value, with a vaccine that has more visible value, might help with the uptake of the public good vaccine. 2. Expanding the label claims of the products. 3. Bundling products to make them more attractive for the poor livestock keepers.