

ITM SCALING UP IN TANZANIA

Scoping Study of East Coast Fever Vaccination

Godfrey G. Bwana

www.livestockfish.cgiar.org

September, 2015



Table of Contents

1. Introduction	3
2. Objective	5
3. Methodology	6
4. Current Status	7
4.1. Regulatory Environment	7
4.1.1. Policies and Strategies	7
4.1.2. Legal Environment	8
4.2. Business Environment and Actors	8
4.2.1. Business Model	10
4.2.2. Business Actors	12
4.2.3. Pricing	18
5. Challenges and Opportunities faced by actors	20
5.1. Challenges	20
5.1.2. Distributors	20
5.1.3. Vaccinators	21
5.2. Opportunities	22
6. Conclusion and Recommendation	23
6.1. Conclusion	23
6.2. Recommendations	23
7. References	25

Abbreviations

CTTBD	Center for Tick and Tick Borne Diseases
ECF	East Coast Fever
ITM	Infection and Treatment Method
LDC	Livestock Development Centers
LGA	Local Government Authorities
LN	Liquid Nitrogen
LTR	Local Technical Representative
MLDF	Ministry of Livestock and Fisheries Development
PMO-	Prime Ministers' Office - Region Administration and Local
RALG	Government
ROI	Return On Investment
SADC	Southern Africa Development Cooperation
TBD	Tick Borne Diseases
TBS	Tanzania Bureau of Standards
TFDA	Tanzania Food and Drugs Authority
TTBD	Tick & Tick Borne Diseases
TVLA	Tanzania Veterinary Laboratory Agency
TZS	Tanzania Shillings
URT	United Republic of Tanzania
VCT	Veterinary Council of Tanzania

1. Introduction

Cattle are prime resource for the people and government of Tanzania. The country has the second largest cattle population in Africa, with an estimated population of 21.3 million heads. Small ruminants, mainly goats and sheep represent the second largest component of mixed farming system (URT, 2013). The country has the largest number of livestock units in the Southern Africa Development Cooperation (SADC) region followed by South Africa, Namibia, Angola, Botswana and Zambia. The majority of livestock in Tanzania are indigenous species and are a vital component of the mixed farming system where they are used as draft animals for ploughing and providing milk and meat.

The regional distribution of the livestock is uneven with nearly 74% of all cattle are kept in six regions of Arusha, Singida, Tabora, Shinyanga, Mwanza, and Mara (MLFD, 2008) Figure 1

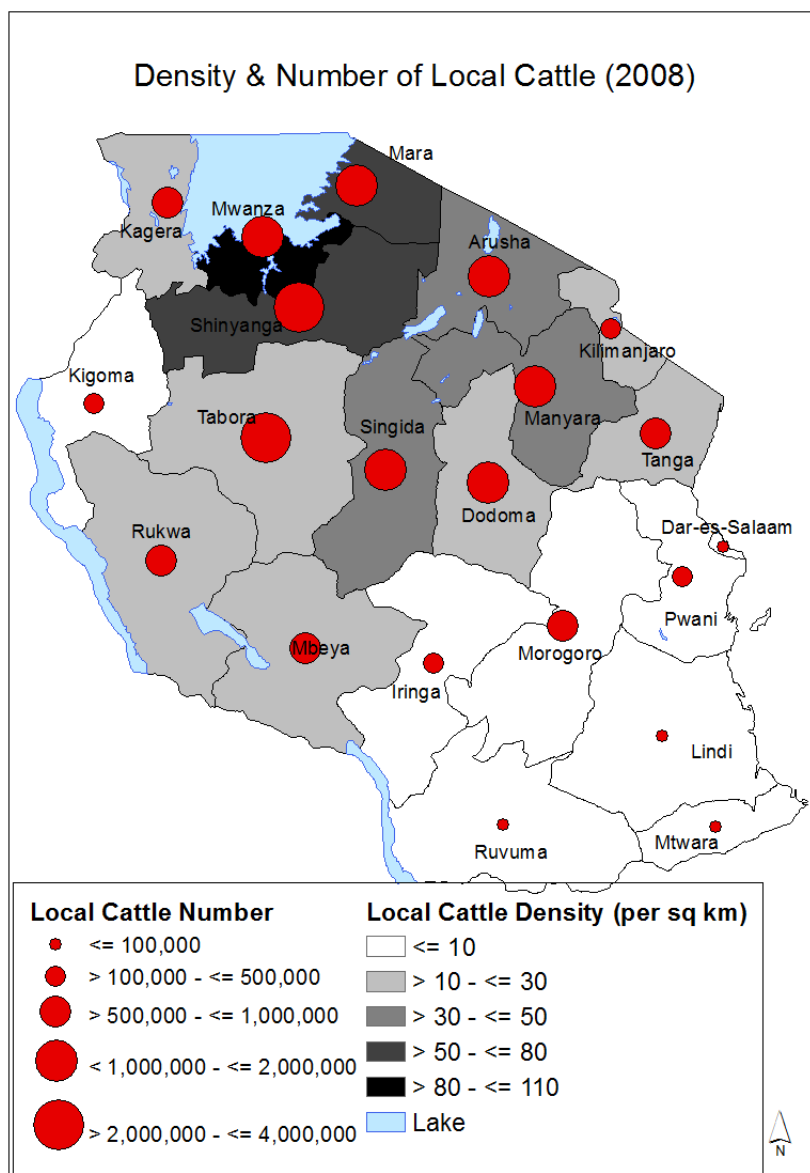


Figure 1. Number of local cattle in Tanzania (2008) (Prepared by Susan Njenga of ILRI RMG)

Several constraints exist for increasing animal productivity, but one of the main constraint is tick-borne diseases (TBD). The major tick-borne diseases are East Coast fever (ECF), Anaplasomosis, Babesiosis, and Erthlichiosis, all transmitted by different species of ticks. Tick-borne diseases contribute up to 72% of annual livestock mortalities in the country (MLFD, 2013), and ECF causes 43% of annual cattle mortalities in Tanzania, making the disease the single most important animal disease that limits cattle productivity in the country (MLFD, 2013)

Over the years the country has carried out a number of interventions in the control of ticks and tick-borne diseases, including compulsory dipping programme (Cap.106), mapping of tick distribution in 1967 and 1998, dip construction and rehabilitation, free dipping programme, training of dip attendants, controlled movement of livestock (establishment of stock routes for dipping and vaccination with holding grounds), monitoring of dip washes, construction of veterinary centres and Livestock Development Centres (LDCs). ECF immunisation in Tanzania started in early 1990s and it is estimated to date about 700'000 cattle have been immunised, majority of them indigenous breeds.

2. Objective

The overall objective of this assignment was to identify the geographical spread of the current ITM vaccination by existing distributors and vaccinators, find out how distributors are identified and registered. The study was also identifying how vaccinators are identified and recruited, trained, registered and monitored, and to collate number of vaccinations by area, livestock production system.

The study was to look at and characterise the current distribution mechanisms of the vaccine, what constraints are faced (financial; human resources etc.) and the opportunities to scale up the technology, both at the distributor and vaccinator level. This will also include a comparison of demand in the existing ITM areas, considering the prices paid and the growth in vaccination numbers over the period since it was introduced.

3. Methodology

In order to realize the objectives mentioned above, reviews of existing literature, reports and publication on ECF and ITM vaccination was carried out. This was complimented with interviews with various actors involved in the ITM vaccines supply chain. The interviews were divided into two level, first level being the actors who are direct on the ECF vaccine supply chain, this included distributors, sub distributors/agents, vaccinators, and cattle keepers. The second level were actors who are on the business environment and support services, these included officials of Ministry of Livestock and Fisheries Development. Interviews with Tanzania Food and, and Drug Authority (TFDA); Veterinary Council of Tanzania (VCT); and Tanzania Veterinary Laboratory Agency (TVLA), were aimed at establishing what roles does these institutions plays and will play in the upscaling of ECF vaccination. Selected areas where vaccination has taken place were visited in order to meet with vaccinators and livestock keepers, this helped to get first-hand information on what is happening on the ground and what need to be improved. Areas visited include Morogoro (Gairo), Kibaya, Kiteto- Manyara Region, Arusha (Monduli), Tanga, Mbeya and Dar E salaam

4. Current Status

4.1. Regulatory Environment

4.1.1. Policies and Strategies

The regulatory environment is examined at two levels, i.e., (i) Policies and strategies, and (ii) legal framework. Tanzania has a conducive policy and legal requirement in governing and controlling **tick and tick borne diseases**, the policies and legislations can be used to significantly reduce tick and tick borne diseases.

The legal environment is supportive and conducive and may help during scaling of ECF vaccination. The legal and policy support exists for facilitating scale up of ECF vaccination. Some of existing policies and legislations are highlighted below.

i. The National Livestock Policy, 2006

This policy guides the livestock industry in Tanzania. The policy in general aims at stimulating development in the livestock industry in order to exploit the available resources with due concern for conservation of the environment. This policy emphasizes on **competitive markets; commercialize livestock industry**, value addition in livestock products and sustainable development

ii. Tanzania Development Vision, 2025

Tanzania has set up its vision document named Tanzania Development Vision 2025 (TDV2025). All national plans and initiatives are geared to attain the goals of TDV 2025. This vision provides guidance on national long-term strategic goals for social and economic development highlights, it provides for change in approach and mind-set in order to make Tanzania a middle income country by 2025 in terms of human development. Therefore, existence of this vision complements what needs to be done in the livestock industry; with over 21m cattle, a significant portion of the population will be involved in it and hence intervention to reduce mortality of cattle will have significant economic benefit to the country.

iii. The Rural Development Strategy, 2001

This strategy focuses on stimulating economic growth and reducing poverty in the rural areas.

iv. Agriculture Sector Development Strategy, 2001

This was designed to create enabling environment and conducive environment for improving profitability of Agriculture sector as basis for improved farm income and rural poverty reduction in the medium term- this has been accomplished successfully and now ASDP II is under way.

v. The Tanzania Livestock Sector Development Strategy, 2010

The National Livestock Development Strategy has been developed as the first step towards operationalization of the Nation Livestock Policy (NLP). The policy identifies issues that impacts the livestock industry. Issues such as livestock identification and traceability, biotechnology and biosafety etc., are addressed in this policy. NLP has policy statements that provides for achieving the policy objectives. The strategy is the operational tool that spells out actionable interventions required to meet livestock sector vision and mission.

vi. The Animal Health Strategic Plan, 1998

This strategy is very key in helping operationalization of ECF, it defines the public sector, private sector, and shared public/private sector roles in delivery of animal health services in the country

vii. Strategic Plan for Control of Tick & Tick Borne Diseases in Tanzania Mainland, 2012/13- 2017/18

This strategy has been developed based on TDV 2025. The strategy wishes that by 2025 there shall be a livestock sector which by large extent shall be run commercially, and which is sustainable. The strategy has geared itself for a modern and sustainable livestock industry. The strategy has a number of strategic objectives. These strategic objectives can be used as opportunities for the upscaling of the ECF vaccination

4.1.2. Legal Environment

The legal framework in the whole livestock industry indicates that there is an established legal framework on how the livestock industry operates in Tanzania; this legal framework is well supported by a good policy framework. The legal and policy environments are good opportunities to support scaling up of ECF vaccination in Tanzania.

The legislations and regulations which oversees the livestock industry includes:

- i. The Land Act No. 4 of 1999
- ii. The Village Land Act No. 5 of 1999
- iii. The Food, Drugs & Cosmetics Act No. 1 of 2003
- iv. The Veterinary Act No. 16 of 2003
- v. The Animal Diseases Act No. 17 of 2003
- vi. The Local Government (District Authorities) Act No. 17 of 1982
- vii. The Local Authorities Finance Act No. 8 of 1982
- viii. The Meat Industry Act No. 10 of 2006
- ix. The Dairy Industry Act No. 8 of 2004
- x. The Hides, Skins & Leather Act Trade No. 18 of 2008
- xi. Tanzania Livestock Research Institute Act No.4 of 2012
- xii. Livestock Registration, Identification & Traceability Act No. 12 of 2010

4.2. Business Environment and Actors

Business environment is the sum of all external and internal factors that influence business. These include employees' management supply and demand, business regulations, competitions, sanctions etc. ECF vaccination as any other business is no exception. The business is taking place in existing business environment. Any business will be successful if the business environment is friendly and supportive to flourish. Internal and external factors are all important for a business to transact successfully.

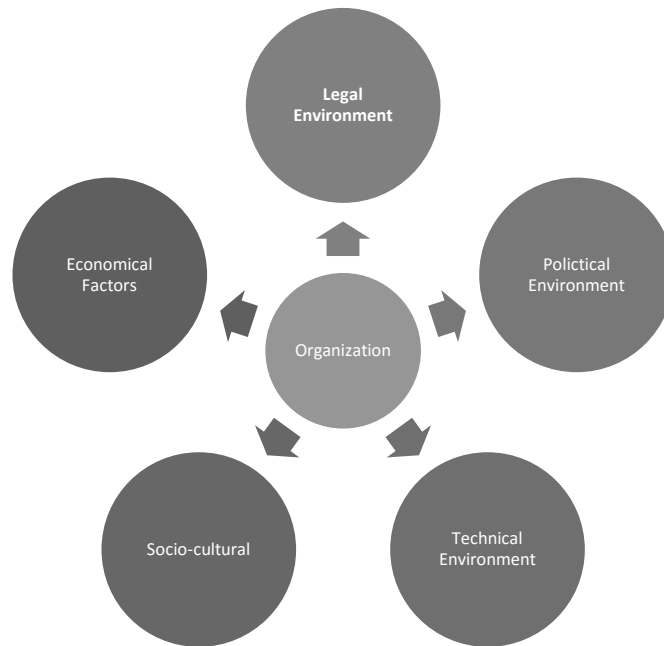


Figure. 2: Business Environment

The business environment of the ECF vaccination has several actors and factors. Internal factors are those which are within organizations, and these will remain within organizations and are controllable by the organizations. These may include employees and employee issues, internal processes. External factors are those factors which are out of control of the distributors but one way or the other they affect performance of the distributors, sub-distributors/agents, and the vaccinators.

External to the distributors there are customers in the case of the Tanzania chain, these are sub distributors or agents in some cases but majority are the vaccinators, other external factors are the rules and regulation, economic factors, political factors, social and economic factors. These need to be looked at to identify which ones need to be addressed if they pose challenges in conducting the vaccination business

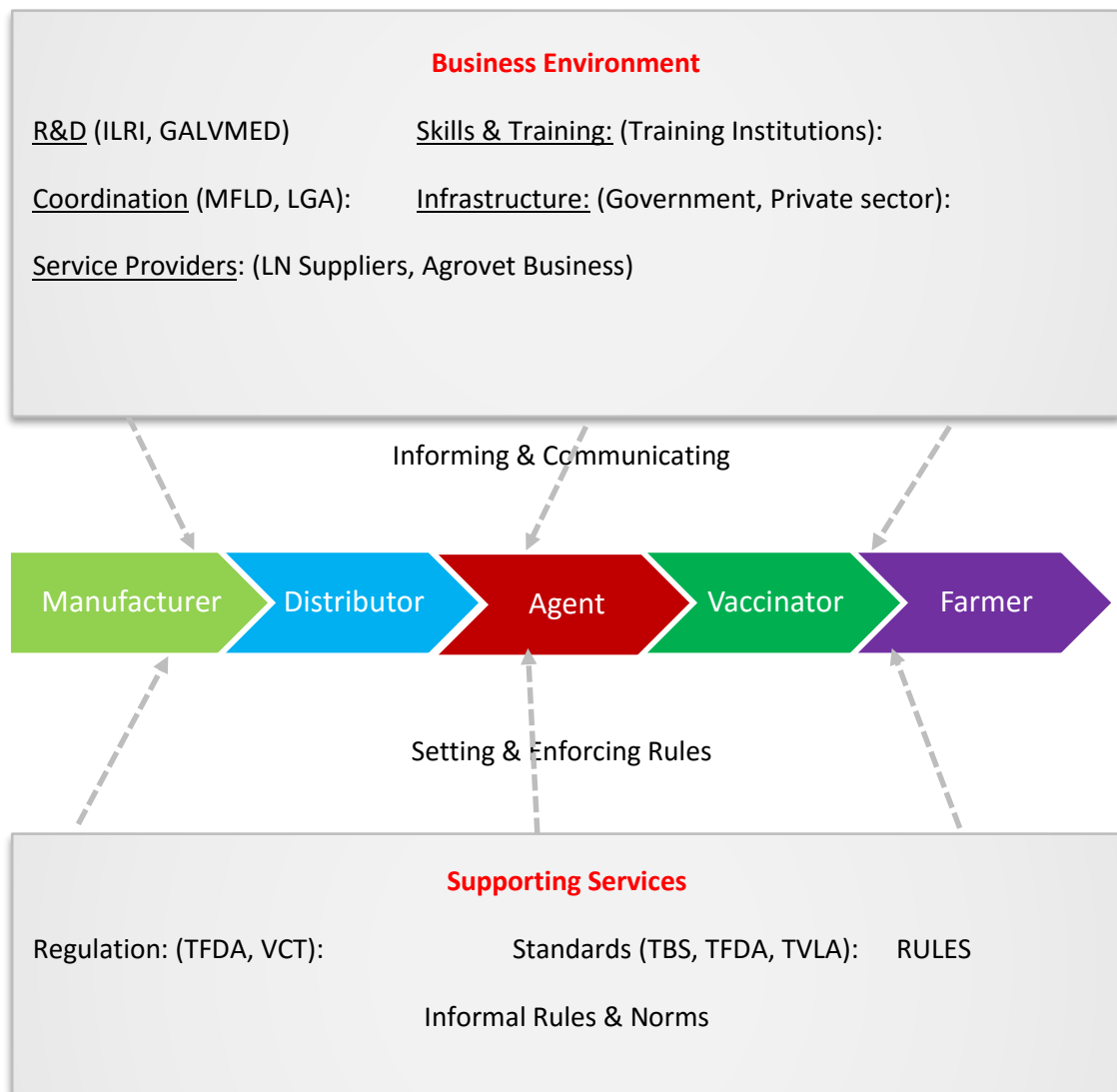


Fig.2: ECF Supply Chain

4.2.1. Business Model

ECF vaccination is a service business with long term impact. The vaccine is a product of research and needs to reach the intended users (livestock keepers). This can only be achieved if a strong business relationship is created among the major actors in the livestock value chain. The current business model involves mainly five key players. These are the Manufacturer, the distributors, sub distributors or agents, the vaccinator and livestock keeper. The transaction starts with Manufacturer and flows down along the supply chain up to the livestock keeper. The distributors are appointed by the Manufacturer and approved by the government. The distributors are at liberty to appoint their agents or sub distributors, this is done based on trust and volume of transaction involved. Exchange takes place at every stage on this existing business model. The model works well but with challenges as they have been elaborated in the actors' section of this report.

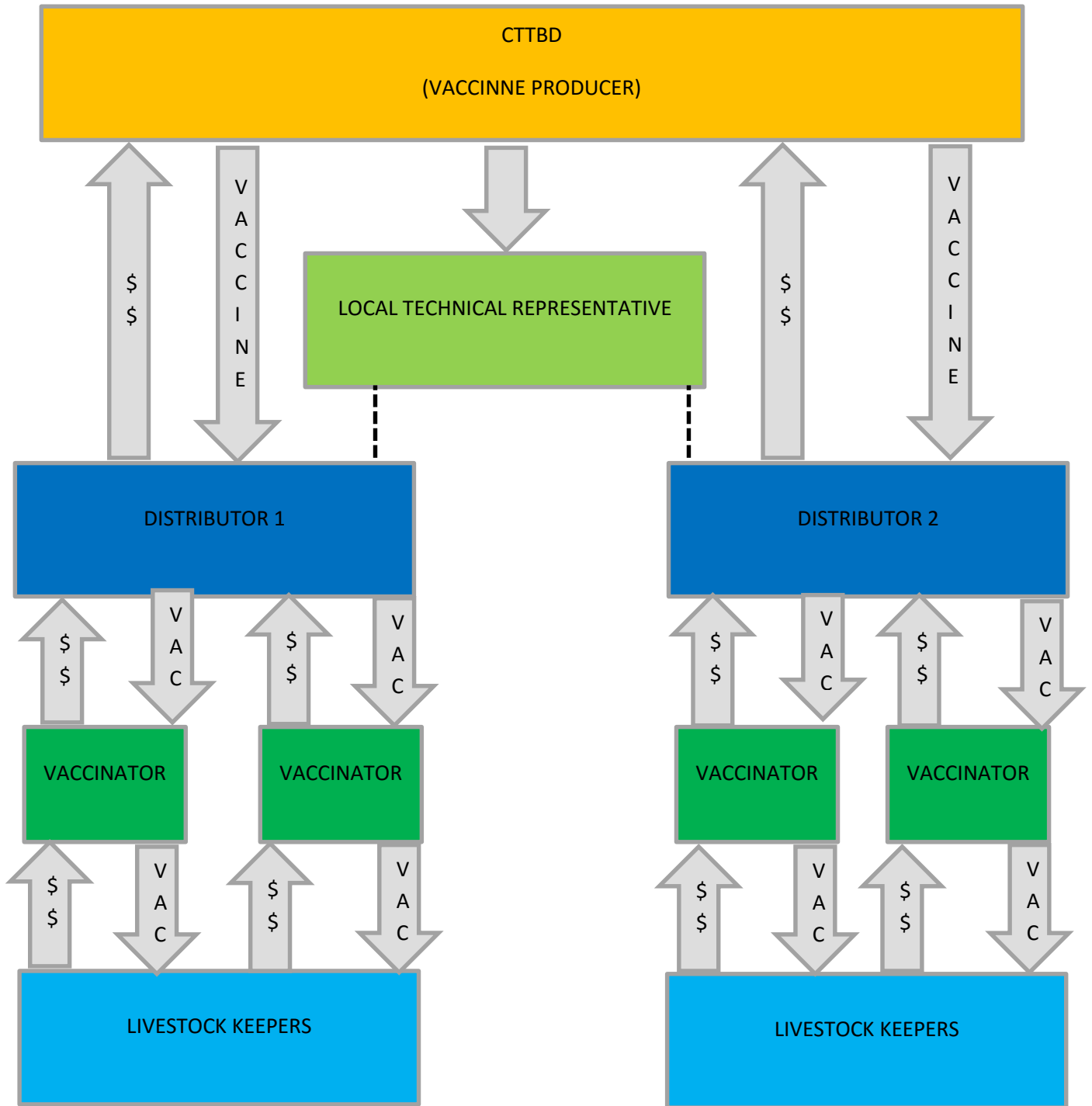


Fig. 3: ECM Vaccine Business Flow

4.2.2. Business Actors

About seven different categories of actors exist in the ECF vaccine supply chain. The key actors include distributors, Sub distributors/agents, vaccinators and livestock keepers. Service providers like Liquid Nitrogen suppliers, and suppliers of other drugs exist as service providers, also government and government agents are actors supporting the supply chain.

Assessing the current situation reveals that ECF vaccination is very important in Tanzania to help the country effectively control the disease. ECF vaccination has advantages over other options which have limitations. In the areas where vaccination has taken place the vaccine is very effective and the farmers are more than willing to pay for the service.

Mr. James Paroli is a farmer from Chakwale, he keeps a reasonably large herd of indigenous cattle. He started using the ECF vaccination for the calves in 2013. He is very pleased with the service noting that mortality rate has significantly dropped. For example, he recalls vaccination of about 100 calves vaccinated two years ago (2013) about 20 died but not from ECF because he knows ECF symptoms, , he confidently concluded that the calves did not die due to ECF... "The calves were losing weight for about a month before they died, and this is not a symptom for ECF, if it were ECF these calves would not have survived for a week" Insisted Mr. Paroli.

From his experience he explained that these deaths which are not ECF caused sends wrong message for the livestock keeper who has little knowledge and they end up linking it with the vaccine, and hence some hesitate to continue vaccinating. He therefore suggests more awareness campaign to livestock keepers especially the pastoralists.

Mr Paroli has committed not to stop vaccinating due to benefits accrued to him after vaccinations, his herd of cattle is increasing fast.

Business competition exists among the distributors, and also among the vaccinators; this is a good indicator for potential and sustainable business in the vaccination process.

The friction among the importers/distributors indicate the competition exists, this kind of competitions are common place in many successful business endeavours.

4.2.2.1. Distributors

There are only two distributors for this business in Tanzania, this is a market condition known as duopoly, where only two firms control the market for selling a certain product.

Duopoly will have the same impact as a monopoly if the two sellers decide to collude. This has not happened in the case of ECF vaccine business in Tanzania, thanks to the existing competition between the distributors and therefore they cannot collude.

Before the vaccine was fully commercialized, the commercial producer (ILRI) appointed two distributors and one of them (Vet Agro) was appointed as Local Technical Representative.

When the commercial production was moved to CTTBD in Malawi, CTTBD appointed the other distributor (RONHEAM INTERNATIONAL) as LTR. During these two periods, all distributors were appointed in consultation with the government. The need for additional distributors have emerged as the need for vaccination continued to rise.

There are no set up mechanism for new distributors to join the market. Currently, the existing distributors are the ones who are recommending additional distributor. The recommended distributors are in most cases their current sub distributors or agents. This needs to be looked into in the future as it may threaten competition in the market and create a cartel.

The distributors work very closely with government (MLFD – Veterinary Service Division), through monitoring some of their activities, importation of the vaccine and training of the vaccinators.

The two distributors have supplied vaccines in Dar es Salaam, Arusha, Kilimanjaro, Manyara, Tanga, Coast, Lindi, Mtwara, Iringa, Mbeya, Rukwa, Singida, Mara and a few in Mwanza.

Of the two distributors Vet Agro distribute mostly in the northern mainly Arusha, Manyara, and Kilimanjaro. Ronheam International distributes also in Arusha, Manyara, and Kilimanjaro, but also in southern parts of the country i.e. Mbeya, Iringa, Ruvuma, Katavi, its Ronheam International who also cover the lake zone, i.e. Mwanza, Kagera, Geita and Shinyanga.

Ronheam International for example has managed to distribute about 90'000 doses since the end of the project (June, 2013), 55'000 doses in a period of 18 months (which is good indicator for market potential). Data from the other distributor could not be was not available to see what has been distributed during the same period.

Based on performance information from vaccinators that so far there are about 160 trained vaccinators. The vaccinators on average claims to vaccinate up to 6'000 calves (this is mainly on pastoralists areas), with the given number of trained vaccinators up to 960'000 to 1'000'000 calves can be vaccinated per year

Vaccinators believes that there is a need to increase the number of so as to bring the vaccine close to vaccinators. Vaccinators wanted to know how an agent can raise to be a distributor, and requested the manufacturer to put in place a transparent system on how a vaccinator or an agent can become a distributor.

The ITM vaccination supply chain has faced cases of misconduct in the vaccination. Several cases and complainant has been raised and communicated to relevant authorities, (Ministry of Agriculture, Veterinary Council of Tanzania, and Tanzania Veterinary Laboratory Agency.) Business completion contributes to these complaints but investigation authorities finds out that in most cases its vaccinators going to vaccinate in some area where another vaccinator “believes” to be his/her territory.

However, because existing potential in the ECF vaccination business unscrupulous people take the opportunity to make super profits at the expense of farmers risking destroying all the previous good work done by honest actors in using the vaccine to eliminating ECF

It is recommended that during the scaling up project this issue should be critically looked at and come up with means to curb this cheating.

4.2.2.2. Sub Distributors/Agents

These are those vaccinators who actually offer other veterinary Services such as AI etc., these have capital and facilities to support ECF vaccination, sub distributors/Agents are likely to become distributors

4.2.2.3. Vaccinators

Vaccinators are the key actors in the ECF vaccination supply chain. They are the ones who deliver the service to the final customers. They perform the critical task of last mile delivery of the vaccine. Due to the delicate nature of the ECF vaccine these vaccinators need to be well trained and licenced to do the job. Recruitment and training of vaccinators is done by the distributors using a distributor- designed curriculum but accredited by the Veterinary Council of Tanzania. About 160 vaccinators are available in Tanzania currently. The majority of these were recruited and trained during the vaccine piloting stage while others were trained when commercial vaccine delivery started in 2013.

There is no mechanism where an independent veterinary service provider who is not linked to a distributor, and would like to enter into the business can be recruited and trained in ECF vaccination.

Monitoring of vaccinators is also not well coordinated. Currently vaccinators work on trust from the distributors and there is little monitoring of the vaccination activities. This has led to unscrupulous vaccinators coming to vaccinate.

Vaccinators need to be people of high professional integrity and adhere to the ethics of their professional and avoid the business aspect to override the professional integrity. They have multiple roles in the vaccination chain, which includes vaccination, storing the vaccine, educating the farmers and monitoring the effectiveness of vaccination.

4.2.2.4. Government

The government is the key actor in the ECF vaccination. Its main responsibility is to oversee and coordinate other actors through different institutions to ensure that Tanzania Vision 2025 (TDV 2025 is achieved through contribution and efforts from other actors in the livestock industry.

Tanzania Vision 2025 envisioned that envisioned that Tanzania as a country will have graduated from a least developed country to a middle income country by the year 2025 with a high level of human development. The economy will have been transformed from a low productivity agricultural economy to a semi-industrialized one led by modernized and highly

productive agricultural activities which are effectively integrated and buttressed by supportive industrial and service activities in the rural and urban areas.

4.2.2.5. Tanzania Veterinary Laboratory Agency (TVLA)

This is an Executive Agency of the Ministry of Livestock and Fisheries Development. The agency has been established under the Executive Agency Act Cap 245 (R.E 2009) and gazetted on the GN number 74 of March 2012.

The Agency is mandated to meet the following objectives: -

- i. Developing and marketing appropriate technological package
- ii. Institutionalize Management Systems
- iii. Undertaking and Strengthening Surveillance and Diagnostic Services
- iv. Improving Infrastructure and Facilities'
- v. Strengthening Financial and Human Resource Management Systems
- vi. Strengthening Institutional Arrangements
- vii. Addressing Crosscutting issues

TVLA has its headquarter in Dar Es Salaam with multiple sites in the country in terms of Zonal offices, laboratories, research centres and research farms.

Examining the role of TVLA at the current set up of the ECF supply chain, it has been noted that TVLA has a very important role of post vaccination verification of the effectiveness of the vaccine. This is done by assessing if there is a difference in incidence of diseases between vaccinated animals and those which have not been vaccinated. For this to happen, TVLA needs to be in close contact with distributors and vaccinators

TVLA applied for a distributorship of the ECF vaccine but unfortunately they were not successful. Since executive agencies operate more or less like the private sector, the agency is still interested to act as a distributor in the ECF value chain, the agency believes that it can use its vast experience and facilities to be effective distributors.

TVLA can confirm categorically from their own assessment, that in most parts where the vaccine has been used farmers appreciate that the vaccine is effective and has helped reduce mortality significantly.

TVLA pointed out that clearly ECF vaccine cannot completely replace the dipping, ticks still carry other diseases which need to be controlled and therefore dipping is still necessary.

There are opportunities for TVLA to be part of ECF vaccination scaling up project including and these include the following: -

- Supervisory role (quality and effectiveness- this can be done in collaboration with the Local Technical Representative for the Vaccine)

- Advisory Role (tapping their expertise and technical capacity)
- Verification role (when it comes to disputes on the effectiveness of the vaccine)
- Creating awareness (specially to end users- this also will be based on their experience and technical capacity in dealing with other vaccines and veterinary drugs)

4.2.2.6. Veterinary Council of Tanzania–(VCT)

The Veterinary Council of Tanzania is a body corporate under the Ministry of Livestock and Fisheries Development. But is independent from the Department of Veterinary Services. VCT was established following enactment of the Veterinary Service Act No. 16, 2003 (Cap 319).

VCT aim is to become an effective institution that ensures the provision of accessible and sustainable quality veterinary services for improved quality of livestock and livestock products.

That ambition will be achieved through regulating the veterinary profession in order to contribute fully to food security and poverty eradication. And also through increased quality livestock and livestock products without causing any harm to the environment.

The council is mandated with the following functions: -

- i. Register¹ veterinarians, veterinary specialists and veterinary practice facilities, enrol² paraprofessionals and enlist³ paraprofessional assistants
- ii. Advise and recommend to the Minister responsible for the profession on any matter related to veterinary practice
- iii. Regulate veterinary practice
- iv. Recognize qualifications, training facilities, training Institution and colleges
- v. Collaborate with other relevant institution or bodies in accrediting courses of training curriculum which provide qualifications for veterinarians, veterinary specialist, enrolment of paraprofessionals and enlistment of paraprofessional assistants
- vi. Determine minimum standards for: -
 - a. Veterinary practice facilities
 - b. Conduct scope of practice activities by veterinarians, veterinary specialist, paraprofessionals and paraprofessional assistants
 - c. Training proficiency required for the degree, diploma, certificate or any other award entitling the holders thereof to practice (meaning the council is mandated to determine the levels of CPE for veterinarian who are practicing on different levels i.e. Registered, Enrolled or Enlisted)
- vii. Exercise effective disciplinary control over the professional ethics and conduct of veterinary practice

¹ Registered- These have veterinary degree and are registered in the Register of Veterinarians

² Enrolled- These have diploma in animal health and are enrolled in the Roll of Paraprofessionals

³ Enlisted- These have certificate in animal health and production and are enlisted in the List of Paraprofessional assistants

- viii. Promote and encourage educational advancement with regard to the practice of the veterinary profession
- ix. Provide information and education with regard to the veterinary profession
- x. Facilitate collaboration among persons and organisations relating to veterinary practice in order to enhance dignity and integrity of the veterinary profession
- xi. Initiate and provide advice to the body for the time being responsible for regulating the use of veterinary pharmaceuticals, drugs and poisons
- xii. Arrange and conduct qualifying examinations to establish competence in veterinary education and practice.
- xiii. Perform such functions as may be required under the Veterinary Act.

Considering its possible role in the ECF supply chain; given the requirement for specialized handling of the ECF vaccine the council could play a critical role of contributing to the development of the vaccination specific training, certifying the trainers and registration and certification of those trained.

VCT does not train vaccinators but certifies the curriculum, and the trained veterinarians who are trained as ECF vaccinators.

The council maintains a database of all trained vaccinators and where they are located. The register of all veterinary experts is under the custody of the registrar. At the moment there are over 3'000 registered veterinary experts. These have been registered in three categories, degree holders, diploma holders, and certificate holders. Among these, over 100 veterinary experts are trained ECF vaccinators.

The training curriculum is developed by the distributors in collaboration with the council. Training is done by distributors whenever they want to increase a number of vaccinators depending on business potential in such areas. This makes training of vaccinators to be at the mercy of the distributor and not the trainee. There is no open system where an interested veterinarian will be trained if not linked with the distributor. The scale up project should tackle this challenge, to liberalize ECF vaccination where possible to have in place accredited institutions which will offer training based on agreed curriculum.

VCT has experienced some challenges in relation to ECF vaccination. This was dealing with a complaint raised after an unscrupulous vaccinator started vaccinating against ECF. When the complaint was lodged, VCT investigated and found out that the vaccinators were not registered and were using fake (unregistered) ear tags. Furthermore, they were not representing any distributors among the two registered distributors. Therefore, there was nothing VCT could do to discipline them since they were not registered VCT could not take any further action here because the unscrupulous vaccination was not working with any of the distributors. This is a weakness in the supervision, a better scenario is for VCT which is mandated to investigate such challenges, should also be given mandate to pursue further such incidences including taking to court the culprits.

VCT are very critical actors in the ECF supply chain with the role of registration of vaccinators, accrediting the curriculum and supervision of ethical and professional conduct of the vaccinators. VCT lack mandate to prosecute culprits and vaccinators who are not

registered. For those who are registered, they have mandate to take disciplinary actions based on profession ethics. For those who are not registered the best they can do is to testify if the culprits are prosecuted by other institutions.

4.2.2.7. Tanzania Food, and Drug Authority (TFDA)

Tanzania Food, and Drug Authority was established by the Tanzania Food, Drugs and Cosmetics Act, 2003. The aim of the act is set an efficient and comprehensive regulation of food, drugs and medicinal devices and herbal drugs

The act under section 5 mandates TFDA among many other things, to regulate all matters relating to quality and safety of food, drugs herbal drugs, medicinal devices, poison, and cosmetics.

TFDA also is mandated to: “Regulate in accordance with the act the importation, manufacturing, labelling, marking, or identification, storage, promotion, sale and distribution of food, drugs, and cosmetics. It is also mandated to” Condemn and order destruction or disposal in any way any products regulated by the act which will be found to be unfit for its intended use”.

In the ECF supply chain, TFDA plays its legal role to make sure the imported drug meets the legal requirement, and has no consequences which can affect the livestock industry

Specifically, TFDA does the following: -

- Controls the registration of the drugs in the country (including the ECF vaccine)
- Regulates the vaccine in the market (making sure that what has been registered is what is being administered). TFDA works closely with the Local Technical Representative of the manufacturer. The law requires that if a drug is not produced in Tanzania, the manufacturer needs to appoint a Local Technical Representative (LTR). TFDA recognizes the LTR and will work with the LTR in case of any complaints, or if the drug does not perform to the expectation.
- Control every importation of the vaccine. Each time distributors import the drug, LTR will inform TFDA how many doses have been imported

In general, the role of TFDA is continuous on this supply chain, it creates the feedback loop which need to be enhanced.

4.2.3. Pricing

Pricing is the process where an entrepreneur or a business person use to determine at what value his product or service will be paid for in exchange, while price is the value which is put on a product or service and is the result of sometimes simple or complex computations and calculations. While computations are done, other factors are considered like research on many factors in the market, understanding and risk taking ability. The pricing strategy takes into account segments, ability to pay, market conditions, competitors’ actions, and trade margin and output costs. Normally pricing is targeted at defined customers and against competitors.

There is no one right way to calculate or determine the price for a product. Four ways are available for calculating or determining the price of product including:

- **Cost-Plus Pricing**- This sets the price by including cost of goods plus fixed costs at volume of production plus a certain profit margin
- Target Pricing- This method sets the price in order to achieve the Return On Investment (ROI)
- Value Based Pricing- Here the product is priced based on value it will create for the customer. This is usually the most profitable if it can be attained
- Psychological pricing- this approach considers the customers' perception

Looking at the ECF supply chain, vaccinators apply the simple method of recovering the costs and add a profit margin. The size of profit margin differs from one vaccinators to another. The study has noted that for ECF vaccination, price ranges from TZS 8'500 – 15'000. (\$3.95-\$6.98)⁴

Availability of Liquid Nitrogen is a challenge, for example Mr. Nnko a vaccinator residing in Kibaya, Manyara Region, the closet town for him to get Liquid Nitrogen is Dodoma, but the Dodoma plant is not reliable, therefore he has to buy from Arusha. Buying from Arusha increases the cost of the vaccine. The following costs are incurred

Fare (to and from)	TZS 32'000
Accommodation	TZS 60'000
Price of LN (20lts)	TZS 150'000
Town Commuting Costs	<u>TZS 20'000</u>
Total	TZS 262'000

The fare from Kibaya to Dodoma is TZS 7'000 and one can do a return trip, therefore if availability of LN in Dodoma is reliable the cost of 20lts would have been about TZS 170'000

There was a case of intruding vaccinators who were vaccinating at the price lower than \$3.95 in Kibaya, it is not clear how can they charge such a lower price. This only suggests that either these fake vaccinators do not actually use the ITM vaccine, no farmer was available if they have vaccinated at the price lower than \$ 3.95.

⁴ Exchange rate used \$1 to TZS 2'150

5. Challenges and Opportunities faced by actors

Different challenges and opportunities exist in the ECF supply chain, the most important of which are highlighted below.

5.1. Challenges

5.1.1. Government and Government agents

The Government and Government Agents are responsible with controlling of Teak and Teak Borne Diseases, therefore any effort to contribute in reducing the TTBD is a blessing. Combating TTBD faces challenges, use of chemicals is expensive and requires specialized handling especially on waste management. Other challenges are: -

- Inadequate financial resources which hinders proper surveillance and reporting of TTBDs, infrastructure and institutional efficiency.
- Weak monitoring system on effectiveness of the therapeutic drugs and acaricide in the field due to inadequate resources.
- In most cases treatment and mixing of acaricide is done by farmers- which runs the risk of under or over concentration of dip wash and therapeutic medicinal products.
- Legal obstacles such as conditions set by the articles of the Animal Diseases Act, no. 17 which requires formation of advisory committee on the use of animal pesticides in the country, this reduces the pace of TTBD control.
- Interference from Institutional set up in implementing TTBD activities has led to conflicts of interest and lack of understanding of the different responsibilities among the authorities (MLFD, PMO-RALG, LGAs & Farmers)
- Unregulated livestock movement for various reasons such as family exchange, pastoralism, commercial stock etc.

All these challenges reduce the pace on the fight against TTBD including ECF. ECF contributes over 42% of TTBD mortalities (URT, 2013), then there is a need to enhance an efficient way to deal with it. ITM which has been scientifically proved to vaccinate against ECF will therefore contribute to elimination of ECF in the scaling up phase.

5.1.2. Distributors

In order for the vaccine to reach the market it has to go through the distributors. Distributors will buy the vaccine from the producers and distribute via sub agents in some cases and direct to vaccinators in most cases. Distributors' faces a number of challenges in executing their tasks, the challenges include:

- **Reliable power supply** –the diluent requires to be stored at negative-20⁰ C. Power supply has been unstable for some time in Tanzania. Distributor might need to have a standby generator which adds to the holding/storage costs of the vaccine
- **Access to Liquid Nitrogen for Storage**- the vaccine need to be stored in liquid nitrogen at negative 196⁰ C Access to Liquid Nitrogen is a challenge. Currently LN can

be obtained in Arusha, Mbeya, Mwanza, Dar Es Salaam, Iringa, Dodoma, and Kilimanjaro. All these plants are not reliable and the price per litre continues to rise. At Tanzania Oxygen Limited the price is TZS 10'000 per litre and at the government plants it can be obtained at TZS 6'000 per litre. At the distributor level, there is a need to consider possibility of a small LN Plant. The investment decision should be done by the distributors if they see importance to do so, otherwise they might consider to work in partnership with owners of the plans to operate the LN plants.

5.1.3. Vaccinators

Vaccinators face a number of challenges some of which are specific to the area while others are common in many areas. Some of the challenges include:

- Vaccination kits- in some areas vaccinators do not have kits due to non-availability and when available are very expensive for vaccinators, efforts are needed to make them subsidized like other agricultural equipments.
- Availability of Liquid Nitrogen (if they have to keep stocks of the vaccine) especially when they need to vaccinate the remote areas. This challenge faces mainly the small vaccinators; for the sub agents who also vaccinates most of them have storage facilities, to them only cost will increase when they replenish the LN from time to time.
- A critical mass is needed for the vaccination to be economically sustainable. This can be attained through awareness campaigns.
- Stability on cost price from the distributors is a good thing, (as only two distributors exist one sells a straw at TZS 350'000 and the other sells at TZS 300'000). The two distributors have fierce competition, this difference is perceived as one distributor would like to force the competitor out of business Under normal business environment this is called completion and its good for business it stabilizes the price. Given the fierce competition existing between the two competitors, it is perceived that one distributor would like to remove another competitor from the business.
- Although some farmers understand the nature of the vaccine (ITM is different form conventional vaccines) there is need for more farmers to be educated about the vaccine. Capacity building at the level of Local Government Authority (LGA) officials (politicians – councillors) will be important to increase their understanding so that they can promote the vaccination instead politicizing the process. There are suggestions that LGA should collect some fees on each animal vaccinated; this is strange proposition because the LGAs does not collect fees on other vaccinations. If this idea will be taken serious by LGAs it will contribute in making the vaccine expensive. This is a strange recommendation from the LGA, because the LGA does not collect fees in any other vaccinations.
- Mobility, vaccination is not carried out close to where the vaccinator lives and given the nature of livestock keeping it requires vaccinators to have suitable transport to reach their clients. This is different if you compare with methods like dipping, where the animals need to be taken to the dipping site.

- Price is the major challenge especially for farmers who are not aware of the vaccine, they feel the price is too high. (between \$ 3.95 – \$6.98)
- Actors are not well coordinated, (vaccinators, LGAs); this happens because vaccinators work closely with distributors and it happens most of the time they will report to the distributors more than feeding the same information to the district authorities, hence the district authorities miss a lot of information on vaccination.

5.2. Opportunities

The ECF vaccination business environment has some existing opportunities which if well capitalized can help in scaling up of ECF vaccination.

Despite the challenges, farmers are already aware of the effectiveness of the ECF vaccine (especially those who have already vaccinated). Vaccinators need to stick to ethical behaviour to avoid chasing away their potential clients.

The farmers in the southern highlands are highly motivated and demand vaccination to even adult cattle. Unfortunately, as demand for vaccination is rising availability of vaccine is decreasing. This is an opportunity to be capitalized.

Huge market potential exists, especially when targeting the indigenous cattle. There are, over 21.3 million cattle while only a fraction has been reached. It is estimated that 72% of all cattle mortality are due to Tick and Tick Borne Diseases of which ECF account to 43.7% (URT, 2013). Therefore, with this population of cattle in Tanzania over 7.6 million are at risk of ECF.

The government on its side understands very well the importance of ECF vaccination and has been boasting of the existing conducive business environment for ECF vaccination. This was reiterated by the then Ag. Permanent Secretary MLFD while opening an ECF Vaccine Importers and Distributors meeting on January 10th, 2014. He said, *“The National livestock policy of 2008 clearly stipulates that the government will strengthen technical support services on tick & tick borne diseases control and that collaboration with other stakeholders will encourage and promote investment in production and provision of acaricides, anti-protozoan drugs and other livestock inputs. It is here actually the issue of ECF vaccine provision falls in”*, he insisted that *“ECF distribution in the country is the responsibility of the private sector, with government principally assuming regulatory role”* This is an opportunity which also can be capitalized during scaling up.

The decision to pilot in the lake zone is a good opportunity for scaling up because the area has a large stock of cattle. This may promote the use of the vaccine and may attract distributors to extend their services to the region.

Existence of the Strategic Plan for Control of ECF in Tanzania is an opportunity which can be seized for scaling up of ECF vaccination. The scaling up strategy should try to align with the 7 strategic objectives of the strategic plan

Willingness by the government to introduce the vaccine to new areas, namely Rukwa, Katavi, and Njombe, and proposal to introduce new distributors are yet other opportunities for scaling up.

6. Conclusion and Recommendation

6.1. Conclusion

ITM Vaccine has reduced death on calves and helped improve livelihood of the livestock keepers, as has been testified by vaccinators and the livestock keepers.

Big business potential for ECF vaccination exists (high demand for the vaccine), and existence of high population of cattle in Tanzania over 21.3million.

Potential for scaling up is very high due successful pilots and trend shown since 2013.

6.2. Recommendations

- Increase awareness for livestock keepers, and LGAs on economic benefits of vaccination
- Liberalize more the distribution and vaccination (increase the number of distributors on competitive manner.
- Streamline training of vaccinators (can be trained by vaccinator in collaboration with accredited institution, or the accrediting institution should be issuing certificates) - this will make it more liberal and may attract more vaccinators.
- Facilitation of mobility to vaccinators due to nature of work, and livestock keeping style, this can be done through arrangement between distributors and vaccinators.
- Subsidization of the Liquid Nitrogen Equipment by Government this can be done through various methods such tax exemptions, or through subsidy like the case is in agricultural inputs make them accessible by the vaccinators
- Streamline certification to come from one institution, e.g. VCT

Address how distributors are appointed, due care is needed in the process since this is a specialized business. Transparent process of appointing the distributors is necessary in name fair trade norms. Interested distributors should be given equal opportunity to participate in the business.

On training of vaccinators it is recommended that training of vaccinators should be done by authorized training institutes, and the curriculum for vaccinators training should be accredited by recognized accreditation authority

At the moment vaccinators are identified and trained by the distributors. Most of the current vaccinators were involved in the pilot project, and therefore were easy to identify and work with. Many are still government employees who vaccinate as part time employment. Others have retired and continue to work as private businessmen.

Include business training in the vaccinators training, this will increase their business skills, and help the understand the business part in ECF vaccination.

The scaling up project should minimize as much as possible paying for the training costs for vaccinators neither should the distributors. If the distributors consider to subsidize, this should be at the minimum. This approach will help set up a sustainable business model which will survive past the project life time.

Awareness campaigns should be considered as way informing the livestock keeper on the benefits of ECF vaccination. The methodology for awareness campaigns might differ from one area to another, and this can be agreed with the respective local authorities.

The ECF scaling up project should try to align its objectives with objective 5 of the Strategic Plan for the Control of Tick and Tick Borne Diseases in Mainland Tanzania developed by Ministry of Livestock and Fisheries Development.

7. References

1. URT: Tanzania Vision 2025
2. URT: Agriculture Development Strategy
3. URT/MLFD (2012): Annual Statistics Report for 2011
4. URT, 2010: Livestock Sector Development Strategy
5. Tshumi, P., Hagan, H. (2008): A Synthesis of the making markets works for the poor (M4P)
6. MFLD, 2013 Strategic Plan for the Control of Tick and Tick Borne Diseases in Tanzania Mainland 2012/13- 2017/18