

Federal Democratic Republic of Ethiopia
Ministry of Livestock and Fisheries

Study to Assess the Feasibility of Public-Private Partnerships for Selected Livestock Facilities/Service Areas in Ethiopia

Final Report

Addis Ababa, May 2017

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Acronyms and abbreviations

ACDI/VOCA	Agricultural Cooperative Development International/Volunteers in Overseas Cooperative Assistance
AGP-LMD	Agricultural Growth Program – Livestock Market Development Project
AHA	Animal health assistant
AKLDP	Agricultural Knowledge, Learning, Documentation and Policy Project
BMGF	Bill and Melinda Gates Foundation
BOO	Build, own, and operate (PPP option)
BOOT	Build, own, operate, and transfer (PPP option)
BOT	Build, operate, and transfer (PPP option)
CA	Concession Agreement
CNFA	Cultivating New Frontiers in Agriculture
CSA	Central Statistical Agency
DCA	Draft Concession Agreement
DSCR	Debt service coverage ratio
DVM	Doctor of Veterinary Medicine
EPA	Environmental Protection Agency
ETB	Ethiopian birr
EU	European Union
EVA	Ethiopian Veterinary Association
FDRE	Federal Democratic Republic of Ethiopia
FMD	Foot and mouth disease
FMHACA	Food, Medicine and Health Care Administration and Control Authority
GTP 2	Second Growth and Transformation Plan
Ha	Hectare
HE	His/Her Excellency
IFD	Improved family dairy
IRR	Internal rate of return
IVC	International Veterinary Certificate
LINKS	Livestock Information Network and Knowledge System
LITS	Livestock Identification and Traceability System
LMIS	Livestock Market Information System
LMP	Livestock Master Plan
MENA	Middle East and North Africa
MoFEC	Ministry of Finance and Economic Cooperation
MoLF	Ministry of Livestock and Fisheries
MoT	Ministry of Trade
MUDH	Ministry of Urban Development and Housing
NADSS	National Animal Disease Surveillance System
NAHDIC	National Animal Health Diagnostic and Investigation Centre
NPV	Net present value
NRS	National Regional State
OIE	Organisation International des Epizooties
OMO	Operate, maintain, and own (PPP option)
OMT	Operate, maintain, and transfer (PPP option)
PMU	Project Management Unit
PPP	Public-private partnership

PPR	Peste des petits ruminants
PV	Present value
QZ	Quarantine zone
RAB	Regional Agricultural Bureau
RFP	Request for Proposal
SHARE	Support Horn of Africa Resilience (Program)
SMC	Sanitary Mandate Contracting
USAID	United States Agency for International Development
US\$	United States dollars
TAD	Transboundary animal disease
VfM	Value for money
WACC	Weighted average cost of capital
WAHS	Woreda Animal Health Service

Executive summary

This is the report of findings of a study to assess the feasibility of public-private partnerships (PPPs) for municipal abattoirs, export quarantines, livestock markets, and for one service area, sanitary mandate contracts.

The study was requested by the Ministry of Livestock and Fisheries (MoLF) and was undertaken in two phases from February 6 to May 10, 2017. Phase 1 addressed technical assessments and identification of PPP options. Phase 2 dealt with financial assessments of these options and ended with an outline of the way forward—the most important component. The structure of this report is based on these phases and the major activities.

The study has shown that the selected PPP delivery options for the three types of facilities are certainly technically and financially feasible and yield definite “value for money” (VfM) outcomes. Sanitary mandate contracting (SMC) could lead to a cascade of benefits that improve the range and quality of both public and private good services.

The major drivers for PPPs in the livestock sub-sector of Ethiopia are (i) lack of public-sector financial capital for constructing new facilities or for upgrading existing facilities and (ii) lack of public-sector technical and business capacity and experience. Both will be provided by the private partners.

The introduction of PPPs will start the process of improving the efficiency of the public sector and will change its work priorities. The public sector must carefully monitor the activities and service quality of private partners to check that all requirements detailed in the PPP Concession Agreement (CA) are being respected. The public sector must also act in the case of lapse or default. This will be an important activity towards ensuring the improvements in quality and increased service capacity expected of PPP involvement.

As expected, the study has confirmed the poor to very poor physical and operational state of many of the selected facilities, largely due to lack of maintenance, investment, and specialist knowledge on the part of the public-sector operators. In general, abattoirs are particularly poor and the livestock market infrastructures much neglected. The two quarantine facilities are new but nonfunctional and include many design faults.

Phase 1 culminated in the presentation of findings of the technical assessments and the presentation of several PPP options identified for each facility. These were presented to stakeholders at a consultative workshop. As appropriate, the participants’ comments and recommendations were included in the Phase 1 report. This report was presented to Her Excellency the State Minister for Veterinary Services and Feed Quality Control, and later she and officers of the Ministry of Livestock and Fisheries (MoLF) selected PPP options that would best suit the Ethiopian context.

The PPP options selected by the MoLF were:

- For municipal abattoirs—For new facilities: build, own, and operate (BOO)—preferably for butchers’ and youth associations. Either limited tender (for butchers’ or youth groups) or open tender. For existing abattoirs in fair condition: operate, maintain, and own (OMO—youth groups) or in the absence of other interest, privatize (sell-off, i.e., selling the facility to a private investor).

- For export quarantines—BOO for new facilities; operate, maintain, and own (OMO) for management of the existing facilities. A single investor or several investors are envisaged for what could be a mix of service quarantines and captive ones.
- For livestock markets—For new facilities, BOO. For existing facilities, OMO.

The financial analyses conducted in Phase 2 produced favorable outcomes, particularly for abattoirs and quarantines, less so for livestock markets. With the assumptions used (which are fully explained in the report), all facilities generated profits and could pay royalties to Government—to the MoLF for the quarantines and to municipalities for abattoirs and markets.

VfM was evident for the three facilities and especially for SMC.

VfM for the facilities was based on:

- Losses accruing to municipalities (poor management, poor revenue collection) replaced by royalty payments;
- Decreased environmental pollution (especially for abattoirs);
- For abattoirs, higher standards of meat quality and safety;
- Upgrading of existing facilities and construction of new facilities in appropriate (i.e., nonresidential) zones;
- Introduction of skilled management and efficient financial management systems;
- Greater efficiency—e.g., use of byproducts in abattoirs.

Brief financial summaries are presented below.

Municipal abattoirs

Category of abattoir	PPP option	% share of revenue to Govt.	Project IRR (internal rate of return)	Equity IRR	Net present value (NPV) @ 14% (million ETB)	Payback period years/ months	PV to Govt. (million ETB)
B	BOO	48.00%	18.34%	20.42%	5.69	5/10	127.24
	OMO	60.00%	18.64%	20.28%	2.11	6/2	159.05
C	BOO	23.00%	18.27%	20.28%	2.41	5/10	15.24
	OMO	44.00%	18.97%	20.71%	0.93	6/1	29.16

Export quarantines

PPP option	% share of revenue to Govt.	Project IRR	Equity IRR	NPV @ 14% (million ETB)	Payback period years/ months	PV ¹ to Govt. (million ETB)
BOO	16.6	19.51	20.82	67.9	6/6	295.3
OMO	26.6	20.01	20.73	45.7	6/11	472.4

¹ PV is the present value of the stream of royalty payments using a discount rate of 14%.

Livestock markets

PPP option	% share of revenue to Govt.	Project IRR	Equity IRR	NPV @ 14% (million ETB)	Payback period years/ months	PV of royalties to Govt. (million ETB)
BOO	30	17.98	20.11	1.38	5/9	0.75
OMO	62	18.02	20.60	0.25	5/4	0.75

To move forwards with PPP proposals, the MoLF must urgently establish formal contact with the PPP Unit of the Ministry of Finance and Economic Cooperation (MoFEC). This Unit oversees and regulates all PPP arrangements in Ethiopia.

A very important outcome of the study was identification of several potential impediments to the implementation of the selected PPP options, including pending submission of two important proclamations and six regulations. The PPP CAs that govern implementation of PPPs define standards, roles of the public and private partners, payments, duration, etc. and should be underpinned by appropriate legislation. The absence of the latter will greatly complicate the CA structure and mean significant changes if and when legislation is enacted. The MoLF must take very prompt action to submit pending proclamations and regulations for approval.

Additionally, the Road Map for Rationalising Veterinary Service Delivery should be officially approved and acted upon without delay. This impinges directly on SMC and provides a policy basis for the MoLF's PPP arrangements.

A very urgent requirement to enable PPP arrangements for the export quarantines is successful completion of an agreement with the Djibouti authorities to enable animals that have been quarantined and certified (mandatory International Veterinary Certificates (IVCs) are required for international trade) to pass through the Djibouti Port. A temporary holding area in Djibouti is required for these animals as they await shipment. Without this agreement, which must be endorsed by Ethiopian live animal exporters, PPP arrangements will not be possible.

A further critical requirement for the quarantine facilities is adequate supplies of good-quality and reasonably priced feed. At full current capacity and 10 cycles per year, some 36,000 tons will be required annually. Feed is a major cost, and variations in unit price will affect financial viability. There is potential to produce good-quality fodder locally, and this would ideally be by the private partners to assure supplies.

There will be a need to expand the throughput of all three facilities to cope with the expected production increases outlined in the second Growth and Transformation Plan (GTP 2). It will be important for concessionaires to respond to these increased demands in order to (i) fulfil the terms of the CA, (ii) maximize earnings and profits, and (iii) discourage establishment of competing facilities.

The findings of the financial analyses were presented to stakeholders (including potential investors) at a consultative workshop held on April 25, at which much interest was generated. Participants understood the legislative, policy, and agreement (with Djibouti) preconditions listed above and the requirement for rapid action to resolve these by the MoLF.

1. Introduction

The Ministry of Livestock and Fisheries (MoLF), Federal Democratic Republic of Ethiopia (FDRE) is keen to improve the quality, scope, and cost-effectiveness of the services offered to livestock stakeholders and consumers. One strategy to contribute to these improvements would be to introduce PPPs in selected technical areas with the aim of attracting private capital to (i) fund improvement of existing facilities, construct new facilities as appropriate, and develop staff capacity, (ii) take advantage of the efficiency and quality that can be delivered by the private sector, and (iii) ensure that high quality and standards are in fact achieved and maintained through monitoring and regulation by the (independent) public sector.

In 2016, the MoLF requested assistance from the USAID-funded Agricultural Knowledge, Learning, Documentation and Policy Project (AKLDP) to investigate the feasibility of incorporating PPP arrangements into delivery of four specific areas: municipal abattoirs, livestock markets, export quarantines, and delivery of public-good vaccinations of livestock using SMC.

In response, a study with the following specific objectives was launched in February 2017:

- To assess the current condition of the facilities and the status of service delivery in the four livestock facilities/service areas proposed for consideration for a PPP, namely export quarantines, local abattoirs, livestock markets, and sanitary mandates for disease control;
- To assess the technical feasibility of PPPs for the selected livestock facilities/service areas and identify the PPP option that best suits the Ethiopian situation;
- To assess the financial feasibility of the proposed PPP options for each of the livestock facilities/service areas;
- To prepare Requests for Proposal (RFPs) and Draft Concession Agreements (DCAs) for each of the identified PPP options for the four livestock facilities/service areas.

The study was implemented in two phases. Phase 1 was from February 6 to March 24, and Phase 2 was from April 3 to May 9, 2017.

Phase 1 assessed the technical feasibility of PPPs and identified potential PPP options for the selected facilities/service area. From the recommendations made by the study team, the MoLF selected the most appropriate PPP options for the Ethiopian context. In Phase 2, detailed financial analyses were carried on these selected PPP options and Draft RFPs and DCAs for quarantine facilities prepared. These three documents will be used to inform the MoLF to take PPPs forward to implementation.

The study was conducted by a team of seven specialists:

- Peter Moorhouse, team leader
- Dipak Abhyankar, PPP expert

These two international experts were ably assisted by five officers seconded from the MoLF and one AKLDP intern:

- Dr. Meseret Bekelle, Veterinary Public Health expert—municipal abattoirs
- Dr. Kassau Amssalu, Veterinary Disease Control expert—sanitary mandates

- Dr. Dereje Wakjira, Senior Quarantine Officer—export quarantines
- Ato Abebe Tadesse, Livestock Marketing Promotion Officer—livestock markets
- Ato Adane Lamesgin, Civil Engineer
- Ato Bruk Tilahun, AKLDP intern and environmentalist

2. Approach and methodology

The team first participated in a series of group discussions to (i) identify stakeholders, (ii) confirm objectives and identify the types of data and information to be collected during meetings with stakeholders, (iii) identify tools to be used, and (iv) develop the tools and checklists and pretest them in Addis Ababa.

Tools used for collecting information/data were:

- Literature reviews—lots of contemporary documents were available;
- Key informant interviews;
- Semi-structured interviews;
- Focus group discussions;
- Observations.

Field visits were made to inspect facilities and collect data from various stakeholders at a number of locations using the tools above. The locations visited were Addis Ababa, Bishoftu, Adama, Mille, Semara, Dessie, Mekelle, Jigjiga, Dera, and Yabello. The stakeholders consulted were:

- Ministry of Livestock and Fisheries;
- Ministry of Finance and Economic Cooperation—PPP project;
- Ministry of Urban Development and Housing;
- Kera Alo private abattoir;
- Mille Quarantine Facility in Afar National Regional State (NRS);
- Afar regional agricultural official in Semara
- Municipal abattoir in Dessie, Dessie municipality, Environmental Protection Agency (EPA) offices in Dessie;
- Mekelle abattoir (closed), Mekelle municipality, office of Mekelle Urban Agricultural Office, Regional Livestock office in Mekelle. Romadi veterinary group, Mekelle. EPA offices, Mekelle;
- Abergelle Export Abattoir, Mekelle;
- Livestock markets and feedlots in Adama;
- Livestock markets and municipalities at Adama, Dera, and Yabello;
- Live animal exporters and feedlotters in Adama.

Overarching policies and legislation that have a bearing on all facilities and services examined in this study were:

- The Road Map for Rationalising Delivery of Veterinary Services—This defines the roles and responsibilities of the public and private sectors and promotes PPPs as a way to enable investment and improved delivery of services. Although finalized in 2015, the Road Map awaits approval and implementation;

- The Livestock Master Plan (LMP)—This is the definitive guide to the development of the livestock subsector. It sets priorities and targets for the period 2015/16 to 2019/20 (these targets are included in the GTP 2) and emphasizes the vital role to be played by the private sector in livestock development, including PPPs;
- The new PPP policy document and proclamation developed by the PPP Unit of the MoFEC. The MoFEC unit will advise, assist, and regulate all PPP initiatives in Ethiopia. Its establishment demonstrates the commitment of Government to integration of PPPs into the national economy.

Based on the data collected, the technical feasibility of PPPs in the selected livestock facilities was assessed and potential PPP options for each of the facilities identified.

On March 21, 2017, Phase 1 findings and recommendations were presented to a stakeholders' consultative workshop. The comments of workshop participants were noted and incorporated, as appropriate, into the final Phase 1 report, which was delivered to, and discussed with, HE Dr. Misrak Mekonnen, the State Minister for Animal Health and Feed Quality Control, on March 24.

During the one-week interval between the two study phases, the MoLF selected those PPP options that were considered the most applicable to Ethiopian conditions. These formed the basis for the detailed financial analyses carried out during Phase 2.

In Phase 2, detailed financial analyses were undertaken of the PPP options selected by the MoLF, and the way forward was outlined. These findings were presented to the second consultative workshop held on April 25, 2017, culminating in a final report that includes comments received. Phase 2 ended with preparation of RFPs and DCAs for the BOO and OMO options for quarantines.

The outcomes of the study in the two phases by facility are presented in the following two sections:

- Section 1: Phase 1 covers the technical feasibility and potential PPP options for each of the facilities/service areas;
- Section 2: Phase 2 covers the financial feasibility of the MoLF agreed options and outlines the way forward.

Section 1: Technical assessments and identification of PPP options

Objectives:

- To determine the technical feasibility of PPP in the four livestock facilities/service areas;
- To identify the potential PPP options for each of the facilities/service areas.

Two parts:

Part A: Assessment of the technical feasibility of PPP arrangements for the four livestock facilities/service areas.

Part B: Assessment of service delivery options for each of the four livestock/service areas.

Part A: Technical assessments, by facility/service area

3. Technical assessment of municipal abattoirs

3.1 Introduction

There are over 296 municipal abattoirs in Ethiopia, a number that is projected to increase to some 616 by 2020. These abattoirs are the primary source of meat at the municipal level: other supplies come from illegal slaughter, particularly of small ruminants. In some areas, camels are slaughtered to supply meat, mainly for the Muslim community. Demand for pork is increasing, and with this the demand for pig slaughter has risen.

Municipalities are responsible for ensuring adequate supplies of (safe) meat for their human populations. However, this does not imply that municipalities must themselves provide slaughter services (although almost all do), but only that they need to ensure that these services are actually provided. Thus, operation of slaughter facilities can be carried out by a third party, with municipal authorities ensuring adequate supplies of meat of good quality and a designated institution providing technical inspections (this institution should be the MoLF).

It is widely acknowledged that the condition of abattoir buildings and equipment is often exceptionally poor, and standards of hygiene, welfare, inspection, etc. can be abysmal. These failings were confirmed by the 2016 Agricultural Growth Program – Livestock Market Development Project (AGP-LMD) Report on Standardisation of Domestic Abattoirs in Ethiopia and again noted during visits to abattoirs under the current study. Problems include unregulated disposal of solid (often dumped) and liquid wastes (often emptied into water courses). It is essential that new abattoirs be correctly sited away from residential areas and that they implement an approved plan for waste disposal—using incineration, septic tanks, lagoons, and municipal waste water facilities as appropriate.

Meat production is set to rise (see Table 1), and it is important therefore that abattoirs are improved and expanded.

Table 1. Second Growth and Transformation Plan (GTP 2) projections for meat production

Year	Red meat production (million tons)	Average live weight (kg)	Dressing percentage (cattle)	Estimated annual slaughter of cattle (head)	Current no. of slaughter facilities	Average slaughter per facility per annum*
2015	0.9	250	50%	7.2 million	256	8,400
2020	1.4	275	53% ²	9.6 million	400	16,800 ³

*Equivalent to 37 per day.

The following table shows the relative frequency of town and cities in Ethiopia by population size (derived from the CSA National Population and Housing Census of Ethiopia of 2007, reported in 2011) and a derived estimate of cattle equivalents slaughtered per day to meet demand.

Table 2. Human populations in larger towns and cities

Projected population of town/city	Examples	Relative frequency	Mean number of cattle equivalents to be slaughtered per day*
Less than 24,000		35	2–6
25,000 to 49,000		71	7–14
50,000 to 99,000		25	13–25
100,000 to 149,000	Arba Minch, Bishoftu, Dila, Debre Berhan, Harer, Hosaina, Nekempte, Sheshamane, Sodo	9	26–38
150,000 to 199,000	Jigjiga, Jima, Dessie	3	38–51
200,000 to 249,000	Bahir Dar	1	51–64
250,000 to 299,000	Dire Dawa	1	64–77
300,000 to 349,000	Adama, Awassa, Gonder, Mekelle	4	77–83

Source: www.citypopulation.de–2015 projections.

*To satisfy an annual demand for 8 kg of red meat per capita. Only a proportion of the indicated number slaughtered will currently pass through an abattoir; the balance will be “illegally” slaughtered. Assumes 250 slaughter days per year and mean carcass weight of 125 kg.

The estimated annual per capita consumption of red meat in urban areas is 8 kg (CSA). For an urban population of 100,000 people, this equates to 800 tons of meat per year, equivalent to some 26 cattle (and camel) slaughters and 35 small ruminant slaughters per day, assuming 225 slaughter days per year, beef (and camel) accounting for 90% of red meat consumed, and mean dressed weights of 125 kg for cattle and 10 kg for small ruminants. The LMP (2014) predicts that

² According to the LMP, there will be a 10% increase in live weight and a 3 percentage-point increase in dressing percentage of cattle.

³ The average slaughter per annum does not include old slaughter slabs/houses that may continue to produce meat with minor upgrading.

red meat consumption will increase by 58% over the period from 2015 to 2020. At its current rate of increase, the population will grow by 16% in this time period, indicating a per capita increase in red meat consumption of 33%, equivalent to a total of almost 11 kg per year. This will require proportionate increases in abattoir activity.

The Ministry of Urban Development and Housing (MUDH) recognizes the serious problems of existing municipal abattoirs, namely:

- Poor quality and hygiene of meat produced;
- Adverse environmental impacts of liquid and soft waste disposal;
- Siting of abattoirs in residential areas, producing serious adverse effects (health, well-being) on local residents;
- Animal welfare issues.

To rectify this unsatisfactory situation, the MUDH (under which municipalities fall) has, in consultation with the MoLF, commissioned standardized designs of four categories of low-cost abattoirs and is developing operating standards for these abattoirs (see Table 3). Municipalities will be encouraged to actively pursue this policy and ensure effective and efficient operation of these facilities.

This MUDH policy provides an excellent opportunity for PPP. The private partner would build and operate new abattoirs (with or without a subsidy from the municipality) and deliver slaughter service of a high standard. This would be embodied in the CA and be assured through monitoring of all abattoir activities (including waste disposal) by the public sector.

Table 3. Details of the new abattoirs

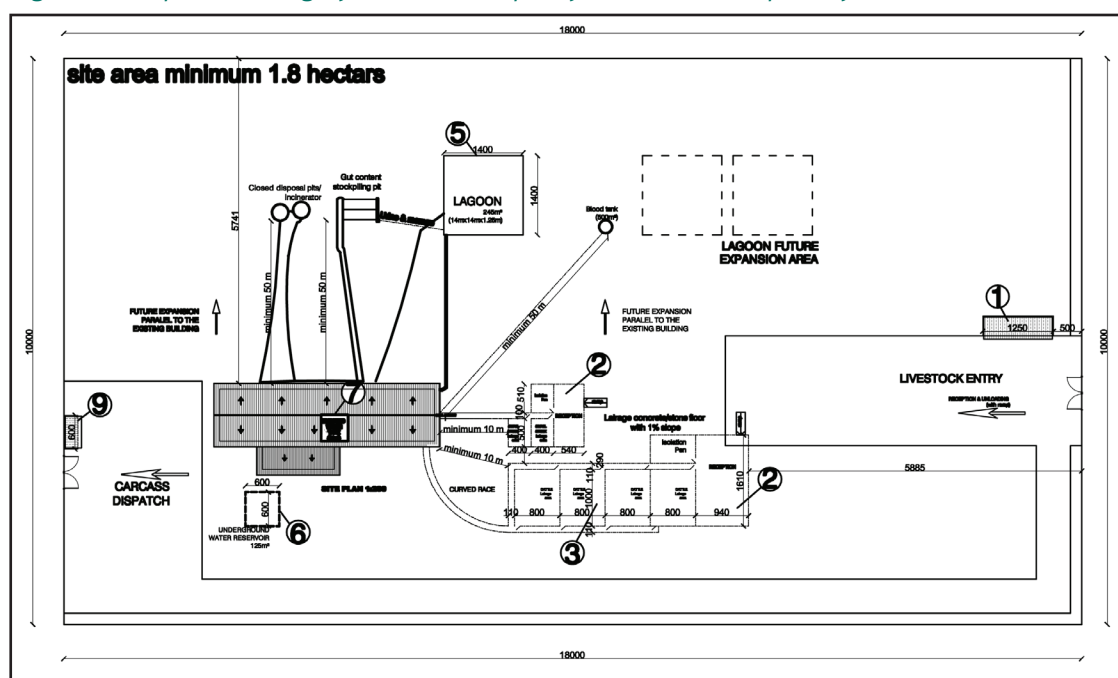
Category of abattoir	Capacity—cattle per day	Estimated cost (thousand ETB)	Approx. size (m ²)	Minimum area of site (hectares)	Water tank capacity (m ³)	Lagoon capacity (m ³)	No. staff required
A	201–500	100,000	730	2.5–3.0	250	500	64
B	51–200	12,000	440	1.8	125	245	43
C	16–50	8,000	240	1.8	25	45	23
D	5–15	100	35				5

The MUDH proposes that standards be monitored by the municipal authorities—not an ideal situation as these inspections will not be by an independent party, and vested interests may affect reported findings.

Currently, the service fees collected at municipal abattoirs do not cover costs. Thus, an annual subsidy is provided to maintain functionality. If the private sector can be persuaded to participate in PPP arrangements, this will yield immediate “VfM” as a subsidy should no longer be required or will be reduced.

The site plan for a Category B abattoir is presented in Figure 1.

Figure 1. Site plan of Category B abattoir (capacity 51 to 200 cattle per day)



3.2 Critical technical issues for municipal abattoirs

These are waste disposal, hygiene, utility supplies, and staff capacity and training.

3.3 Policy and regulatory issues

As referenced above, a policy to encourage the establishment of modern “fit-for-purpose” abattoirs has been developed by the Ministry of Urban Development and Construction. Furthermore, the MoFEC has established a PPP project to inform and guide the PPP processes through development of a draft PPP proclamation and a PPP policy. These basics will greatly assist the establishment of some form of PPP for abattoirs at the municipal level.

There are two outstanding issues in relation to private-sector involvement in municipal abattoirs:

- The lack of legislation governing regulation of quality and hygiene standards in domestic abattoirs. There is a draft Regulation on Meat Hygiene and Safety that was prepared in 2012 but this awaits ratification.
- Related to the above point is the confusion at the local level regarding the mandate for ensuring quality and hygiene in abattoirs. Is this the responsibility of officers of the regional animal health services (who are technically qualified) or of the municipality?

It is to be noted that the draft Proclamation for the Protection of Animal Health, Welfare and Veterinary Public Health clearly states that the Chief Veterinary Officer shall be responsible for defining: (i) national standards for design, licensing, and management of slaughter facilities, (ii) standards for ante- and post-mortem examination of slaughter stock, and (iii) the housing, handling, and management of animals before and during slaughter.

This confusion regarding local-level responsibilities for regulating hygiene and quality in abattoir design, management, and operation must be resolved before PPPs can be implemented.

For some abattoirs, for example Dessie, all regulation of the abattoir, including meat inspection, is carried out by the municipality. There is no role for the MoLF. This is most unsatisfactory as:

- The draft Proclamation for the Protection of Animal Health, Welfare and Veterinary Public Health clearly assigns responsibility for all aspects of abattoir operations to the MoLF and its representatives at local level (i.e., *Woreda* Animal Health Service (WAHS));
- The combination of one administration both operating and regulating a facility is contrary to good practice as it lacks independence.

A further potential problem arises from the role of the Food, Medicine and Health Care Administration and Control Authority of the Ministry of Health (FMHACA), which is responsible for protecting the population from health risks arising from unsafe or poor-quality food. As indicated above, clear descriptions of the intended roles of the FMHACA, municipal authorities, and the MoLF regarding regulation of municipal abattoirs should be agreed before PPP arrangements are proposed.

The Ministry of Environment, Forest and Climate Change and municipal authorities are concerned about the indiscriminate disposal of abattoir wastes and the adverse effects of abattoir activities on the environment. The situation in the three abattoirs visited was very poor and confirms the findings referenced in Table 6.

Correct disposal of abattoir waste is costly but must be implemented. The additional costs should be borne by the primary beneficiaries, the municipality inhabitants, in the form of slightly increased prices.

3.4 Current conditions

3.4.1 Stakeholder identification

The following stakeholders were identified and targeted for data and information collection and participation in the stakeholders' consultative workshop:

- ***The MoLF***

This Ministry is ultimately responsible for the livestock sub-sector and for ensuring production of animal products of the required quantity and quality. As laid down in the pending draft Proclamation for the Protection of Animal Health, Welfare and Veterinary Public Health, the Chief Veterinary Officer is responsible for all abattoir activities and the quality and hygiene of meat until it leaves the abattoir. Thereafter, the FMHACA should assume responsibility for retail outlets, restaurants, etc.

Meat inspection activities and reports are a component of the National Animal Disease Surveillance System (NADSS) directed by the Epidemiology Directorate of the Animal Disease and Feed Quality State Ministry of the MoLF and implemented by the Regional Agricultural Bureau (RAB) and Veterinary Laboratory System (National Animal Health Diagnostic and Investigation Centre (NAHDIC) and the Regional Veterinary Laboratories).

- ***Municipal authorities***

These are the current owners and operators of the municipal abattoirs. Abattoir operations are subsidized, and municipalities cannot provide funds for maintenance or improvements to the structure, equipment, and functioning of abattoirs. Hence the lamentable condition of the majority of domestic abattoirs. Funds are certainly not available for construction of new facilities.

- **Food, Medicine and Health Care Administration and Control Authority of the Ministry of Health**

Under the provisions of Proclamation 661/2009, the FMHACA is responsible for protecting the public from health risks emerging out of unsafe and poor-quality food. In this context, “food” means “any raw, semi-processed or processed substance for commercial purpose or to be served for the public in any way intended for human consumption” and presumably includes meat.

- **The Ministry of Urban Development and Housing (MUDH)**

The MUDH is responsible for guiding and assisting the activities of municipalities. The MUDH has an interest in improving the structure and operation of municipal abattoirs and, given the financial constraints, would welcome involvement of private sector players.

Under the guidance of the MUDH, municipalities are developing land use plans/zoning that should, according to the “Structure Plan of the MUDH Urban Planning, Sanitation and Beautification Bureau” include suitable space for abattoirs. This provision is important to reduce the multiple adverse effects of abattoirs in residential areas.

Recognizing that most municipal abattoirs are in a very poor to deplorable state, the MUDH has, in line with GTP 2, developed an ambitious plan to construct new facilities. Four standard designs have been developed. Details are presented in Table 4.

Table 4. Details of the standard-design abattoirs

Category of abattoir	Capacity—cattle per day	Estimated cost (ETB)
A	201–500	100,000,000
B	51–200	12,000,000
C	16–50	8,000,000
D	5–15	100,000

Table 5. Categories of abattoir required, by population—MUDH proposals

Population of town/city	Number of abattoirs	Estimated no. of bovines to be slaughtered annually*	Estimated no. of shoats to be slaughtered annually*	Category of abattoir required**
< 50,000	9	2,200	3,000	D
51,000 to 100,000	18	4,350	6,000	C
101,000 to 150,000	8	7,230	10,000	C
151,000 to 200,000	3	10,110	14,000	B
201,000 to 250,000	1	12,960	18,000	B
251,000 to 300,000	1	15,900	22,000	A
> 300,000	4	18,750	26,000	A
Total	44			

*A = 201–500 cattle slaughtered per day, B = 51–200, C = 16–50, D = 5–15 (slab).

**Assumes 8 kg red meat/capita/year. Beef accounts for 90%, 200 slaughter days per year. Demand increases dramatically at time of religious festivals.

Allied to the construction of new facilities, the MoLF and MUDH have developed standard operating procedures aimed at greatly improved operations, hygiene, and welfare.

This policy of the MUDH provision will be very important to PPP arrangements as it allows for new abattoirs and new standards, thus preparing the way for private investors.

- ***The Ministry of Environment, Forest and Climate Change***

This ministry is concerned about the levels of environmental pollution resulting from careless disposal of solid and liquid abattoir waste and the effects on surface and ground water, and the movement of livestock through residential areas and the resultant noise and dust pollution that damages human health. The involvement of the private sector is welcomed as this should improve abattoir structure, equipment, and service quality as well as re-siting the facilities out of residential areas where required.

- ***Regional Bureau of Livestock/Agriculture (RAB)***

As the regional body responsible for agriculture and the livestock sub-sector, the RAB has an interest in ensuring the delivery of animal health products of the required quality and quantity.

- ***Butchers, restaurants, and hotel owners***

These are the primary clients of the municipal abattoirs where their animals are slaughtered for an agreed service charge. Focus group discussions have revealed that these stakeholders are concerned about the poor quality and lack of hygiene at abattoirs and would be willing to pay higher service fees if these can be improved. Stakeholders are even willing to form associations to participate in PPP arrangements.

- ***Municipality inhabitants***

Inhabitants who live close to abattoirs are very concerned about the adverse environmental effects of abattoir activities, citing poor health (e.g., from dust and contaminated water), psychological effects (especially on children), noise, etc.

- ***Consumers***

Ultimately, higher abattoir service charges resulting from improved waste management will be reflected in slightly higher retail prices (a few ETB cents per kg), which will improve well-being due to lower bacterial contamination and reduced risks of food poisoning, spoilage, etc. Public awareness campaigns will be required to carry this message to the population at large.

3.4.2 Current condition of facilities

The municipal abattoirs visited were extremely unsuitable. The one in Dessie was deplorable, and the complaints of residents close to the facility in Mekelle forced the municipality to close it down.

Other reports (for example the MoLF, the Ministry of Trade (MoT), AGP-LMD report of 2016) attest to the very poor condition of municipal abattoirs and the unsanitary practices found in them.

In general, the policy of the MUDH to build new facilities with high standard operating procedures is therefore much required and timely.

3.4.3 Water supplies

At least 1,000 liters per bovine/camel and 100 liters per small ruminant are required to enable cleanliness and hygiene in an abattoir (Food and Agriculture Organization of the United Nations (FAO), Standard plans for small abattoir and market). Water shortage is a recurring problem, even in newly constructed facilities. Good standards of hygiene require adequate water supplies, and these must be assured for new and upgraded facilities.

3.4.4 Electricity supply

This must be assured, particularly for lighting to enable inspections, etc. during night-time slaughter. For this purpose, a standby generator is essential. Of 20 abattoirs included in the Cultivating New Frontiers in Agriculture (CNFA) study, 17 had connection to the electricity mains, and of these 5 had a standby generator. Given that most slaughtering occurs at night, a reliable supply of electricity is absolutely essential to enable high standards and, importantly, for meat inspection.

An extract from the report of an environmentalist on Dessie abattoir states: *“The main slaughtering building does not currently have a functioning light bulb, the workers there explained that: ‘during night time it’s very difficult for us to slaughter because it gets very dark.’”*

3.4.5 Waste disposal

This is a critically important activity to safeguard the environment and human health. Waste disposal is costly but must be carried out properly and in line with Ministry of Environment, Forest and Climate Change requirements. These costs must be passed on to the immediate beneficiaries, namely the municipality populations, in the form of slightly increased meat prices. Failing this, a subsidy from the municipality will be required.

Suitable options for liquid waste disposal include (i) a septic tank that is regularly drained into a purpose-built tanker and discharged into the municipal liquid disposal facility, (ii) a lagoon, and (iii) a biodigester to produce biogas. In these systems, solids settle out and must be regularly removed. Solid waste should be incinerated or if possible treated in a rendering plant (financially viable only for large abattoirs).

For large abattoirs, modern effluent treatment systems including a solids screen, aerobic tanks, etc. should be installed. These would not be cost effective for small- and medium-sized abattoirs. One solution here would be to convert organic waste (this makes up much of abattoir waste) into methane using a biogas digester. A 30-cubic meter (30,000 liter) biogas digester costs in the order of US\$ 10,000. The methane can be used to heat water, etc. The solid waste from the unit could be dried and sold/disposed of as fertilizer. Under current conditions, an abattoir with a capacity of 40 or so bovines would produce some 5,000 liters of liquid waste per day.

Details of the current situation are presented in Table 6.

The proportions of the various products and byproducts of cattle slaughter are presented in Table 7.

The data presented in Table 6 indicate that 14% of abattoirs discharge liquid waste onto open fields or into rivers, and 100% dispose of gut contents and 85% dispose of bone, hoof, and horn

Table 6. Disposal of liquid and solid wastes by municipal abattoirs in Ethiopia

S/N	Category	Waste material	Storage/disposal system	No. of slaughter slabs/houses
1	Liquid	Blood and sewage	Septic tank	11
			Lagoon	2
			Open field	2
			River	5
2	Solid	Gut contents	Open field	20
		Bone, horn, hoof	Open field	17
			Rendering	1
			Incinerator	2
		Tallow	Drying and marketing	19
			Rendering	1
3	Other	Urinals and toilets	Septic tank	12

Source: Report on Domestic Abattoirs, CNFA, 2016.

onto open field areas. The majority (95%) dry and market tallow. The foregoing demonstrate that much improvement is required, particularly in the disposal of gut contents.

Table 7. Indications of mean proportions of products and byproducts in a bovine carcass

Product/byproduct	Proportion (%)	Product/byproduct	Proportion (%)
Meat	41	Red offal	6
White offal	10	Waste	20
Edible fat	10	Hide	5
Bone	8		

3.4.6 Overhead lines/rails

These are essential to (i) enable thorough bleeding, (ii) lift carcasses off the floor, (iii) enable inspection, and (iv) facilitate carcass splitting. This means that the bovine abattoir building must be designed so that it can accommodate a line at a height of 5 meters from the floor for bleeding, which is then reduced to 3.5 meters after “legging” (i.e., transfer from chain hooks to dressing hooks).

Eighty percent of municipal abattoirs are fitted with an overhead rail (CNFA, 2016).

3.4.7 Capable staff

Initial training of recruits followed by regular refresher training will be required, together with adequate supervision, to ensure that agreed standards are maintained.

3.4.8 Sited away from residential areas

Land use/zoning plans developed and implemented by municipalities will guide the siting of new abattoirs so that they are constructed in areas that are well supplied with utilities and will not be engulfed by residences. Ideally, there should be a buffer zone of at least 500 m between an abattoir and the nearest residences (New South Wales EPA, 2016). The majority of abattoirs (> 70%) in Ethiopia are located in residential areas. This will be much reduced because of (i) municipality land use/zoning plans and (ii) the MUDH policy to build new, re-sited abattoirs.

3.5 Estimated remaining life

Apart from recently constructed abattoirs in Jimma, Adama, Awassa, and (under construction) Bahir Dar, the clear majority of abattoirs are over 20 years of age. Due to lack of maintenance and repair, these are in poor condition and need replacing. This is accommodated in the MUDH plan.

Without significant expenditure for maintenance and repair, the estimated remaining life of the abattoirs visited is short. The Dessie facility is totally unsuitable and, anyway, in an extremely poor condition. It is operating on “borrowed time.” The Mekelle facility has been closed by the municipality due to its very unsuitable location. Its remaining life is zero.

3.6 Present-day value

Municipal abattoirs are generally in a state of disrepair and often poorly sited (in residential areas). It is concluded that the present-day value is minimal and that municipalities would benefit from relocation of abattoirs to nonresidential areas. This would remove a hazard for the human population. It would also vacate a potentially valuable site, which could be developed after the ground has been rehabilitated.

3.7 Condition and need for rehabilitation

As referenced above, most abattoirs are in a very poor state of repair. If the policy of the MUDH to build new and well-sited facilities can be implemented without undue delay, rehabilitation will not be required.

3.8 Service coverage and need for expansion

The overall capacity of the municipal abattoir system must be significantly expanded to respond to:

- The predicted increases in red meat production and annual per capita consumption—up to 11 kg from the current 8 kg;
- The intention to discourage and eventually ban “informal” slaughter of livestock, which will increase the demand for abattoir services by approximately 25% for cattle and 75% for small ruminants.

A simple analysis of data collected at Dessie and Mekelle is presented in Tables 8 and 9. The analysis illustrates the gap between estimated demand for red meat and current abattoir supply.

The data in Tables 8 and 9 illustrate the current gap between estimated demand and actual supply from the abattoir. The data also demonstrate the sensitivity of the market to unsatisfactory abattoir service—poor service leads to increases in illegal slaughter. In this analysis, it is assumed that the demand for red meat (8 kg/capita/year) is satisfied from one source or another.

Table 8. Proportion of cattle slaughters by abattoir and location

Location	Population	Estimated no. cattle required	Cattle processed by abattoir	% provided by abattoir	Comments
Dessie	200,000	10,242	6,762	66%	Disgraceful state of abattoir discourages buyers.
Mekelle	345,000	17,684	5,796	33%	Abattoir is > 5 km from the city.

Table 9. Proportion of shoat slaughters by abattoir and location

Location	Population	Estimated no. shoats required	Shoats processed by abattoir	% provided by abattoir	Comments
Dessie	200,000	32,000	7,984	25%	Disgraceful state of abattoir discourages buyers.
Mekelle	345,000	55,200	5,775	11%	Abattoir is > 5 km from the city.

3.9 Estimated cost of rehabilitation

The majority of existing abattoirs are in residential areas. These, and those in poor condition (the majority), will be replaced by new, standard-design facilities under the MUDH policy. A few abattoirs are in fair condition and not in residential areas. For these, rehabilitation costs will vary from facility to facility but will probably be in the range of US\$ 10,000 to US\$ 50,000.

3.10 Estimated cost of expansion

It is estimated that the total cost of a new Category B abattoir will be in the order of ETB 18 million, and for a Category C, ETB 8 million.

3.11 Compliance with standards

From the findings of the current study and the CNFA report, it can confidently be concluded that the municipal abattoirs currently fail completely to comply with hygiene standards, Organisation International des Epizooties (OIE) standards of animal welfare and hygiene, and the New Brunswick Guidelines for Abattoir Waste and Carcass Disposal of 2014.

The MUDH abattoir designs and operating procedures, combined with staff training and regulation, must greatly improve compliance.

3.12 Organizational structure

In the Dessie municipal abattoir visited, there is a total of 42 staff members, 3 in administration (all permanent) and 29 technical workers (there are also 10 temporary members but the intention is to convert all to permanent employment, except the stand-in DVM). Details are presented in Tables 10 and 11.

Table 10. List of administrative staff

No.	Position/activity facility/ abattoir manager and administrative staff/ permanent	No. of personnel	Educational background	Average monthly salary
1	Abattoir service case team leader	1	Degree in management	5,081
2	Accountant	1	Diploma in accounting	1,743
3	Storekeeper	1	Diploma in accounting	2,298

Table 11. List of technical staff

No.	Position/activity technical staff	No. of personnel	Educational background	Average monthly salary	Remarks
1	Veterinarian	2	DVM	3,491	The one permanent DVM is away for training. A temporary replacement has been hired.
2	Slaughter man II	6	Unknown	1,511	All permanent.
3	Slaughter man I	6	Unknown	1,305	Two are temporary and paid ETB 900 per month. Plan is to make them permanent.
4	Cleaner	4		900	All permanent.
5	Lairage keeper	2		1,305	Both on contract, plan to make permanent.
6	Carcass weighing	1		2,008	Permanent.
7	Carcasses loading and unloading personnel	3		1,305	All on contract at ETB 900 per month. Plan to make permanent.
8	Driver	2		3,001	One permanent, one temporary.
9	Guard	3		1,050	One permanent, two temporary. Plan to make all permanent.

The annual salary bill is ETB 561,528 (47% of total costs). There are personal services contracts for 10 employees but these will soon be phased out as temporary staff are made permanent.

3.13 Cost of services assessment

Examples (Dessie) are presented in Table 12.

Table 12. Abattoir costs (Dessie)

No.	Item	Amount per year per ETB
1	Salary	561,528
2	Overtime	226,464
3	Knife sharpening	1,044
4	Fuel for two vehicles	130,000
5	Different oils for two vehicles	15,200
6	Phone	3,324
7	Water	12,000
8	Electricity	1,200
9	Maintenance	140,000
10	Cleaning materials	23,760
11	Stationery	2,500
12	Uniforms	79,843
13	TOTAL	1,195,663

The cost per animal processed at Dessie is estimated to be ETB 176.

3.14 Tariffs

Abattoirs charge a service fee per animal processed. This varies from ETB 80 for cattle, ETB 12 for sheep, and ETB 15 for goats at the very poor Dessie abattoir to ETB 350 for cattle and ETB 40 for small ruminants in Mekelle. Generally, service charge revenues collected by municipal abattoirs do not cover costs and there is a “hidden” subsidy— “hidden” because costs and revenues are recorded in completely different parts of the accounting system.

The total amount collected at Dessie abattoir in the last financial year was ETB 540,104, indicating an annual loss of over ETB 655,000.

3.15 Additional comments

These are summarized in Table 13.

3.16 Conclusions of the technical assessment

There is real scope for PPP arrangements to improve the infrastructure, equipment, and operation of municipal abattoirs. Stakeholders are keen, and strategy for this is led by the MUDH.

The drivers for PPP involvement in financing and management of the municipal abattoirs are the excellent plans of the MUDH, the willingness of butchers to be involved (for example in Jima and Harar the butchers’ associations are already in discussion about taking over the abattoirs), and residents’ concerns about environmental pollution and the need to relocate abattoirs.

Table 13. Additional comments

Measure	Comments
Technical quality of services	Generally very poor.
Adequacy of maintenance programs	Generally poor to nonexistent.
Capacity of staff	Fair, training is given but low remuneration and poor facilities discourage high-level working standards.
Adequacy of facilities and equipment	Poor (most) to fair (few).
Constraints on above	Financial constraints and lack of knowledge.
Sustainability of service delivery under existing tariffs	Services must be provided, but with low revenue levels quality declines and customers move to other sources (illegal slaughter) of meat. Therefore, not really sustainable.
Appropriateness of service delivery levels	According to focus groups, poor.
Acceptability	According to focus groups, poor.
Affordability	According to focus groups, butchers will pay more for products coming from facilities with high standards of hygiene.
Suggestions	Given the findings of this study, it is essential that corrective action be taken. The means to this will be the plans of the MUDH, coupled with PPP arrangements. Local-level inspection mandates must be clearly specified.

4. Export quarantines

4.1 Introduction

4.1.1 General

The OIE definition of a quarantine is “An establishment under the control of the Veterinary Authority where animals are maintained in isolation with no direct or indirect contact with other animals, to ensure that there is no transmission of specified pathogen(s) outside the establishment while the animals are undergoing observation for a specified length of time and, if appropriate, testing and treatment.” Thus, biosecurity must be the paramount concern in the design and management of a livestock quarantine.

The primary aim of export quarantine facilities is to enable the application of strict management and biosecurity procedures for animals destined for export as live animals to prevent the introduction of diseases into importing countries. Quarantining animals is one of the conditions specified by importing countries. This must be satisfied and attested to in the International Health Certificate that accompanies all consignments of livestock and their products.

The specific objectives of establishing export quarantine facilities in Ethiopia are to:

- Certify Ethiopian animals as free from transboundary animal diseases (TADs);
- Apply importing country requirements and other international standards to live animal export of the country;
- Prevent bans because of trade-related animal diseases;
- Sustain and further develop markets for Ethiopian live animals by increasing the competitiveness of the country at international markets;
- Underline the Ethiopian origin of exported live animals from this country.

There are two target export quarantine facilities: Mille in Afar NRS and Jigjiga in Somali NRS. Neither is yet functional, and some much-needed structural improvements are being undertaken. It is to be noted that the design of these facilities is based upon feedlots and not quarantines. Quarantines should be designed such that the highest standards of biosecurity are assured so that individual batches of animal are kept physically separated (by at least, say, 10 meters) to minimize the probability of transmission of trade-sensitive infectious diseases from one to the other. Additionally, internal management (e.g., movement of people and vehicles, systems for delivering feed into feed troughs, movement of livestock between pens, etc.) must prevent spread of infectious diseases. Furthermore, the entry gate and unloading ramps must be totally separated (e.g., at opposite ends of the facility) from the exit gate and ramps. Many other conditions must be satisfied to assure biosecurity.

The purpose-built quarantine facility in Djibouti is of satisfactory standard, and the individual pens in a group are separated by a gap of > 10 m. Groups of pens are separated by a greater distance. Figures 2 and 3 show the standard of facilities at the Djibouti quarantine. Construction is fairly basic and low cost, and lessons can be drawn from this when considering the building of new facilities in Ethiopia.

Currently, there is a livestock quarantine (pre-quarantine) in Adama, which will be phased out once the Mille and Jigjiga quarantines become operational. Adama is situated on the Addis-to-

Figure 2. Example of a cattle quarantine



Figure 3. Example of a shoat quarantine



Djibouti railway line, is close to most feedlots in Ethiopia, and gives relatively easy access from the pastoralist areas that are the prime source (95%) of export livestock. It is possible that (some) importing countries could approve the use of an improved Adama quarantine (see 4.1.2). The proximity to the railway line to Djibouti, feed sources, and live animal markets would facilitate live animal exports. This is an alternative option to the use of the Mille facility.

An excellent report “Public-Private Partnerships for Livestock Service Facilities: Lessons from Djibouti and Somaliland for the Mille Quarantine Centre” prepared in 2014 for the Ministry of Agriculture and the MoT has provided some material for the current assessment.

Live animals from the Mille Quarantine Facility will be transported by truck to Djibouti Port for export to, mainly, the Gulf states. From Jigjiga, quarantine animals will be trucked to Berbera Port (or Djibouti depending upon international relations), again for export to Gulf countries.

The Djibouti quarantine currently takes live animals almost exclusively from Ethiopia and exports them with International Health Certificates issued in Djibouti, incorrectly indicating that this is the country of origin. This arrangement is not in Ethiopia’s interest: hence the desire for an Ethiopian export quarantine that will show origin as Ethiopia. However, the relationship between Mille and the Djibouti quarantine has not been finalized and negotiations continue. Ideally, after their quarantine period (up to 30 days but less if any time spent in pre-quarantine is approved by the veterinary authorities of importing countries) in Mille, animals would be trucked to a holding area in Djibouti and loaded onto a ship as soon as possible with their Ethiopian International Veterinary Certificates. The relationship between Mille and Djibouti quarantines must be clarified before any PPP arrangement can be organized; otherwise there is a significant risk for the private investor. Ideally, the latter would own/ manage both the Mille and the Djibouti facilities.

This technical assessment of the Mille Quarantine Facility also covers the Jigjiga Quarantine Facility as they are both new, of the same size and design, and, as yet, not being used. So, the same criteria will be applied to both.

Ethiopia is piloting an animal identification and traceability system (Livestock Identification and Traceability System (LITS)) in the animal export chain. This system will enable monitoring of animals throughout the export chain, from Level 1 markets (see 5.2 for a description of market levels), where animals are identified using official, individually numbered ear tags. Animal movements and

locations through the export chain will be recorded in the LITS online database as well as all events such as testing and test results, vaccinations, and disease occurrence, with details and date.

Thus, by the time export animals reach the quarantine facility, each will have a traceability record that can be used as evidence for completion of the International Health Certificate. Once LITS is widely implemented, it will greatly improve the confidence of veterinary authorities of importing countries in Ethiopian certifications. This confidence is essential to enable and expand international trade.

It is highly probable that the authorities of importing countries will specify more demanding technical requirements as time passes. With LITS and its capacity for residue testing, Ethiopia is well positioned to respond to such demands. Established in-country and internationally compliant export quarantines are essential to creating a trusted Ethiopian brand.

4.1.2 Adama Pre-Quarantine Facility

This facility served as the source of export livestock destined for the Djibouti quarantine, a role that will be taken over by the Mille Quarantine Facility once it is operational. Details are in Table 14.

Table 14. Adama facility—Numbers of animals handled, by species and year

Year	Cattle	Sheep	Goats	Camels
1998	10,065	48,007	-	257
1999	81,056	4,807	-	8,925
2000	52,275	-	-	12,269
2001	53,133	21,589	-	6,210
2002	49,853	21,589	6,413	32,531
2004	44,060	246,079	61,520	40,597
2005	51,748	282,843	70,711	45,109
2006	59,233	155,233	38,958	38,158
2007	58,520	255,137	8,520	37,002
2008	71,838	205,008	9,999	14,939
Averages	53,000	124,000	19,600	23,600

Assuming that Mille successfully absorbs animals that were handled at Adama, the minimum numbers of animals for the first year of operation would be > 50,000 head of cattle, > 210,000 small ruminants and 14,000 camels. Respective capacities of Mille at its current size are 112,000 (cattle), 75,000 (small ruminants) and 52,500 (camels). It is clear that an immediate priority would be to increase the small ruminant capacity at Mille through new pens or temporary conversion of cattle pens to suit small ruminants.

4.1.3 Stakeholder identification

The following stakeholders have been identified:

- **The MoLF**

The MoLF is the current “owner” of the two export quarantine facilities. The MoLF funded the establishment of these facilities, including: identifying the sites on which the quarantine facilities were constructed; approving the design of the facilities; and awarding construction contracts for construction.

The MoLF will continue to be responsible for inspection and regulation of the quarantines after private-sector involvement to ensure that management and operation of the quarantines is as per national and international standards, is in line with the requirements of importing countries, and is fully participating in LITS. Importantly, only veterinarians authorized by the Veterinary Authority of the MoLF can issue the International Veterinary Certificates that are required for international trade (as described by the OIE, which underpin animal health control in international trade in live animals and assure compliance with the Sanitary and Phytosanitary Agreement of the World Trade Organization).

LITS, a Directorate in the MoLF, will incorporate export quarantines into its monitoring of cattle in the live animal export chain.

Mille Quarantine Facility must be one component of an SPS (Sanitary and Phytosanitary Agreement of the World Trade Organization)-compliant livestock export chain that includes (i) disease control/preventive measures as stipulated by importing countries, (ii) high standards of disease surveillance, (iii) ability to trace the source of each animal (currently this is back to the primary market) and then onwards through the marketing chain, and (iv) emergency preparedness (for example, immediate actions to be taken if disease is suspected in quarantined animals).

- **Regional bureau of livestock/agriculture (RAB)**

Regional officers in Afar are very keen that the Mille Quarantine Facility become operational as soon as possible. A regional land use plan is being finalized, and land will be made available for fodder production (for Mille Quarantine Facility and also for sale to local livestock owners), either through cooperatives or private operators.

- **Live animal exporters**

Passage through officially approved quarantines is a mandatory requirement for all legally exported livestock from Ethiopia. Live animal exporters will therefore be the primary users of the quarantines.

- **Veterinary authorities in importing countries**

These authorities issue import permits that specify all conditions that must be met for imported livestock in terms of animal health requirements (testing, vaccinations, ectoparasite control, inspections) and other considerations such as species, breed, sex, age, weight, etc. It is in the interests of these authorities to carry out periodic inspections to confirm that their requirements are being respected.

- **Feedlot operators**

These are part of the live animal export chain and feed livestock into the export quarantines. Their experience in feeding and caring for large numbers of confined animals must be applied to management of the quarantine facility.

- **Consumers (in importing countries)**

Ultimately, producer prices in importing countries will reflect all costs incurred in the live animal export chain of exporting countries, including quarantine charges, and all domestic costs of processing and marketing.

The pre-export animal health measures taken by the Ethiopian authorities (for example, testing, traceability, quarantine) will protect consumers from meat-associated diseases in countries that import livestock from Ethiopia.

- **Feed suppliers**

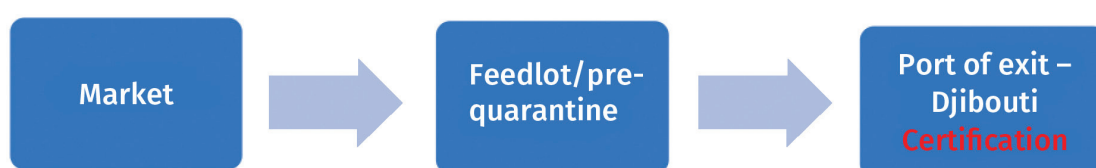
Animal destined for export must be kept in an export quarantine for up to 30 days (depending upon time spent in an approved pre-quarantine facility), during which time they must be supplied with feed so that body weight is maintained. Large quantities of feed will be required—see Section 4.5.1.

4.2 Current condition of Mille Quarantine Facility

The Mille Export Quarantine Facility will be one of the two export livestock quarantines and part of the live animal export chain. This chain commences in the primary markets where each bovine is identified by a uniquely numbered ear tag, and details are entered into the LITS online database management system (DBMS). From the primary markets, animals then move to collection points, secondary markets, feedlots, etc. where they are inspected, tested, and vaccinated. All details are entered into the LITS DBMS. At the export quarantine, any remaining vaccinations required by the importing country are carried out. The animals are maintained in isolation and provided with feed, shelter, water, and health care. Each animal's history, as recorded in the LITS database, is used to inform the issuance of International Veterinary Certificates.

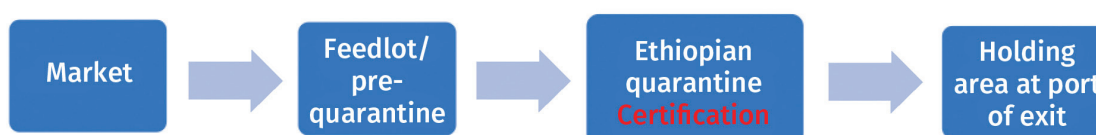
Figures 4 and 5 illustrate the current and proposed export chain. These differ in a very important manner—the authority that issues the International Veterinary Certificate. Currently this is issued by the Djibouti Veterinary Authority, a situation to the extreme disadvantage of Ethiopia.

Figure 4. Existing export chain showing point of certification



The new system shown in Figure 5 will enable Ethiopian certification and help to develop and reinforce an Ethiopian brand.

Figure 5. Proposed export chain with Ethiopian certification



Although new, the Mille Quarantine Facility is nonfunctional as the original design had numerous faults, some of which are currently being corrected.

The export quarantine facility at Jigjiga is identical to Mille and, when functional, will channel livestock to Berbera Port in Somaliland. The alternative would be Djibouti, and the choice of which port to use at any point will depend upon international relations at the time. The total cost

of this new facility was in the order of ETB 90 million (some US\$ 4 million). As it is not yet in a functional state, its current value will be less than this.

4.3 Estimated remaining life

Once upgraded, the facility would have a life, with effective maintenance and repair, of over 20 years.

4.4 Condition and need for rehabilitation

The original design had many faults and was really for a feedlot rather than for a quarantine facility. Very high standards of biosecurity, the fundamental requirement of a quarantine facility, were not adequately addressed. For example, there was a common entrance and exit, lack of a secure boundary fence, no separation between pens, no vehicle washing and disinfection area, and no crush for examination, sample collection, and treatment of sick animals. Animal welfare standards (for example, provision of adequate feed and water trough space per animal, and provision of shade areas) were inadequate. Under these conditions, animals cannot be expected to thrive. Live weights will decline, and there will likely be deaths due to heat stroke/dehydration/feed deprivation.

4.5 Special considerations for Ethiopian export quarantines

4.5.1 Feed

When the facility is filled to capacity (i.e., using the data presented in the AKLDP report and provided by the facility manager), the daily requirement for feed will be on the order of 115 to 150 tons of dry matter per day (likely a ration of chopped hay, molasses, and sugar tops from the sugar factory, plus protein concentrates from the highlands). Given 10 cycles per year, each of 21 days, the annual requirement would be some 36,000 tons. To cope with projected numbers of live animal exports, it is estimated that capacity of the quarantines must be tripled, indicating a feed requirement of just over 108,000 tons of dry matter per year. This in turn will require an area of some 3,500 hectares of well-managed and irrigated fodder production.

There would appear to be significant potential for fodder production in the Dubti/Ascoma areas of central Afar NRS. Land and water (Awash irrigation canal or pumped ground water) are readily available.⁴ Mille Quarantine Facility would provide one large market for this feed; local livestock breeders, local feedlots, etc. would also be interested. If price allows, this fodder production could supply highland dairying and feedlot areas. There is a need to interest the private sector to investigate the technical and financial feasibility of (i) producing forage in the area and then (ii) converting this into various grades of animal feed by chopping or grinding the hay and mixing it with protein concentrates (e.g., oilseed cakes), cereals from the highlands, and molasses and sugar cane tops (from the local sugar cane factory).

4.5.2 Number of livestock in the facility at any point in time

It has been proposed that an “all-in-all-out” strategy would resolve the problem of disease spread between animal batches. This is true but totally impractical—can one group of up to 15,000 cattle, 7,000 camels, and 10,000 small ruminants be quickly assembled, trucked to Mille, and then, after the required quarantine period, rapidly trucked to Djibouti?

In practice, batches of 1,000 to 6,000 head of cattle, 1,000 to 3,000 camels, and 3,000 to 10,000 small ruminants can be expected. At special times of year (for instance, the Eid al Adha festival), these numbers will increase significantly.

⁴ This comment was received during discussions with the Afar NRS Agricultural Office

The numbers of animals present in the facility can never reach the maximum level cited in reports (i.e., 15,000 cattle, 7,000 camels, and 10,000 small ruminants) because biosecurity demands that individual groups of animals (species and ownership) must be kept separate by keeping intervening pens empty. This would give a generous 33 meters of separation. Capacity will depend upon the mean size of a batch of animals. Examples are presented in Table 15.

Examples of the numbers of animals in a “typical” export batch as reported by the livestock exporters association⁵ are presented in Table 16.

Table 15. Estimated actual quarantine capacity—cattle, by batch size

Batch size (head of cattle)	Pens required for batch	empty pens*	Actual capacity—% of theoretical full capacity
500	2	1 in 3	67
1,000	3	1 in 4	75
2,500	8	1 in 9	89
5,000	15	1 in 16	94

*With current pen size (33 m x 42 m) holding a maximum of 340 head.

Table 16. Numbers of animals in “average” export batch, by species

Species	Range—head in “average batch”
Cattle	1,000 to 6,000
Camels	1,000 to 10,000
Small ruminants	3,000 to 10,000

*Source: Live Animal Exporters Association.

New batches of animals must be scheduled according to quarantine throughput. On arrival, newly arrived animals must be examined, ear tag numbers recorded, sprayed with acaricide, and then taken into arrival pens. After two days or so, they would be placed in a pen close to the entry gate and then progressively moved from pen to pen until they reach the exit area 21 days later.

4.5.3 Reducing the probability of disease spread between quarantined animals or introduction from animals in the area

This is the key role of animal quarantines and a difficult issue with Mille and Jigjiga Quarantine Facilities. As referenced above, the design of these facilities appears to be based upon the needs of a feedlot. A quarantine is very different, as the far stricter biosecurity standards required entail (i) strong border security, (ii) completely separate entry and exit ramps, (iii) a defined animal flow system with newly arrived animals being placed in isolation/observation pens close to the entrance and then, over the ensuing three weeks, progressively moved through the pens to the exit ramps, (iv) separation between pens (up to 10 meters is recommended to reduce probability of disease spread through aerosol transmission), and (v) preventing fomite spread of disease agents between pens (personnel, feed trucks, manure trucks, etc.).

5 W/o Kibbe Milat, General Manager of the Livestock Exporters Association.

Despite some MENA states having already approved Mille as an export quarantine, the need for biosecurity improvements remains as such decisions can easily be reversed. Furthermore, the needs of many other importing countries must be considered.

4.6 Compliance with standards

The “Standard Methods and Procedures for Export Quarantines in the Greater Horn of Africa” (IBAR, the Interafrican Bureau for Animal Resources) lays down the following procedures for quarantines. Comments on these requirements regarding the current state of Mille Quarantine Facility are given in red.

- Quarantine requires authorization by the Chief Veterinary Officer. *Present.*
- A reception facility, including a crush and holding pen, is required for inspecting animals prior to entering the quarantine. *Present—en route to spray race.*
- Quarantine sites must be located to ensure isolation and securely fenced. Fence needs attention.
- Basic requirements include loading and offloading facilities. *Present.*
- A stable source of electricity is needed. Present from mains. *Standby generator required.*
- A reliable and healthy water supply is required. *Present, but spare borehole required.*
- Sufficient feeding facilities must be provided. *Feed trough arrangement must be modified.*
- Holding and isolation pens must be provided. *Present.*
- There should be a regulatory laboratory. *Present.*
- Offices and cold chain equipment and facilities are required. *Cold chain required.*
- Vaccination and treatment equipment, and toilets must be provided. *Will be provided.*
- A postmortem facility and incineration must be provided. *Present.*
- Security arrangements are necessary. *Present.*
- Safe disposal of waste materials must be provided. *Needs improvement.*
- Crushes in reception and quarantine areas, and other equipment and facilities as need be are required. *More crushes needed.*
- Adequate regulatory veterinary staff shall be available all times at quarantine sites. *OK.*
- Animals received into a quarantine shall have a movement permit and Veterinary Health Certificate, and Certificate of Origin if animals originate in another member state. *OK.*
- Such records shall be maintained for a minimum of one (1) year and then provided to veterinary authorities as per request and/or required by law. *OK.*
- Mixing of different consignments of animals and species shall not be allowed. Must be assured.
- The animals shall be subjected to inspection at the quarantine gate. *OK.*
- Daily inspection of animals must be undertaken by the quarantine veterinary staff. *Must be assured.*
- Sanitation, prophylaxis, vaccination, treatment, and/or culling of sick animals shall be carried out as appropriate, and records maintained. *Must be assured.*
- If case of infectious/contagious disease, veterinary authorities shall be informed to take necessary measures. *Must be assured.*
- The cause of any deaths shall be investigated and appropriate sampling and testing undertaken. *Must be assured.*
- Regular cleaning, disinfection, and safe disposal of waste materials must be undertaken to meet OIE standards, and records must be maintained. *Must be assured.*
- Before the International Veterinary Certificate is issued, official veterinary authorities shall inspect animals pending export and review the quarantine management report and laboratory results. The final animal health examination should be held within 24 hours of shipment. *Must be assured.*

There appear to be no definitive international standards covering animal welfare implications of the design of quarantine stations. For this feasibility study, the following (Australian and US) recommended standards for feedlots were used as shown in Table 17.

Table 17. Compliance of quarantine design with international standards

Criterion	Recommendation	Current Mille allowance
Space per bovine	9 m2 minimum to 34 m2	4 m2
Feed trough length per bovine	38–46 cm	9.7 cm
Water trough length per bovine	15–18 cm	1.2 cm
Hay rack length per bovine	20 cm	Nil
Space per small ruminant	2.4 m2	1.5 m2
Feed trough length per small ruminant	5 cm	3.6 cm
Water trough length per small ruminant	3 cm	0.4 cm
Shade	2 m2 per bovine	0.5 m2

4.7 Need for expansion

4.7.1 Practicalities

The estimated maximum capacities of Mille, considering the comments made in 4.5.2, are presented in Table 18. An average of 75% of maximum and 10 cycles per year have been assumed.

Table 18. Estimates of maximum annual handling capacity for Mille

Species	Maximum handling capacity per year
Cattle	112,500
Camels	52,500
Small ruminants	75,000

4.7.2 Predictions

The current maximum capacity (with the very high animal density rates shown above) is 15,000 head of cattle, 10,000 small ruminants, and 7,000 camels. With 10 cycles (each of 21 days) per year, the total potential live animal export capacity is 112,500 cattle, 75,000 small ruminants, and 52,500 camels (a total of 240,000 head). The GTP 2 target for 2017/17 is over 760,000 head. Given this and the policy to channel illegal exports (estimated as more than 0.5 million cattle, 1.1 million small ruminants, and 0.1 million camels per year) into the legal export chain, the capacity of the two export quarantines (Mille and Jigjiga) must be greatly expanded.

The GTP 2, covering the 5-year period 2015 to 2020, includes the following estimates (Table 19) of the numbers of live animals exported during the plan period.

Table 19. Predicted numbers of live animal exported, by species and year—number of head

Species	Period				
	2015/16	2016/17	2017/18	2018/19	2019/20
Cattle	253,000	302,000	361,141	431,564	515,718
Camels	72,584	77,665	83,101	88,918	95,143
Shoats	364,789	383,029	421,331	463,464	509,811
Total head	690,373	762,694	865,573	983,946	1,120,672
Cattle equivalents	369,321	425,734	494,685	575,720	671,356

Table 20. Predicted earnings from live animal exports by species and year—US\$ millions

Species	Period				
	2015/16	2016/17	2017/18	2018/19	2019/20
Cattle	156.8	187	223.9	267.6	319.7
Camels	58.0	62.1	66.5	71.1	76.1
Shoats	27.4	28.7	31.6	34.8	38.2
Total	242.2	277.8	322	373.5	434.0

The current total annual capacity of the Mille and Jigjiga Quarantine Facilities, assuming 10 cycles per year and 75% capacity, is 225,000 head of cattle, 150,000 small ruminants, and 105,000 camels. Comparing these data with the estimates of Table 19 indicates that by 2019/20 bovine capacity must be doubled, camel capacity should suffice, and small ruminant capacity must be at least tripled. Bringing illegal exports into the formal export chain would demand doubling of these estimates. Predicted earnings from live animal exports are presented in Table 20.

4.7.3 Pen size and dimensions

Ideally, a pen would hold a maximum of 150 head of cattle. Using the Australian standard of 9 m² per animal, this equates to an area of 1,350 m². A feed trough length of some 50 meters is required. This would be the length of the longer side of the pen, indicating a pen of 27 x 50 meters, with the 50-meter side next to the passage for the feed truck. The length of the sides could be adjusted if a feed trough was installed at each end of the pen.

The water trough should be at least 30 meters in length for this number of cattle.

These requirements, plus those noted in 4.5.3, 4.6, and elsewhere in 4.7, should inform design of the new quarantine facilities.

4.7.4 Separation of pens

Pens should be physically separated by at least 10 meters.

4.7.5 Slope of pen floor

This should be graded to a slope of 3–5°.

4.7.6 Provision of shade

A shaded area of at least 40% of total pen area is required.

4.8 Estimated cost of expansion

Historical costs of construction are presented in Table 21.

Table 21. Historical costs of quarantine construction, by location

Facility	Year	Capacity—cattle equivalents	Total cost (US\$)	Cost per cattle equivalent (US\$)
Mille, Afar NRS, FDRE	2015	27,500*	4.5 million	163
Saudi-Emirates International Veterinary Quarantine Management Company, Somaliland	2009	75,000	5.0 million	67**

*Using the high stocking rates given in the Ministry of Agriculture, MoT, AKLDP, and AGP-LMD document.

**Adjusting for 10% inflation per annum, this would be equivalent to US\$ 118.

Within five years, the planned annual exports of live animal from Ethiopia will be in the order of 670,000 cattle equivalents. Current capacity (with spacing) is some 317,000 cattle equivalents. Therefore, an additional 353,000 cattle equivalents are needed. Taking US\$ 120 per cattle equivalent as a guide, the costs would be some US\$ 43 million.

4.9 Employees

Organizational structure: Given that the two target quarantines are nonfunctional, there is no agreed organizational structure. The draft structure (see Table 22) is under development by the MoLF.

Table 22. Preliminary estimates of staff salaries (ETB), by category, Mille Quarantine Facility

Category	Number of employees	Mean monthly salary	Annual total
General manager	1	12,150*	145,800
Professionals	10	10,125*	1,215,000
LITS	8	6,750*	648,000
Middle level	20	3,000	720,000
Laborers	90	1,000	1,080,000
Total			3,808,800

*Including a 35% hardship allowance.

If staffing levels remain unchanged at both facilities, the total annual salary cost will be in the order of ETB 7.6 million.

4.10 Service coverage assessment

Total service coverage would mean that the two quarantines can handle the total predicted numbers of live animals exported from Ethiopia to the Gulf countries. This can be a very seasonal trade with peak demand periods, especially for small ruminants to supply the festival of Eid Al

Adha, the date of which is approximately 11 days earlier each year. At these peak periods, the volume of live animal exports can more than double.

However, given the projected live animal exports shown in Table 19, it is clear that, once operational, the two export quarantine facilities would, at their current size, not be able to handle the projected numbers of live animal exports projected for 2016/17.

4.11 Operating costs of services

Summary costs) are presented in Table 23 and assume year 1 utilization of 60% of maximum capacity.

Table 23. Provisional annual costs (60% utilization year 1)

Cost item	Million ETB/yr
Salary and wages	3.81
Veterinary fee	0.53
Animal health assistant	0.45
Electricity	0.18
Fodder	27.39
Vaccine care	1.15
Total	33.51

4.12 Tariffs

The service fees currently charged in regional export quarantines are presented in Table 24. These depend, among other factors, upon species and destination. Different importing countries may have different technical specifications.

Table 24. Regional quarantine service charges per animal

Location of quarantine	Service fee charged (US\$)	
	Cattle	Small ruminants
Puntland	15	4
Berbera	18–20	4
Djibouti	25–30	6

In addition to these quarantine facility charges, livestock exporters must pay a levy to governments.

Details of tariffs in place cannot be discussed as the Ethiopian facilities are not yet functional. However, the data presented in Table 24 can guide the scale of the tariffs to be charged.

4.13 Additional comments

As neither quarantine facility is operational, none of the following is applicable at the time of report preparation. It is assumed that operations will be as required by international and regional norms and that the following outcomes will all be satisfactory or better.

- The technical quality of service delivery—good, if recommendations are followed;
- Adequacy of maintenance programs—good, if recommendations are followed;
- Capacity of staff—training and orientation will be required before operations start;
- Adequacy of facilities and equipment—should be good if all pending works are completed.

Constraints on the foregoing include:

- Sustainability of service delivery under existing tariffs—if conditions re Djibouti are resolved;
- Appropriateness of planned service delivery levels—satisfactory (workshop finding);
- Acceptability—satisfactory (workshop finding);
- Affordability—satisfactory (workshop finding);
- Other suggestions regarding technical matters—required design changes mentioned above.

4.14 Conclusions of the technical assessment

It is concluded that PPP would be a technically feasible strategy for operation of the Mille Export Quarantine Facility BUT only if the following requirements can be fully satisfied:

- Successful negotiations are conducted with the Djibouti government and the operator of Djibouti quarantine so that (i) animals can be quarantined in Ethiopia according to the requirements of the importing countries, (ii) International Veterinary Certificates and quarantine certificates can be issued by Ethiopian authorities, and (iii) after leaving Mille, animals can be held in a designated biosecure area close to Djibouti Port pending loading onto a ship;
- Importing countries agree to the above;
- Importing countries formally approve Mille as an export quarantine facility;
- All design issues are resolved;
- Adequate quantities of competitively priced feed can be sourced. This requires local production of fodder and accessing byproducts from the local sugar factory.

Similar conditions would be applied to Jigjiga Quarantine Facility.

The drivers for PPP involvement in export quarantines will be the overriding requirement of the Ethiopian authorities to expand exports and for Ethiopian certification of livestock exports (to replace the current Djibouti certification).

5. Livestock markets

5.1 Introduction

There are over 1,650 livestock markets in Ethiopia (MoT). Of prime importance are the markets in the livestock export chain, commencing with primary markets in the pastoralist areas and leading via secondary markets to feedlots where animals are conditioned and proceed on to domestic slaughter, slaughter in export abattoirs, or to export quarantines.

For generations, livestock marketing in Ethiopia has been unregulated and lacked transparency (it has been in fact quite secretive), and the retail prices of meat bore little relationship to the farmgate price of livestock. Many middlemen in the marketing chain increased marketing costs without adding value.

The demand for livestock marketing is set to increase over the coming years as total official livestock exports are predicted to exceed 1 million head by 2020 (GTP 2), an increase of over 400,00 head, and similarly meat exports will rise. Total production of red meat for domestic consumption as predicted by GTP 2 will also increase by some 35%.

Efforts will be made to reduce and eventually eliminate illegal livestock trading, which, again, will increase flow through livestock markets.

The livestock markets in the pastoral areas supply some 95% of export livestock and therefore serve as the vital first link in the livestock export chain (of live animals and meat). It is in the pastoral livestock markets that animals enter the formal export chain and receive health checks and certificates, and identification through uniquely numbered official ear tags. These are entered into the MoLF livestock identification database.

For this reason, livestock markets in the pastoral areas will be the prime target for PPP.

5.1.1 Critical technical issues for livestock markets

There is a long history of study and adjustment of livestock markets and marketing systems in Ethiopia. Recent experience clearly illustrates that great care must be taken when changes are made.

Through ACDI/VOCA (Agricultural Cooperative Development International/Volunteers in Overseas Cooperative Assistance), USAID funded construction of 25 new livestock markets for use by pastoralists in Afar, Somali, and Oromia NRSs. These markets included water and feed troughs, pens to enable separation of different species of livestock, weigh scales, crushes to allow clinical examinations, bulletin boards, and public toilets.

These markets were evaluated in 2010. Six were nonfunctional due to conflict issues. Only some 20% of facilities were in use. Due to a lack of maintenance, the general condition was poor, with some facilities being unusable.

Livestock Market Management Boards had been established in two regions. Unfortunately, although standards for revenue collection and use (e.g., 30% of revenue to be used for maintenance) had been developed, these were not implemented.

It appeared that local breeders and traders preferred to use very simple “bush” markets where costs were lower, access was easier, etc.

The ACDI/VOCA initiative was “before its time.” With the new Livestock Market Proclamation (see below), introduction of LITS, and development of a market information system, well-constructed markets with all required facilities will be required. These requirements will be enforced by the new State Ministry of Livestock Marketing and Infrastructure.

5.1.2 Stakeholder identification

The following stakeholders were identified:

- ***The MoLF***

The Livestock Marketing State Ministry of the MoLF is responsible for implementation of the new Livestock Marketing Proclamation and therefore has a critical role to play in the establishment, operation, and regulation of these markets.

The MoLF is also responsible for implementation of LITS through the LITS Directorate of the State Ministry of Veterinary Services and Feed Quality Control.

- ***Municipal authorities***

These are the current owners and operators of livestock markets. However, their involvement is negligible: the major official involvement in markets is by the tax authorities. Little or no maintenance is carried out, and there appear to be no municipal employees on duty at markets.

- ***The Ministry of Environment, Forest and Climate Change***

This ministry is concerned with the levels of environmental pollution resulting from careless disposal of carcasses and pollution of the environment by dust, animal dung, etc.

- ***Regional Livestock/Agricultural Bureaus (RABs)***

As regional representatives of the MoLF, the RABs are responsible for ensuring efficient livestock marketing, implementing of the Livestock Marketing Proclamation, implementing of LITS (control of this system will be a federal responsibility), and ensuring effective standards of animal disease control and surveillance. Veterinary inspectors and LITS staff must attend all trading days at markets (usually one or two nominated days per week).

- ***Market players***

These include breeders, cooperatives, feedlot operators, exporters, abattoirs, butchers, and consumers. All will be interested in fair, competitive pricing.

- ***Municipality inhabitants***

Inhabitants who live close to livestock markets can be affected by dust, smells, noise, etc. emanating from the market. These should be minimized.

5.2 Policy and regulatory issues

Recently, the MoT and the MoLF developed a new Live Animals Marketing Directive (819/2014), which is designed to bring transparency and efficiency to the marketing system. The new marketing rules will eliminate middlemen (brokers, collectors, etc.) and bush markets and similar unregulated markets.

The new proclamation has the following provisions:

- Livestock markets are categorized into two types: Level 1 and Level 2. At both, animal prices shall be determined based on weight, breed, sex, age, and physical state. Prices shall be agreed through negotiation or auction;
- Level 1 markets: These are for dealing among breeders, or breeders as sellers, and cooperatives, feedlot operators, exporters, abattoirs, butchers, or consumers as buyers. All animals traded through Level 1 markets shall be checked by a veterinarian and identified with an official numbered ear tag;
- Level 2 markets are for *fattened animals only* and for (i) breeders, feedlot operators, and cooperatives as sellers and (ii) exporters, abattoirs, butchers, and consumers and buyers. All animals traded through secondary markets must be identified (by ear tag), and have an official health certificate and an ownership document.

Veterinary inspectors should be present on all marketing days of both levels of market to check for signs of important infectious diseases. Market inspections are an important component of the NADSS.

These provisions have implications for the design and management of livestock markets as follows:

- Must be regulated by the Livestock Marketing State Ministry of the MoLF;
- Require races and crush pens for examination and identification of animals (Level 1) or for examination and recording of identification numbers (Level 2);
- Require races leading to weigh scales;
- Require auction facility;
- Must participate in the Livestock Market Information System (LMIS);
- Should participate in the Livestock Information Network and Knowledge System (LINKS) of Texas A&M University;
- Require livestock inspection points;
- Must participate in LITS;
- Must be fenced, have loading and unloading ramps, and have separate pens (with shade areas) in which to hold animals of different species;
- Must have facilities for tax officials, LITS, LMIS, and animal health officers;
- Must have separate compartments (pens) for each species.

In order to attract market players, livestock market operators should encourage establishment of veterinary clinics/drug stores/livestock requisite retailers (of livestock-related equipment, mineral/vitamin supplements, etc.), food and drink outlets, and so on. These should all be owned and operated by licensed private-sector players.

5.3 Current condition of assets

The livestock markets visited, Haro Beke (Yabello), Dera, and Rob Gebya (Adama), were active. Structural details are presented in Table 25 and required improvements listed in Table 26.

Table 25. Characteristics of livestock markets visited

Market	Dimensions	Market days per week	Facilities
Haro Beke	100 m x 100 m	1	Three compartments, one per species. Shade areas. Built by ACDI/VOCA.
Dera	100 m x 110 m	1	One compartment only.
Rob Gebya	150 m x 150 m	2	Two compartments.

Table 26. Livestock markets visited—improvements required

Market	Condition	Improvements needed	Maintenance
Haro Beke	Fair	Perimeter.	Savings account to meet maintenance expenses was established.
Dera	Poor	Perimeter. Required facilities absent.	ETB 8,000 per year allocated. But result?
Rob Gebya	Poor	Perimeter. Required facilities absent.	No provision.

Details of capacity and charges are presented in Table 27.

Table 27. Capacity and charges, by market

Market	Capacity	Mean sales per market day	Fees charged/head
Haro Beke	3,000 shoats 2,000 cattle	2,000–3,500 shoats 1,600–2,400 cattle 20–50 donkeys	Shoats: ETB 7 Cattle: ETB 25 Donkeys: ETB 25
Dera	1,000 shoats 1,000 cattle	900–1,500 shoats 800–1,400 cattle	Shoats: ETB 5 Cattle: ETB 15 Donkeys: 15
Rob Gebya	3,000 shoats 2,000 cattle	2,000–3,500 shoats 1,600–2,400 cattle	
20–50 donkeys	Shoats: ETB 8 Cattle: ETB 20 Donkeys: ETB 12		

5.4 Present-day value

The capital cost of establishing a livestock market that is fully compliant with current legislation and practices is in the order of US\$ 325,000 (the ACDI/VOCA cost with the addition of an auction facility was US\$ 500,000). This includes staff and other project costs (say, 75%), giving a net cost of some US\$ 162,500. Taking inflation into account, this would be some US\$ 350,000 today.

Given the poor condition of the installed facilities, it is doubtful that present-day value would exceed 10% of the original cost, say US\$ 35,000 maximum.

5.5 Estimated remaining life

Assets have depreciated markedly over the past 12 years, and many are now unusable. The estimated remaining life is 0 years. Upgrading is required, or else new market facilities must be constructed and maintained.

5.6 Condition and need for rehabilitation

Infrastructure at all three livestock markets is in a very poor, unusable condition and cannot satisfy the needs of the Livestock Proclamation, the Livestock Identification and Traceability System (LITS), or the Livestock Market Information System (LMIS). Total refurbishment and equipment is required, or new facilities should be constructed.

5.7 Need for expansion

The estimates presented in GTP 2 (doubling of numbers of live animal exports, increased export of meat, increased production of red meat for domestic consumption) and the intention of Government to increase the numbers of animals traded through formal (rather than illegal) channels means that market throughput must increase substantially. Probably the most cost-effective way to achieve this would be to increase the number of trading days per market. The number is currently one or two days per week.

5.8 Costs of rehabilitation

Exact costs will vary from market to market. Those constructed by ACDI/VOCA will require repair/ replacement of some equipment. Examples are given in Table 28.

Table 28. Indicative costs of rehabilitating market facilities

Item	Approximate cost (US\$)	Number of units	Total cost (US\$)
Cattle weigh scale—electronic	US\$ 2,500	1	2,500
Cattle crush	US\$ 1,000 (locally made)	3	3,000
Cattle race	US\$ 50 per meter	100	5,000
Auction ring	US\$ 1,500 (built on site)	1	1,500
Perimeter and pen fencing, wooden posts, high tensile wire	10 per meter length, .01 per meter per year for maintenance	800	8,000
Shade areas	10 per square meter	2,000 m2	20,000
Public toilet	1,000	4	4,000
Pen for sick animals	1,000 with shade	1	1,000
Gates	150	10	1,500
Contractors' fees	50,000	1	50,000
Total			99,000*

*An estimate of ETB 1 million is used in the financial model.

5.9 Costs of expansion

There will be minimal capital costs if expansion is based upon increasing the trading days per market.

5.10 Compliance and standards

The following general requirements (Table 29) for livestock markets incorporate OIE standards for animal welfare and best practices as recommended by the Guide to Best Practice by the European Association of Livestock Markets. Ethiopian standards are summarized in Table 30.

Table 29. General welfare standards for livestock markets

Measure	Compliance
Sufficient space for animals depending on size, species, etc.	Currently space is sufficient (10 m2 per bovine).
Separate enclosures to segregate different species and sizes of livestock	In some markets. Upgrade those not in compliance.
Water to be available all the time	In some markets. Upgrade those not in compliance.
Shade to be provided	In some markets. Upgrade those not in compliance.
Facilities for physical examination of animals	In some markets. Upgrade those not in compliance.
Suitable loading and unloading ramps	In some markets. Upgrade those not in compliance.
Trained animal handlers	None. Upgrade.
Veterinary care available	Minimal. Upgrade those not in compliance.
Pens for isolation of sick or injured animals	No. Upgrade.
Facilities for inspection of animals	No. Upgrade.

Table 30. Specific standards for Level 1* Ethiopian livestock markets

Measure	Compliance
Weigh scale	In poor condition in ACDI/VOCA-built markets. Need to repair these as required and install in remaining markets.
Auction ring or similar	None. Need to install in all markets, both first and second levels.
Crush to enable ear tagging	Ensure that this has an entrance race.
Office facilities for LITS and LMIS staff	Construct in all facilities.

*To comply with additional requirements of Proclamation 819/2014, LITS, and LINKS.

5.11 Employees

Currently, livestock markets do not have permanent employees. Youth groups and casual laborers assist with moving, loading, and unloading livestock.

A fully operational market, with facilities described above and trading on, say, four days per week would require the staff establishment shown in Table 31.

Table 31. Probable monthly staffing costs

Item	Number	Probable monthly cost (ETB)
Full-time manager	1	8,000
Full-time record and store clerk	1	5,000
Veterinary inspector fees	4 days	2,000
Records and store clerk, only on 20 market days per month	1	150 per day, totals 3,000.
Part-time contracted and trained employees on market days—from youth group	10	20 market days at ETB 200 per man day totals 40,000.
Maintenance—contracted part-time local technician	1	200 per hour, say 10 hours per month, totals 2,000.
Total		60,000

5.12 Service coverage

The current coverage is difficult to estimate given the preference for “bush” markets. It is probably less than 50%.

However, once the Livestock Marketing Proclamation and LITS are fully implemented and the stakeholders become familiar with requirements, coverage for export animals (live animal exports, and for the export abattoirs) will be 100% as unidentified animals will not be accepted into export marketing chains.

5.13 Operational costs

The costs of operating LITS and LMIS will be borne by Government. Markets may have to pay a modest fee for the services of a veterinary inspector.

Estimated operating costs of service for an improved market are presented in Table 32.

Table 32. Estimated annual costs of a livestock market (based upon the three facilities visited)

Cost item	Estimated annual cost (ETB)
Labor costs including Veterinary Inspector	720,000
Staff administration costs	36,000
Overhead expenses—500 per session	52,000
Vehicles—for supervision	300,000
Maintenance—25% of revenue (ACDI/VOCA)	475,000
Chemicals, disinfectants, etc.—ETB 200 per session	20,800
Staff training—2 per year at ETB 70,000 each	140,000
Service contracts	0
Total	1,743,800

The mean number of animals transacted per market per year is reported as 206,000, giving a cost per animal marketed of ETB 8.5.

With the actual revenue collected (ETB 1.9 million), the revenue per animal marketed is ETB 9.2 per head. If all expected revenue (ETB 2.7 million) is collected, the revenue per animal would be ETB 13.1 per head.

5.14 Tariffs

Tariffs are presented, by market, in Table 33.

Table 33. Tariffs at the three facilities visited

Market	Capacity	Mean sales per market day	Fees charged/head
Haro Beke	3,000 shoats 2,000 cattle	2,000—3,500 shoats 1,600—2,400 cattle 20–50 donkeys	Shoats: ETB 7 Cattle: ETB 25 Donkeys: ETB 25
Dera	1,000 shoats 1,000 cattle	900–1,500 shoats 800–1,400 cattle	Shoats: ETB 5 Cattle: ETB 15 Donkeys: ETB 15
Rob Gebya	3,000 shoats 2,000 cattle	2,000—3,500 shoats 1,600—2,400 cattle 20–50 donkeys	Shoats: ETB 8 Cattle: ETB 20 Donkeys: ETB 12

Annual revenues, by market, are presented in Table 34. It should be noted that the recorded actual revenues are far lower than the calculated amount (from average numbers sold per week).

Table 34. Annual revenues from the three facilities visited

Facility name	Actual annual revenues—mean for Ethiopian Calendar years 2007 and 2008 (rounded)
Haro Beke	480,000
Dera	1,478,000
Rob Gebya	3,722,000
Mean	1,897,000

5.15 Additional comments

Table 35 summarizes additional comments made by Peter Moorhouse.

Table 35. Other comments

Measure	Comments
Technical quality of service provided	This is by untrained temporary staff and therefore poor.
Adequacy of maintenance programs	Nil.
Capacity of staff	Very poor.
Adequacy of facilities and equipment	Poor.
Constraints	Financial.
Sustainability of services under existing tariffs	Sustainable due to low costs. If all fees were collected and quality, etc. improved, the markets could be financially sustainable.
Appropriateness of service delivery levels	Inadequate.
Acceptability	OK, but users have the option of bush markets.
Affordability	OK, but users have the option of bush markets.

5.16 Conclusions of the technical assessment

With the introduction of the Livestock Marketing Proclamation, LITS, and LMIS, there is the compulsion for exporters to use formal livestock markets. As illegal marketing is reduced and the increased production envisaged by GTP 2 takes effect, the throughput of markets will increase (maybe double or more). This will mean more effective use of market resources and therefore increased revenues and profits for the private partner.

Eventually, LITS will be progressively applied to other classes of livestock. PPP could then expand to markets in additional areas, such as high-potential livestock areas in the highlands.

6. Background to the Sanitary Mandate Contracting (SMC) scheme

6.1 General

Federal veterinary services are responsible for control of TADs and cover the associated costs of vaccines and vaccine transport and storage.

Each year, many million doses of vaccine (Table 36) are supplied to field offices. In line with the Veterinary Rationalisation Road Map and general Government policy regarding integration of the private sector, a pilot SMC scheme was implemented by the Ethiopian Veterinary Association (EVA) in 2015/2016.

Table 36. Number of doses of TAD vaccines distributed, by year

Ethiopian Calendar year (Gregorian year)	Total number of doses supplied free of charge to regions
2006 (2013–14)	66 million
2007 (2014–15)	101 million
2008 (2015–16)	83 million

This pilot was to support implementation of the European Union (EU)-funded peste des petits ruminants (PPR) project, which is a component of a regional program to control and then eradicate PPR. Six *woredas*, three in Somali NRS and three in Borena Zone, were selected and private veterinary groups were recruited to vaccinate small ruminants on behalf of the regional animal health services. Two vaccines were administered—PPR and sheep and goat pox.

SMC can be used to deliver several public-good functions in addition to vaccination, for example to undertake market inspections, meat inspections, disease surveillance, and animal testing (e.g., serology for brucellosis and other diseases, and tuberculin testing).

As this was a pilot, and the first real SMC in Ethiopia, assistance in the form of training and issuance of veterinary kits for field use was given.

This report aims to assess the impact of the SMC scheme and to estimate any financial and technical benefits that accrued.

Disease control of TADs is a public good, and the use of SMC for TAD vaccinations has several prerequisites:

- A national disease control/preventive policy for the selected disease. It is clearly important that the SMC work towards a definite policy in terms of type of vaccine, species, number, age group, etc. of animals, location, time of year, etc.
- Availability of qualified private contractors;
- Available funds;
- Strategy to redeploy staff who previously participated in vaccination campaigns to improving delivery of other public-good functions such as disease surveillance, veterinary public health, regulation, etc.;

- Promulgation of the draft “Proclamation for Establishment of an Ethiopian Statutory Veterinary Body;”
- Ratification of the Road Map for Rationalising Delivery of Veterinary Services.

Although a true PPP arrangement, the SMC scheme differs in character from arrangements for the three facilities included in this study. SMC is a service contract in which the public sector pays the private partner an agreed rate per unit (in this case per animal vaccinated), whereas the facility PPP arrangements involve payments from beneficiaries to the private partner, with possibly annual payments from the private to the public partners.

6.2 Policy and regulatory issues

The enabling policy documents are the Road Map for Rationalising Delivery of Veterinary Services, the LMP (as reflected in GTP 2 targets for animal vaccinations), and the PPP policy document prepared by the MoFEC.

The MoFEC has also developed the new Public-Private Partnership Proclamation, which provides the essential legal underpinning,

6.3 Technical assessment

6.3.1 Stakeholder identification

The following stakeholders were identified:

- ***The MoLF***

The Veterinary Services and Feed State Directorate of the MoLF is responsible for control and prevention of animal diseases and thus has a real interest in the design and implementation of vaccination campaigns. Pursuing efficiency and the delivery of other veterinary public-good functions are priorities. Hence the interest in SMC by MoLF, as it would ensure a high standard of vaccination plus enhanced delivery of other public-good services.

The role of the public sector in SMC vaccination schemes is to monitor the performance of the contractor (serological testing, field visits to vaccination teams, field visits (focus group discussions) with target livestock owners, etc.) and, if satisfied, to approve the contractors' invoices.

- ***Regional bureaus of livestock/agriculture (RABs)***

As regional representatives of the MoLF, the RABs are responsible for ensuring efficient disease control. For TADs, this means implementing the national strategies developed in cooperation with the Federal Veterinary Service. The *woreda*-level veterinary services would liaise with SMC contractors and assist and monitor as required on behalf of regional and federal authorities.

- ***Private veterinary practitioners***

These are the private partners who undertake vaccinations (and other public goods) under contract to the public sector. If efficient, they will make a profit from the SMC. Ideally, SMC vaccinations would be for a long-term disease control policy (such as that for foot and mouth disease (FMD)) so that the private partner has an assured income stream and uses some of the proceeds to strengthen his veterinary practice/network, diversify services (for example, by expanding into clinical work), and invest in new equipment (e.g., an improved cold chain, diagnostic equipment, and so on).

Thus, SMC will strengthen and capacitate the private sector and improve delivery of animal health services.

- **Ethiopian Veterinary Association (EVA)**

This represents private veterinarians and aims to improve professional standards, increase capacity, share information, and so on. As SMC expands, the EVA would represent practitioners in negotiations with the public sector.

The EVA was awarded a grant by the EU-funded Livestock Value Chain – Public-Private Partnership project (LVC-PPD) project to undertake this pilot SMC.

- **Livestock producers**

These stakeholders have a great interest in protecting the health of their livestock: in Ethiopia, diseases are a serious constraint to livestock production, productivity, and profitability.

- **Livestock exporters**

Live animal exporters require animals that meet the requirements of importing countries. These often involve specified vaccinations, animals originating from disease-free populations or populations that are regularly vaccinated, or animals from a country with high levels of disease control.

- **The National Animal Health Diagnostic and Investigation Centre (NAHDIC).**

This is the principal veterinary investigation laboratory for Ethiopia and the referral and reference center for the country. NAHDIC conducted all serology for the pilot SMC and is ideally suited to continuing this task (for a fee) for future SMC and public sector-implemented vaccination programs.

6.4 Organization of the SMC

The SMC scheme was undertaken in the following *woredas* shown in Table 37.

Table 37. Details of *woredas* included in the SMC scheme

Region	<i>Woreda</i>	Number of sheep and goats
Oromiya—Borena Zone	Yabello	318,000
	Arero	320,000
	Teltele	323,000
Somali Region	Awbare	1,173,336
	Jigjiga	948,735
	Kebribeyah	1,369,551
Total		4,409,736

6.5 Monitoring the effectiveness of the SMC vaccination program

As this was a pilot SMC, great care was taken to ensure that results could be accurately evaluated. To aid this process, sero-surveillance was carried out in the target populations in advance of vaccination. This was to estimate the proportion of animals with significant titers of PPR antibodies. Sero-monitoring was carried in the same populations after vaccination. This was to estimate sero-conversion rates.

The serological findings are presented in Figure 6 and show a laudable result. The overall pre-vaccination sero-prevalence rate was 55%, and SMC vaccination had increased it to a very impressive 92%. This finding indicates that the vaccinated kebele populations, with the exception of animals in Denebe kebele, were very well protected against PPR and presumably also sheep and goat pox.

Results of this magnitude are not easy to achieve under field conditions.

Figure 6. Summary results of sero-surveillance and sero-monitoring

Somali region - Fafan Zone					
District	Kebele	Pre-vaccination		Post-Vaccination	
		No of samples	% positives	No Samples	% positives
Jigjiga	Lemedega	100	59	100	94
	Beladiha	100	29	100	92
	Hart alibele*	-	-	100	83
Kebribeyah	Gilo	100	69	100	96
	Labashak	100	44	100	93
	Deneba*	-	-	72	43
Aw-Barre	Sheck Ali	100	38	100	73
	Gobyer	100	22	103	91.3
	Hasadin*	-	-	100	94
Oromia region - Borena Zone					
Yabello	Areri	100	58	100	100
	Dicalle	100	65	100	97
	Aroweya*	-	-	100	99
Arero	Bobela	100	96	100	100
	Haro Dimtu	100	66	100	100
	Meta Gefersa*	-	-	100	100
Teltele	Bule Korma	100	55	100	99
	Fulo Tole	100	62	100	83
	Bila*	-	-	100	97
Total		1200	55	1775	92

*Not sampled in pre-vaccination

Findings of the NADSS have demonstrated the absence of clinical disease in the vaccinated populations, whereas disease did occur in other populations in these regions. This is a very meaningful result as the acid test of a vaccination program is whether it protects against the target diseases. See Figure 7 for a photo of vaccinations underway during the SMC vaccination program.

Figure 7. Vaccinations underway



6.6 Conclusions of the technical assessment

Given the excellent sero-conversion rates achieved and the absence of any clinical cases of the target diseases in the vaccinated populations, it must be concluded that the SMC-implemented vaccination program was extremely well carried out and that the cold chain, vaccination handling, and other procedures must have been of a very high standard to achieve such results.

This one-off pilot SMC vaccination project was also very successful in financial terms.

If SMC is to be implemented on a large scale by veterinary services, then:

- Contractors must be selected through competitive open tender;
- It must be a component part of a long-term disease control policy so that longer-term (several year) contracts can be awarded. One good candidate for this is FMD control, for which long-term (every four months) vaccinations are required;
- SMC costs should be borne by the federal level. *Woreda* budgets could not absorb SMC contracting costs;
- Public-sector staff who were previously engaged in work duties should be redeployed to other public-good activities or to the private sector;
- Strict monitoring by the public sector will be essential, through field checks, serology, and disease surveillance to monitor post-vaccination disease incidence;
- SMC units will be required at regional level to assist, advise, and guide *woreda* veterinary services;

- There must be long-term benefits to the delivery of private-good animal health services. Ideally, private contractors would invest some of the SMC profits into developing their businesses by improving quality and range of veterinary drugs, building capacity, expanding veterinary clinical services, providing advisory services to clients, and so on.

6.7 Benefits of using SMC for delivery of public-good TAD vaccinations

The participation of private-sector veterinary services to undertake vaccinations that are a component of long-term disease control programs would assure the private contractors of a predictable income stream and enable the public sector to redeploy and retrain staff who were previously engaged in these vaccinations, or to encourage staff to move to the private sector.

This approach has the potential to produce a cascade of benefits, including:

- Improved delivery of other (rather neglected) public-good services to which staff are deployed such as animal disease surveillance, regulation, extension, and veterinary public health;
- Giving the private-sector entrepreneurs the confidence to invest in equipment, transport, staff training, etc. The capacity of SMC for delivery of TAD vaccines would be improved and the range of services offered expanded. These services could include, in selected higher-potential areas, delivery of animal health clinical services. In turn, this would enable more redeployment of public-sector workers and further improve delivery of other public-good services.

The final result would be better capacitated private and public services and improved delivery of a wider range of services. “VfM” would be generated from the SMC contract costs.

PART B: Assessment of service delivery options

7. Assessment of service delivery options

7.1 Definition of PPP

The World Bank's Public-Private-Partnership in Infrastructure Resource Center defines a PPP as:

A long-term contract between a private party and a government entity, for providing a public asset or service, in which the private party bears significant risk and management responsibility, and remuneration is linked to performance.

The potential PPP options considered were:

Corporatization: A municipality/ministry forms a separate legal corporate entity to manage municipal service provision. The municipality/ministry continues to own the enterprise, but it operates with more of the freedom and flexibility generally associated with a private-sector business.

Service Contract: A municipality/ministry pays a fee to a private firm to provide specific operational services such as operating facilities, vaccination, etc. Typical duration: 1–3 years.

Management Contract: A municipality pays a fee to a private firm to assume overall responsibility for operation and maintenance of a service delivery system, with the freedom to make day-to-day management decisions. Typical duration: 5 years.

Lease Contract: A private firm rents facilities from a municipality/ministry and assumes responsibility for operation and maintenance. The lessee finances working capital and replacement of capital components with limited economic life. The lessee does not finance fixed assets, which remain the responsibility of the municipality/ministry. Typical duration: 10 years.

Concession: A private firm handles operations and maintenance and finances investments (fixed assets) in addition to working capital. Assets can be owned by the firm or the municipality/ministry for the period of the concession and, when owned by the firms, are transferred back to the municipality/ministry at the end of this period. The project is designed to generate sufficient revenues to cover the private firm's investment and operating costs, plus an acceptable rate of return. The municipality/ministry exercises a regulatory and oversight role and receives a concession fee for this arrangement, which typically focuses on operating and financing the expansion of existing system components. Typical duration: 15+ years.

The option of municipal debt by way of issuance of bonds to the public has not been considered as financial markets in Ethiopia are not yet sufficiently matured.

7.2 Most commonly used PPP options

The most commonly used PPP options are:

- **BOT: Build, operate, and transfer**
This is a form of concession/PPP, with an emphasis on construction of new, stand-alone systems. The municipality/ministry may or may not receive a fee or share of profits. Some of

the BOT contracts are also supported by way of grant (viability gap funding) to enhance the feasibility of the project. Typical duration of the concession is more than 15 years.

- OMT: Operate, maintain, and transfer
If the asset is already constructed and requires minimal refurbishment, the OMT concession option may be preferred. The Government will receive an annual share of revenue or pre-decided royalty as determined by the bidding process. Typical duration is 10 to 15 years.
- BOO: Build, own, and operate
This type of concession is used when the asset is akin to a production house or a factory such as a solid waste-based power plant, photo-voltaic solar power production, etc.
- BOOT: Build, own, operate, and transfer
This concession is similar to BOO, with the difference that the facility is transferred to Government at the end of concession. This is not so common because the facility is used for its entire useful life.
- OMO: Operate, maintain, and own
- Annuity: If the project revenue is insufficient or revenue risk is too high to pass on to the private partner, Government undertakes to make an annual (or other interval) payment (the annuity payment) to the investor to enable recovery of the investment.

7.3 Option selection rationale

Service delivery options have been selected for each of the four facilities considering the following criteria:

- The ability of the municipality/ministry to obtain the capital required for investment given its current obligations and anticipated sources of revenues;
- The ability of potential private-sector participants to provide the required capital, effect service delivery within defined standards to all eligible recipients, and receive a reasonable return on their investment, within the range of potential tariff(s) that may be levied;
- The effect on the technical quality of the service delivery;
- The likely response from all stakeholders;
- The service delivery efficiency of each alternative;
- Risk sharing between public and private sectors;
- Cost recovery efficiency.

7.4 Options for abattoirs

Many of the municipal abattoirs in Ethiopia were built through the Second Livestock Development Project over forty years ago. Most towns are served by these very old facilities run by local municipalities. The physical, sanitary, and operational condition of these abattoirs is very poor. Since their construction, the towns and cities have expanded rapidly, and many are now sited in the middle of densely populated areas. Effluent and waste disposal is generally also very poor.

As referenced in the technical assessment, there is thus an urgent need to construct new abattoirs away from residential zones, ones that would adhere to structural requirements, hygiene management practices, and environmental compliance.

7.4.1 Assessment of future service delivery alternatives

Municipal authorities are unable to provide funds for upgrading existing abattoirs or for constructing new facilities.

Butchers are the major clients of abattoirs and would make ideal private partners for abattoir PPP arrangements. If private companies take over an abattoir on a PPP basis, there is a danger that they would circumvent the butchers and sell meat and offal directly to consumers. This would put many butchers out of business: not a good outcome.

Butchers' groups have expressed interest in taking over abattoirs and indeed have already achieved this in Jima and Harar. The preferred option would be to organize a restricted tender for butchers' groups (or youth groups, a priority for Government). Only if this fails would a tender be offered to attract private companies/individuals.

The MoLF and MUDH policy for new abattoirs is described in section 3. It is clear from Table 5 that Categories B and C will be in demand. Category D facilities are slaughter slabs and not, as explained, suitable for PPP.

Financial models have been developed for abattoir Categories B and C.

The pro forma financial model (Annex I) indicates that a typical investment for a new abattoir of Category B would be around ETB 12 million. Considering around 70% of the requirement would be met through debt availed from commercial banks, the equity investment would be less than ETB 4 million. As per the field data, each city has around 30 to 50 butchers on average. Hence, the investment requirement per butcher is in the range of ETB 80,000 to 150,000, which appears reasonable. Category C abattoirs require a capital investment of around ETB 8 million. Investment by each of the butchers would be in the range of ETB 50,000 to 100,000, depending on the number of butchers willing to invest.

For investors to meet conditions for a loan they must own the abattoir (as a surety), a factor that would additionally protect the investors from premature closure of the CA.

Generally, the concession period of any production facility is for the entire life of the facility. Hence, transfer of ownership at the end of the concession is irrelevant. Suitable clauses in the CA could be structured to enable Government to confiscate the facility in case of breach of specified conditions by the investor. Hence, the PPP model most suitable for a new abattoir would be build, own, and operate (BOO).

Some stakeholders believe a BOOT arrangement, under which the abattoir would be transferred back to the municipality at the end of the CA is best.

For operational abattoirs that are in fairly good condition and not in residential areas, corporatization could be an option. However, it was noted that corporatization is a complex, time-consuming bureaucratic process and may not be suitable for a small-sized investment such as abattoirs. Hence, sale to a private entrepreneur by an OMT PPP arrangement would be a good alternative. This was well supported by stakeholders in the consultative workshop. Leasing the existing facility would fetch only the rental income to Government, whereas the OMT structure could attract royalty payments from the private partner to Government. OMT would be preferred over a simple lease contract. Butchers or the private investor would be required to invest working capital (i.e., not capital for construction) only for the OMT option.

While OMT is more suitable for "offer to butchers'/youth groups," as they would not be required to provide upfront capital investment, privatization (selling to a private investor) appears

more suitable if offered to any other private-sector investor. OMT would fetch a consistent and incremental revenue stream to Government, whereas privatization would deliver a single large payment to Government. A summary of PPP options for abattoirs is given in Table 38.

Table 38. A summary of PPP options for abattoirs

For proposed new abattoirs	BOO	The MoLF will decide.
	BOOT	Recommended option is BOO with suitable provision for renewal of concession period in the agreement.
For operational abattoirs in good condition	OMT	More suitable for butchers and youth groups.
	Privatization (sell-off)	Recommended for private investor. However, the MoLF may also consider OMT.

The following stages of procurement under BOO/BOOT/OMT models are suggested:

Stage 1: Make an offer to butchers in the town/city to invest in the new abattoir under BOO/BOOT model or take over a good, existing abattoir under the OMT model, as the case may be. The Federal Government could facilitate by providing a fronting role and part of the capital for new abattoirs. Funding from IFC (International Finance Corporation, a division of World Bank) may also be explored. Butchers would have a vested interest in running the facility as this would ensure that their livelihoods are not endangered because of a private player's possible retailing of meat, offal, and fat. Government would be required to provide training to the butchers in abattoir operation and essential business management skills.

As per the policy of the Ethiopian Government, the offer may also be made to the youth groups in the city. However, training needs for youth groups would be much more demanding compared to that for butchers. The youth may also not be able to secure the required capital. However, the large youth employment fund set up by Government could possibly assist here.

Government's fronting role would thus include providing (i) initial leadership in formation of butchers'/youth groups' business structure and (ii) requisite training.

In the cities where the butchers' and/or youth groups are unable to undertake the abattoir project, it may be offered to private investors (Stage 2).

Stage 2: Private-sector abattoirs may be set up under a BOO/BOOT model, with the size of the royalty payments as a bid parameter. This is easier to implement than evaluation of tenders is. Customers would benefit if the private investor also ventures into the retail chain. However, as mentioned above, this could jeopardize the livelihoods of butchers.

Operational abattoirs may be privatized (sold off) if butchers'/youth groups are unable to take over the operations on an OMT basis.

The pro forma financial model in Annex 1 of this report indicates that abattoirs can be profitable and self-sustainable businesses. As shown in the financial model, the investment could be recovered with 16% IRR in 10 years.

It is important to note that illegal slaughter will threaten the financial performance of abattoirs, and hence, creation of public awareness and enforcement of legislation by the public sector is required.

7.5 Options for quarantine facilities

In Ethiopia, there are two government-owned international quarantine facilities: Mille and Jigjiga. Mille is located in Afar Region to facilitate the export of live animals via Djibouti Port, and Jigjiga is located in Somali Region to facilitate the export of live animals via Berbera in Somaliland. The total area of the Mille and Jigjiga Quarantine Facilities is 600 hectares each, with the current facilities occupying only 48 hectares in each.

7.5.1 Assessment of future service delivery alternatives

The management of quarantines is complicated and requires quick decisions and very serious follow-up. The capacity of the existing facilities, given the intention of Government to export over 1 million head, is also small and expanding the construction in the 600 ha of land will be required. The Government is unable to provide funds for building additional quarantine facilities. As neither quarantine facility is operational, corporatization as a service delivery alternative is ruled out.

The simple lease of land would not yield adequate returns to Government and is not favored by the stakeholders. The potential private investor would not only be required to operate and maintain the facility as in the case of a simple management contract but also must develop the business and increase the volume of export-worthy animals. Hence, PPP options like BOO, BOOT, and OMT are considered appropriate.

Since most of the 600-ha areas at Mille and Jigjiga are vacant, a suitable PPP arrangement for constructing and operating new quarantines would be BOO or BOOT. As stated in the case of abattoirs, the quarantine facilities also would be used by the investor for their entire lives. Hence, transferring back to Government at the end of concession may be irrelevant. The BOOT option would reserve the rights of Government over the facility at the end of the concession period. It may be noted that both ownership-vesting and transfer at the end have financial implications and would have an impact on the bid price offered by the bidder. In the case of the BOO option, only the land would be transferred back to Government. In the case of the BOOT option, the constructed facility would also be transferred to Government at the end of the concession period. These parameters would be factored in by the investor in its financial bid.

A private sector investor may or may not continue with the existing design of the current facility. If a private investor is willing to operate the constructed facility without significant alterations, the OMT option would be the most suitable.

It is better to select the PPP option that gives maximum financial benefits with minimal risk to Government. Hence, the most suitable option for quarantine facilities on the vacant land would be BOO.

Two key points to consider for quarantine facility development are:

- As stated in 4.14, an agreement with the Djibouti Government for acceptance of livestock quarantined in Mille is of critical importance;
- Given the large vacant areas of land at Mille and Jigjiga, it would be possible to divide this area into three to four portions for different investors, considering the economic size of the parcels of the land. If the entire vacant area is offered to a single investor, it would potentially bear the risk of under-use due to the developer's limitations in attracting business, risk appetite, and financing capacity. Also, a large-scale single concession brings a risk of monopoly-related issues.

Thus, the PPP option for the existing facilities is OMT, and BOO/BOOT for the new facilities.

7.5.2 Suggestions regarding selection of private investors

- Operators of quarantine facilities in neighboring countries with port linkages would bring distinct advantages to Mille and Jigjiga. In order to rapidly operationalize the quarantine facilities in Ethiopia, a limited tender may be floated initially, specifying the eligibility criteria as entities operating a quarantine facility in a neighboring country. The Livestock Exporters' Association of Ethiopia or even individual Ethiopian livestock exporters (or a consortium) could also participate in such a limited tender offer if they have the suitable qualification criteria.
- Mille Quarantine Facility may be declared and developed as a quarantine zone (QZ). As referenced above, available land may be mapped out based on economic parcel-sized plots; three to four different facilities may be proposed. Government may consider attracting investors by provision of tax incentives and allotting a nearby piece of land for fodder production. Government may also consider building/improving transportation facilities.
- Allotment of facilities could be for:
 - Captive facilities: The exporters would develop a quarantine facility for their own exports only. These would not provide service to other exporters.
 - Service provider: Investors would set up facilities that provide quarantine services to the exporters and would charge a fee for the service.

It may be noted that it is easier to attract investors for a captive facility as there is no revenue risk. The physical structure and inspection/certification elements in a captive facility and service facility are exactly the same. Only the commercial components are different. In the case of a captive facility, there is no revenue collection as the facility is for the concessionaire's own export business only. For captive facilities, the risk of the importing country refusing batches of animals is reduced because of inter-linkages of the concessionaire and the host (importing) country. The facility would be maintained exactly as per the need and specifications of that country.

This approach may also be possible without specifically declaring the area a QZ. However, an added advantage of a QZ is tax incentives, which encourage investors to set up a facility in the zone. Otherwise, the investors are, at least theoretically, at liberty to set up a privately-owned quarantine facility anywhere else.

The major operational cost for quarantine facilities is that of fodder, which requires expenditure of approximately 75% of all revenue. Other parameters such as fee levels and salary/wages, etc. would be determined by the market and benchmarks at the location. Annex 1 of this report

contains a pro forma financial model for a service-providing quarantine facility. The facility is profitable and sustainable with an estimated IRR of around 14% considering 20 years' concession, provided cost and availability of fodder is managed properly.

Summary details of options and procurement are presented in Tables 39 and 40.

Table 39. Summary of the options for quarantine facilities

For existing (constructed) facilities	OMT	
For proposed new facilities on vacant land	BOO	The MoLF will decide.
	BOOT	Recommended option is BOO, with suitable provision for renewal of concession period in the agreement.

Market testing through dialogue or by call of Expression of Interest (EOI) would be required to check whether some investors would be interested in the constructed facility on an OMT basis.

Based on Government policies and legislative provisions, a decision must be made on whether to declare QZs. If QZs are to be declared, possible tax incentives and prospects for fodder provision would need to be examined.

Table 40. Procurement of PPP operators

Stage 1	Limited tender for quarantine operators in neighboring countries and livestock exporters in Ethiopia.
Stage 2	Captive facility tender.
Stage 3	Service provider facility tender.

7.6 Options for livestock markets

Livestock markets are trading facilities where the prospective buyers and sellers carry out negotiations and trade. It is mandatory to register and pay a transaction fee. Since significant numbers of animals are brought to the market, loading/unloading ramps, water, and toilet facilities must be provided.

The Government would like to see better upkeep and maintenance of the markets. PPP is seen as a means of improving maintenance and also as a means of constructing new markets.

As noted in 5.1.1, there are unofficial (bush) markets in Ethiopia where traders escape registration and payment of fees. Proclamation 819/2014 explicitly prohibits such unofficial trade. Effective enforcement of this proclamation is required to enable development and use of the proposed improvements to livestock markets.

7.6.1 Assessment of future service delivery alternatives

Some good livestock markets have already been built by Government. Addition of some new markets is also envisaged. In either case, the key factor for private-sector involvement in the markets is efficient maintenance and professional operation, as desired by Government.

Markets are built infrastructures and are viable only where there is significant trading activity. Hence, the PPP model for the proposed new markets would be BOT. For existing markets, the PPP option would be OMT.

Investment required for the construction of a new market is around ETB 5 million, as per the data collected from the field visits. Currently, all revenue is derived from market fees. Government must determine whether part of the fee revenue would be shared with the private investor (PPP operator). Participants in the stakeholders' consultative workshop thought that this would be unlikely. In this case, it would be necessary to raise the fee chargeable for each trade, with the investor retaining a portion and paying the residual to the municipality. However, the willingness of the traders to pay significantly higher fees is doubtful as they are already avoiding the tax by using the bush markets.

As per the pro forma financial model, around 60% of the fee revenue for proposed new markets and 7% to 10% of the fee revenue for existing markets would be required to be retained by the private investor to ensure reasonable profits and the sustainability of the project. Alternatively, the fee per trade should be raised to that extent.

Two critical issues for the success of the PPP mode in case of markets are:

- Establishing a revenue model for the private PPP investor;
- Ensuring better upkeep through an appropriate surveillance system.

Other value-adding facilities may be provided at markets, including veterinary drug and feed shops, agrochemical shops, animal health clinics, cafes/restaurants, etc. LITS facilities must be provided and will certainly ensure use of markets when this system becomes mandatory. Promotion of LINKS will also help to enable competitive pricing for the sellers and ease of selection for the potential buyers.

Live animal exporters have a vested interest in sourcing and buying good-quality livestock and could be interested in investing in and operating a few livestock markets as captive facilities. These would be monopoly markets for the exporter who would be the PPP investor. In such cases, though sellers would be many (i.e., the animal owners), the buyer would be only the investor. This proposition however was not supported by many stakeholders in the consultative workshop because of the danger of monopoly pricing of the animals. The selected PPP options for markets are shown in Table 41.

Table 41. PPP options for livestock markets

BOT	For proposed new markets.
OMT	For constructed markets.

Selection of the PPP operator (procurement) would be through a regular tender mechanism, with the proportion of fee revenue to be given as royalties used as a bid parameter.

7.7 Options for SMC

SMC—in this case carrying out vaccination on behalf of the public sector—is a service, and no fee is collected from the end user, i.e., the animal owner. PPP operators are paid an agreed fee per animal vaccinated. A SMC pilot project was carried out by the EVA in 2015/16 and is fully described in section 7.7.

This pilot proved to be very successful in financial terms. Cost per animal vaccinated was less than that of Government. Details are presented in Annex I. Effectiveness was also high. Sero-conversion rates were > 90%, and livestock owners were very pleased with the coverage and team performance.

Participants in the consultative workshop pointed out that SMC can only lead to wider impacts if long-term contracts can be awarded.

7.7.1 Assessment of future service delivery alternatives

SMC is not a physical asset. Hence, most alternatives such as lease, concession, BOT, OMT, etc. are not applicable. Management contracting is also not applicable. Service contracts are the only means of engaging the private sector.

7.7.2 Options for SMC

The options for SMC are:

- A service contract through empanelment of private partners for long-term vaccination programs;
- An ad-hoc service contract for the medium to long term.

7.8 Tariff fixing for abattoirs, quarantine facilities, and markets

The tariff (fee) chargeable for abattoirs, quarantine facilities, and markets by the private-sector investors/operators was discussed at length with the stakeholders. These facilities are nonexclusive concessions with profit motives, unlike essential facilities such as highways. Those who avail of these livestock facilities are also part of the business chain. Hence, a controlling fee/tariff of one of the factors in the business chain may not be advisable. However, it is also noted that the Ethiopian livestock value chain has not matured to the extent that many players understand the concept and use of market-determined pricing. It is reasonable to expect that the market would eventually have many players and competitors. Hence, over the years, the market would develop market-determined, competitive pricing.

At this stage, the issue to be addressed is whether to control the tariff (fee) in the concessions to be given away in the near future. If the tariff is fixed, with a suitable escalation formula at this stage, eventually over the years these concessionaires may find a significant mismatch between their pricing and that of the market. Also, leaving the tariff to the concessionaire's discretion would not be advisable.

In the consultative workshop, the stakeholders agreed that the tariff may have some built-in flexibility to move from an initially regulated tariff to a market-determined one in the future. In this view, the following suggestion may be considered. The Government would form a tariff-controlling authority for livestock. The CA would provide for adherence to the tariff notifications promulgated by the authority from time to time. The authority would initially specify the

tariff (fee) based on the market conditions. Over the years, as the market develops with more competitors, the authority would introduce flexibility in the tariff by specifying a range instead of specific values and eventually would leave it to the market forces to determine.

7.9 Summary of options for consideration

These are given in Tables 42, 43, and 44.

Table 42. Service delivery options for abattoirs

For proposed new abattoirs	BOO	The MoLF may decide.
	BOOT	Recommended option is BOO, with suitable provision for renewal of concession period in the agreement.
For operational abattoirs in good condition	OMT	More suitable for butchers' and youth groups.
	Privatization (sell-off)	Recommended for private investors. However, the MoLF may also consider OMT.

Table 43. Service delivery options for quarantine facilities

For existing (constructed) facilities	OMT	
For proposed new facilities on vacant land	BOO	The MoLF may decide.
	BOOT	Recommended option is BOO, with suitable provision for renewal of concession period in the agreement.

Table 44. Service delivery options for livestock markets

BOT	For proposed new markets.
OMT	For constructed markets.

Options for SMC are:

- Service contract through empanelment of private partners for nation-wide coverage;
- Ad-hoc service contract for medium to long term.

Section 2: Financial analyses and the way forward

8. Introduction to financial analyses

8.1 Objectives of financial analyses

The financial feasibility of a proposed project is carried out to assess its viability as a stand-alone business as a PPP. The objectives of financial modelling and analysis are:

- **To assess the viability and sustainability of a project.**

The inputs required for a financial model include estimated capital cost, expected business volume, fee or tariff projected for all the operational years, estimated operational cost, etc. The model also considers issues related to taxation, depreciation, etc. Based on these parameters, a projected income statement is prepared. The financing of the capital cost is indicated as a mix of debt and equity. Based on the loan repayment schedule and projected income statement, key indicators such as project IRR,⁸ equity IRR, and NPV are calculated. The benchmark of weighted average cost of capital (WACC)—see Table 47—is set based on the lending rate in the country, the inflation rate, and the cost of equity. WACC is used as the discount rate for calculation of NPV. The desired project IRR is benchmarked using the WACC and the equity IRR using the cost of equity. A sensitivity analysis is carried out using variations in capital expenditure and revenue. Generally, realistic assumptions are preferred for the financial model; however, whenever the range of values for a particular parameter is wide, a conservative figure is preferred.

- **To assess the need for Government support in terms of grants, if any.**

It is common to find that some projects are not viable because of the high capital investment involved. However, some of these projects may still be structured as PPP projects through the provision of a grant by Government to effectively reduce the capital outlay of the private investor. If the estimated value of the required grant is within the specified limits, the project may be considered for bidding using the PPP mode.

- **To set a benchmark for the bid-evaluation process.**

A financial model effectively indicates the benchmark for the desired bidding parameter, which helps in the evaluation of bids. Commonly used bidding parameters are (i) amount of capital or operational grant demanded by the bidder, (ii) revenue to be shared with Government and in case of annuity, and (iii) the value of the annuity⁹ itself.

⁸ The IRR is the interest rate that gives an NPV of zero. The NPV is the total of a stream (i.e., by year) of present values of incomes minus the total of a stream of present values of costs. Equity IRR is the IRR net of financing.

⁹ With an annuity-based PPP, the public sector pays the private partners an agreed annual fee for designing, building, financing, and operating a nonrevenue-yielding facility such as a hospital or school.

9. Financial analysis of municipal abattoirs

9.1 Outcome of Phase 1

Phase 1 culminated in identification of a series of options for PPP arrangements. Two strategies have been identified: build new facilities and upgrade existing facilities.

9.2 Financial model for abattoirs

Two strategies for developing abattoirs under a PPP arrangement have been considered:

- New abattoirs to replace the old/unsuitable abattoirs. These would be sited in a zone designated under the municipality zoning plan;
- Transfer of existing abattoirs that are in good condition, are not in a residential area, and have space for compliant waste disposal facilities (e.g., lagoon).

9.3 Sizes of abattoirs

As described in Tables 4 and 5, the MoLF and MUDH have proposed construction of four categories of abattoir depending on the population of the target city or town: Category A for 201 to 500 cattle per day, Category B for 51 to 200 cattle per day, Category C for 16 to 50 cattle per day, and Category D for 5 to 15 cattle per day. Category D facilities are slaughter slabs and too small to be considered for PPP.

9.4 Rationale for parameters considered in financial model

- **Abattoir service fee.** As shown in Table 45, these vary from facility to facility. Private abattoirs tend to charge higher fees. However, focus group discussions clearly showed that abattoir clients were prepared to pay more for prompt delivery and good standards of hygiene.

Table 45. Abattoir fees charged by species and abattoir

Municipality	Sector	Fee per bovine	Fee per shoat
Bishoftu	Public	150	69
Adama	Public	150	70
Dessie	Public	80*	12–15**
Kara (AAAE*)	Public	212	35
Abergelle	Private	350	45
Kara Alo	Private	400	130

* Addis Ababa Abattoirs Enterprise.

**Very low fees due to appalling service levels.

Table 46. The process of selecting PPP options for municipal abattoirs

Municipal abattoirs					
Initial recommendation arising from outcomes of the Phase 1 technical and financial analyses				Final recommendation arising from opinions of participants at consultative workshop and the decision of the MoLF	
Type of facility	Recommended PPP option	Comments	Procurement	Option	Procurement
For proposed new abattoirs	BOOT	Recommended option is BOO with suitable provision for renewal of concession period in the agreement.	Restricted tender	BOO for youth groups, butchers' associations, others.	Restricted tender Restricted tender Open tender
For operational abattoirs in good condition	Privatization (sell-off)	Recommended for private investors.	Open tender	Privatization is the least preferred option.	Open tender
	OMT	OMT is more suitable for veterinary graduate youth groups butchers' association any interested party.	Restricted tenders	OMO	Restricted tenders

Since the proposed abattoirs would be modern with high hygiene standards, and fully compliant with all sanitary and environmental requirements, it is considered reasonable to set a service fee of ETB 300 for cattle. A fee of ETB 300 per bovine is used in the financial model for year 1, increasing by 3% per year thereafter.

- **Other revenue:** Other than providing service to butchers and other customers, the abattoir would also earn income from the sale of byproducts such as tallow, hide, head and feet, blood, etc. These have been costed at 20% of the current international price since the Ethiopian market has yet to organize itself for processing and export of these byproducts. Detailed calculations are presented in the financial model.
- **Operating expenses:** Some of the operating expenses are fixed, i.e., they do not vary with capacity utilization or revenue. Other expenses vary with capacity utilization. Costs were categorized as shown below.
 - Fixed operating expenses:
 - **Salary:** Salaries drawn by permanent employees are paid irrespective of level of operations. The number of permanent employees and skill-based salaries depends upon the size of the abattoir. Assumptions of staff requirements used in the financial models are based on financial reports acquired during Phase 1.

- **Maintenance:** Abattoirs spend significant amounts on upkeep, maintenance, and repair. Based on data provided by a major Chinese abattoir equipment supplier, these would be around 5% of the capital cost per year. Periodic overhauls, each costing around 5% of capital costs, have been included at 5-year intervals.
- **Cleaning and sanitation:** These costs are presently around 3% of revenue (5% of capital cost) for operational abattoirs. Since the proposed abattoirs would strictly adhere to EPA and other relevant regulations, cleaning and sanitation is factored at 10% of the capital cost.

All the fixed operating expenses are increased by 5% per annum.

- Variable operating expenses:
 - **Wages:** Wages of the temporary workforce would grow with capacity utilization. Detailed assumptions regarding wages are given in the financial model.
 - **Fuel and lubricants:** Around 9% of the revenue is spent on these consumables, as per available data.
 - **Administrative and miscellaneous expenses:** Around 8% of revenue is spent on other administrative, accounting, and sundry expenses.

It should be noted that the assumptions presented above are conservative. This means the income is taken at the lower end of the available range of data, and expenses are at the higher end of the range.

9.5 Financial parameters

- **Capital investment:** A quote was invited from a turnkey contractor-supplier of abattoir equipment from China¹⁰ who has already supplied equipment to one of the abattoirs in Ethiopia. Equipment costs based on this have been used in the financial model.
- **Interest rate:** Abattoirs are categorized as service-sector units by the Investment Commission of Ethiopia. Since this sector is not under the purview of the Commercial Bank of Ethiopia, a Government-owned bank, projects would be funded by private-sector banks. Interest rates indicated by private-sector banks for such projects is 14% to 16%. For the financial model, a rate of 15% per annum has been used.
- **Cost of equity:** In the absence of capital markets, the cost of equity would be based on expected return on equity by the prospective owners. Since the interest rate is 15%, a risk premium of 3% for equity investment and 2% for perceived risk related to early-stage PPP projects have been assumed, giving a cost of equity of 20%. The equity IRR for the financial model is benchmarked at 20%.
- **WACC:** Given an interest rate of 15%, a tax rate of 30%, (i) the tax-adjusted cost of debt is 10.50% (15×0.7), and the loan represents 70% of all finance. Hence, the WACC of the loan is 7.35% and that of equity is 6.00%, giving a total WACC of 13.35% ($7.35 + 6.00$). These details are presented in Table 47.

Table 47. Calculation of the weighted average cost of capital (WACC)

Source of finance	Proportion of finance (A)	Tax adjusted cost (B)	WACC (A) × (B)
Loan	70%	10.5%	7.35%
Equity	30%	20.0%	6.00%
Total			13.35%

¹⁰ One-Stop Engineering Co. Ltd., Qingdao, China. Chopin.zhao@china-onestop.com.

- **Tax:** Corporate tax in Ethiopia is 30%. Abattoirs for domestic service do not enjoy any tax holiday or tax concession. Hence, this regular tax rate has been used.

9.6 Financial model for BOO and OMO models

Please refer to Table 46 for details of how the PPP options were selected for the municipal abattoirs.

BOO: The financial model for BOO is developed based on the above parameters. Capital expenditure may vary based on location and demand. The expected revenue share accruing to Government is proposed as a bid parameter.

OMO: Existing operational abattoirs would be given away as OMO concessions. These abattoirs vary in age and value. Hence, before bidding, abattoir-specific data should be used to populate the financial model. For the current financial model, it is assumed that the Government authority would recover a specified amount as a fixed upfront payment from the successful bidder. The bidding parameter would be same as that for BOO; namely, the percentage revenue share. In this case, a significant share of revenue to Government would be expected as the initial investment is low compared to the BOO option.

Financial models have been developed separately for Category B and Category C abattoirs and for each option—BOO and OMO.

Summary outputs from the financial models for abattoirs are presented in Tables 48, 49, and 50.

Table 48. Summary financial output from abattoir models, by category and PPP type

Category of abattoir	PPP option	% share of revenue to Govt.	Project IRR	Equity IRR	NPV @ 14% (million ETB)	Payback period years/months	PV ¹¹ to Govt. (million ETB)
B	BOO	48.00%	18.34%	20.42%	5.69	5/10	127.24
	OMO	60.00%	18.64%	20.28%	2.11	6/2	159.05
C	BOO	23.00%	18.27%	20.28%	2.41	5/10	15.24
	OMO	44.00%	18.97%	20.71%	0.93	6/1	29.16

Table 49. Break-even point, by category of abattoir

Category of abattoir	Break-even point (% capacity)	Number of cattle per year
B	31	18,000
C	42	24,000

¹¹ PV is the present value of the stream of royalty payments using a discount rate of 14%.

As an example of the financial models developed, 5-year summary financial details for a Category C abattoir with an OMO option are presented in Table 50, from which it may be seen that profits increase with capacity utilization, rising from a loss after interest and depreciation of ETB 0.96 million to a profit of ETB 0.73 million in year 5.

Table 50. Summary details for first 5 years of operation: OMO, Category C, in millions of ETB

Parameter	Year				
	1	2	3	4	5
Capacity utilization (%)	50	60	70	80	90
Revenue	3.25	4.08	4.98	5.95	7.01
Less: Revenue to Govt.	0.75	0.94	1.14	1.37	1.61
Net revenue	2.50	3.14	3.83	4.58	5.40
Total expenses	2.06	2.28	2.51	2.79	3.57
Profit before interest	0.44	0.87	1.32	1.79	1.83
Interest	0.86	0.82	0.78	0.74	0.55
Profit before depreciation	(0.42)	0.05	0.55	1.05	1.28
Depreciation	0.55	0.55	0.55	0.55	0.55
Profit before tax	(0.96)	(0.50)	0.00	0.51	0.73
Tax	-	-	-	-	-
Profit after tax	(0.96)	(0.50)	0.00	0.51	0.73

The above summary findings clearly illustrate that the PPP options are financially viable for abattoir Categories B and C. As financial performance varies directly with capacity, it is presumed that viability would also hold for Category A facilities.

It is to be noted that there is financial viability even with generous royalty payments to the municipalities, which increase from ETB 0.75 million in year 1 to ETB 1.61 million in year 5.

Full financial data for abattoir Categories B and C, PPP options OMO and BOO, are provided in Annex I.

Technical feasibility was demonstrated in Phase 1.

9.7 Tariff structure review

Abattoirs are demand-driven, profit-intending businesses. Generally, the abattoir service charge is not regulated. However, this is an essential service that has so far been provided by Government agencies such as municipalities. For PPPs, the tariff may not be left entirely to the PPP private partner but, based on location, per capita incomes, capital investment, operating expenses, and the going rate in the market, the PPP operator will propose fees (per cattle, small ruminant, and in some areas camels) to the municipality/MUDH. The MUDH will then, through its designated authority, consider and approve or negotiate these fees. Eventually, the tariff would

be left to the market forces, initially by specifying the range and later entirely at the discretion of the concessionaire. A span of around 10 years may be considered appropriate to move from a regulated tariff to a freely determined one.

9.8 Capital expenditure update

Capital expenditure would be funded by the concessionaire through a mix of equity and debt. Abattoirs are considered a service sector by the Investment Commission of Ethiopia. As a result, they are not a priority lending area for the Government-owned Commercial Bank of Ethiopia or the Development Bank of Ethiopia. Loans would be available through private-sector banks. The loan component could be up to 70% of the total capital requirement.

9.9 Revenue collection

Abattoirs primarily serve butchers, restaurants, and hotels. Due to a number of factors, including poorly trained staff and lack of effective accounting systems, revenue collection by municipal authorities is inefficient (estimated as 60–70%). For this reason and low fees (due in part to low standards of service), many municipal authorities subsidize abattoir operations. For example, the subsidy is some ETB 0.5 million per year at Dessie.

For PPP abattoirs, revenue collection/credit control, etc. would be the responsibility of the abattoir private partners, optimally controlled using a computer-based accounting system. The agreed royalty payments would be transferred to the municipality by the private partner on a quarterly or annual basis.

9.10 Implementation issues

Legal: Strict implementation of environmental protection regulations must be enforced. Measures would include re-siting abattoirs out of residential areas (using the land use/zoning maps developed by municipal authorities), and effective waste handling such as lagoons, pits in which to temporarily store blood and solid wastes, and use of municipal waste disposal facilities (see Figure 1).

Offer to youth groups: According to the policy of the Government of Ethiopia, the MOLF has indicated that the abattoirs on PPP mode could be given to suitable youth groups (for example, unemployed veterinary graduates). Youth groups would require extensive training regarding the operation of abattoirs and business management. It is therefore essential that Government establish policy guidelines and a budget for this purpose.

Offer to butchers: Butchers (individuals or butchers' associations) would be well equipped to operate PPP abattoirs as they are fairly familiar with abattoir operations and understand business management. A short refresher/upgrading training on abattoirs and financial matters would suffice.

9.11 Regulatory and institutional issues

In addition to the comments given in 3.3, it is essential that general open licenses for abattoirs be controlled to protect the interests of the PPP operator from unfair competition from a totally private abattoir that does not pay royalties and is not subject to tariff controls.

9.12 Financial impacts

The estimated revenue share passed on to Government would be significant and could be assigned to expanding and improving other municipality-funded livestock sector-related activities.

9.13 Risk allocation

Table 51. Risk allocation

Concessionaire	Government
• Revenue risk/business risk	• Nonperformance risk
• Regulatory risk	• Incidental business risk
• Competition risk	• Default on agreement risk

Table 51 shows the risk allocation for concessionaires and the Government. In general, the risks borne by the public sector would be reduced. For example, those related to day-to-day operation of the abattoir would be totally transferred to the private partner.

9.14 VfM

VfM is a key requirement for use of a PPP in Ethiopia (the MoFEC draft “Policy for the Use and Implementation of Public-Private Partnerships – Supporting Economic Development in Ethiopia” of February 23, 2017 and draft “Public Private Partnership Proclamation” of 2016).

The PPP policy document states that “demonstration of this expectation (VfM) is a requirement for projects to use the PPP delivery approach.”

VfM resulting from introduction of PPP arrangements for municipal abattoirs is adequately demonstrated by:

- Supplementing municipality revenues: replacement of the current subsidies drawn from municipal resources to support abattoir operation by royalty payments from the private partner to the municipalities;
- PPP leading to high standards of meat quality and safety as a result of the significant improvements in buildings and equipment, staff training, and adherence to the new working practices developed by the MoLF and MUDH. Municipal authorities do not have funds to improve the existing facilities or construct new ones. High abattoir standards of welfare and hygiene under PPP will also be promoted as inspection and monitoring will be carried out by an independent body (local animal health staff). Currently, independent monitoring is not assured;
- Significantly reducing environmental pollution as PPP CAs will specify full compliance with all existing and future EPA legislation. In most of the existing facilities, the disposal of waste is noncompliant (for example, all dump solid waste on open fields, 25% pour blood, etc. into rivers). Currently, EPA compliance officers find it impossible to act against municipal authorities (e.g., in Dessie). Adverse environmental impacts will also be reduced by re-siting of abattoirs away from residential areas (94% of abattoirs were inappropriately sited);
- Encouraging efficient use of byproducts under PPP—for example, by stimulating the development of a rendering industry. This will enhance revenues and therefore royalty payments.

As a result of a shortage of public funds, low motivation, and a lack of technical and management expertise, these benefits would not be obtained if municipalities continued to operate the abattoirs.

10. Financial analyses for export quarantines

10.1 Outcome of Phase 1

Phase 1 culminated in the identification of a series of options for PPP arrangements. Two strategies have been identified: upgrade the existing facility and build a new facility or construct two or three new facilities.

The construction of new quarantine facilities is definitely required to cope with the anticipated increase in numbers of live animals exported.

It is strongly recommended that lessons be learned from the poor design of the existing facilities, specifically to (i) enable compliant biosecurity measures to be taken, (ii) provide adequate shade, (iii) provide adequate feed and water trough space, (iv) enable distribution of feed using feed trucks, (v) install an efficient water distribution system, and (vi) enable examination of individual animals.

The process of identifying the optimal PPP options for export quarantines is summarized in Table 53.

10.2 Financial analysis of PPP options for export quarantines

Quarantine facilities have been developed at Mille and Jigjiga. Apart from the constructed facilities, there is ample land available for development of additional quarantine facilities. The existing facilities would be given as OMO concessions and the proposed new facilities as BOO concessions (decision of the MoLF, March/April 2017).

New quarantine facilities would be developed based on site plans of the available land (600 hectares at each facility). The capacities of each facility could vary according to the needs of the export trade and the private partners. A financial model has been developed for a quarantine facility of 32,000-animal capacity, which is the capacity of the constructed facility at Mille. This model could be modified for other capacities as required.

10.2.1 Rationale for parameters considered in financial model

- Tariff/fee for quarantine service: Quarantine service charges in neighboring countries are presented in Table 52.

Table 52. Quarantine service charges in neighboring countries

Location of quarantine	Service fee charged (US\$)	
	Cattle	Small ruminants
Puntland	15	4
Berbera	18–20	4
Djibouti	25–30	6

Table 53. The process of selecting PPP options for the export quarantines

Export quarantines					
Initial recommendation arising from outcomes of the Phase 1 technical and financial analyses.				Final recommendation arising from opinions of participants at the consultative workshop and decision of the MoLF.	
Type of facility	Recommended PPP option	Comments	Procurement	Option	Procurement
For proposed new quarantine facility or facilities	Designate entire 600 ha site as a QZ. BOO or OMT	The QZ would ideally include tax incentives. It could accommodate up to three additional facilities. The new facilities would be widely separated, well-designed quarantines with internationally complaint standards, including biosecurity. Ideally, they would have a mixture of captive and service provider facilities.	Restricted tender (for experienced regional players), or open tender to involve Ethiopian investors.	BOO	Restricted tender for regional players. Restricted tender for captive facilities. Open tender for service providers.
For existing facility	OMT	Upgrading required; hence, the best PPP option would be BOO.	Restricted tenders.	OMO	Restricted tenders for regional players, or open tender.

For the purpose of the financial model, daily fees of US\$ 22 (ETB 506) for cattle, US\$ 7 (ETB 161) for small ruminants, and US\$ 25 (ETB 575) for camels has been assumed for 2018. Annual increases of 3% per annum to this fee are included in the financial model.

- **Salary and wages:** Salary costs, a fixed component, i.e., independent of capacity utilization, has been included in the financial model and inflated at 5% per year. Wages are adjusted on a pro-rata basis depending on capacity utilization and, again, inflated at 5% per annum.
- **Electricity:** Electricity would be required for pumping of water as well as for lighting. Costs of US\$ 32 per day when the facility is occupied by animals and US\$ 6 per day on other days have been estimated for 2018. As capacity utilization and number of cycles increase, so electricity requirement would increase accordingly. Electricity costs have been inflated at 5% per year as for all other expenses.
- **Fodder:** A daily fodder requirement (dry matter) of 2.50% of body weight of the quarantined animals has been assumed. The average body weight of cattle is taken as 350 kg, sheep/goats as 30 kg, and camels as 400 kg. An average fodder cost of ETB 3.50/kg has been taken for the first year of operation. This cost is expected to reduce with time as the efficiency of local fodder production increases. From the third year onwards, costs are expected to fall to ETB 2.00 per kg, and thereafter rise with inflation. The concessionaire is expected to produce fodder in the nearby areas (e.g., in Dubti and Ascoma for the Mille Quarantine Facility). Assistance from the regional government will be required to enable this.

It may be noted that Djibouti Quarantine Facility allows the users either to provide fodder for their animals or to pay for fodder supplies from the quarantine operator. For the proposed

facilities in Ethiopia, users should not be permitted to provide their own fodder but should be required to use supplies provided by the concessionaire. There is a good reason for this stipulation: to maintain good standards of biosecurity. Hence, the fee charged by the concessionaire will be inclusive of fodder cost. However, this must have a variable component to absorb variations in cost of fodder. Approval of the quarantine fee by the MoLF would clearly indicate this variable component and its extent.

- **Vaccines:** Vaccinations of animals in quarantine may be required, depending on the conditions stipulated by importing countries. It is assumed that 50% of bovines and camels would require such vaccinations. Calculations of the costs of vaccination are given in the financial model.
- **Laboratory expenses:** Laboratory testing expenses for contagious bovine pleuropneumonia (CBPP) (presently around ETB 50.63 per animal) and FMD (ETB 76.09) is a requirement of some of the importing countries. The cost is borne by exporters directly and hence has not been considered in the financial model.
- **Experts:** Expenses towards engagement of veterinarians and paraprofessionals has been accounted for at prevailing rates. In the fifth year, when full capacity utilization would be achieved, three of each of these experts will be required. Expert costs are based on data available from the quarantine facilities in the neighboring countries.
- **Routine maintenance:** Expenses for routine maintenance of 0.25% of capital cost have also been considered. This is also inflated at 5% per annum.
- **Loan tenure and capita structure:** Quarantine facilities have a long gestation period. The payback period is typically longer than 6 years. Hence, a loan tenure of 10 years has been assumed. It is noted that private-sector banks in Ethiopia can provide loans for a tenure of up to 15 years.
- **Interest rate:** Quarantine facilities are categorized as service-sector units by the Investment Commission of Ethiopia. Since the service sector is not under the purview of the Commercial Bank of Ethiopia, a Government-owned bank, they would be funded by private-sector banks, where the interest rate for such projects is 14% to 16% per year. For the quarantine facility financial model, a rate of 15% per year has been used.
- **Cost of equity:** In the absence of capital markets, the cost of equity would be based on expected return on equity by the prospective owners. Since the interest rate is 15%, a risk premium of 3% for equity investment and 2% for perceived risk related to early-stage PPP projects could be considered. Hence, cost of equity is pegged at 20%. Equity IRR for the financial model is benchmarked at 20%.
- **WACC:** The interest rate is 15%. The tax rate in Ethiopia is 30%. Hence, the tax-adjusted cost of debt is 10.50%. Considering a debt proportion of 70%, WACC is 13.35%. For calculation of NPV, a discount rate of 14% has been considered. Further details are presented in 9.5 and Table 47.
- **Tax:** The corporate tax rate in Ethiopia is 30%. Quarantine facilities may not enjoy any tax holiday or tax concession. Hence, the regular tax rate would be applicable.

10.2.2 Financial model for BOO and OMO models

BOO: The financial model for BOO is based on the above parameters. Capital expenditure may vary based on location and demand. Royalty payments based on a per animal basis is proposed as a bid parameter.

OMO: Existing operational abattoirs would be given away as OMO concessions. For the instant financial model, it is assumed that the relevant Government authority would recover ETB 30 million as a fixed upfront payment from the successful bidder. The bidding parameter would be

the same as that given for the BOO option, but for OMO a higher royalty payment per animal is expected as the initial investment would be relatively low.

Summary outputs from the financial models for abattoirs are presented in Tables 54, 55, and 56.

Table 54. Summary financial output from quarantine models, by PPP option

PPP option	% share of revenue to Govt.	Project IRR	Equity IRR	NPV @ 14% (million ETB)	Payback period years/ months	PV to Govt. (million ETB)
BOO	16.6	19.51	20.82	67.9	6/6	295.3
OMO	26.6	20.01	20.73	45.7	6/11	472.4

Table 55. Break-even point, by PPP option

PPP option	Break-even point (% capacity)	Cattle equivalents per year
BOO	59	13,700
OMO	57	13,600

The above summary findings clearly illustrate that both PPP options are financially viable for quarantines despite the payment of generous royalties to Government. As an example of the financial models developed, 5-year summary financial details for the OMO option are presented in Table 56, from which it may be seen that profits increase with capacity utilization, rising from a loss after interest and depreciation of ETB 25.17 million to a profit of ETB 25.08 million in year 5. By year 20, the annual profit has reached ETB 45.24 million.

Table 56. Summary details for first 5 years of operation of quarantine, OMO, in millions of ETB

Parameter	Year				
	1	2	3	4	5
Capacity utilization (%)	60	70	80	90	100
Revenue	56.72	79.51	106.97	139.38	177.34
Less: Revenue to Govt.	9.44	13.23	17.80	23.21	29.51
Net revenue	47.28	66.28	89.17	116.17	147.83
Total expenses	76.98	104.51	122.55	137.56	148.68
Profit before interest	(20.26)	(24.99)	(15.58)	1.83	28.66
Interest	3.32	2.99	2.66	2.33	1.99
Profit before depreciation	(23.59)	(27.99)	(18.24)	(0.50)	26.67
Depreciation	1.58	1.58	1.58	1.58	1.58
Profit before tax	(25.17)	(29.57)	(19.83)	(2.08)	25.08
Tax	0	0	0	0	0
Profit after tax	(25.17)	(29.57)	(19.83)	(2.08)	25.08

Technical feasibility was demonstrated in Phase 1 but is dependent on resolution of policy and legislative issues described in 4.14 and 3.3.

10.3 Tariff structure review

Not applicable. Fees will be determined through negotiations between the facility owners and the MoFEC tariff unit considering the quarantine tariffs in neighboring countries. Given that the facility is privately run, it can be expected that revenue collection and credit control will be efficient.

10.4 Capital expenditure update

Capital expenditure would be funded by the concessionaire through a mix of equity and debt. A quarantine facility is considered a service-sector unit by the Investment Commission of Ethiopia. As a result, it is not a priority lending area for the Government-owned Commercial Bank of Ethiopia. Loans would be available through private-sector banks. The loan component could be up to 70% of the total capital requirement.

10.5 Revenue collection

The quarantine facilities are service facilities for livestock exporters. The revenue collection mechanism will be left to the service providers. Royalties, determined on a per animal basis, would be paid to Government, either quarterly or annually, as agreed.

10.6 Implementation issues

- **Legal:** As stated in the Phase 1 report, the Government of Ethiopia must rapidly resolve the issue of acceptance by the Djibouti authorities of livestock that have been quarantined and issued with IVCs at Mille.

The Mille Quarantine Facility currently has many local employees who are used as guards. The purpose of this apparent over-staffing is to generate local jobs, satisfy the local community, and allow for a lack of work experience. Ways must be found to retain (most of) these employees to prevent problems with the local community.

- **Lending terms:** A quarantine facility requires significant capital investment, varying from ETB 50 to ETB 90 million, depending upon the proposed capacity. A concession of 20 year's duration will be required. Risks are comparatively higher than those associated with other facilities, for example abattoirs and markets, because of issues related to international trade. It would therefore be prudent for Government to intervene and ensure that quarantine-related loans are provided at rates below 10% per annum, coupled with a moratorium of two to three years. This would improve the debt service coverage ratio (DSCR), which the financial model predicts as negative for the first three years of operation.

10.7 Regulatory and institutional issues

Regulatory: Exporters have expressed grave concern about the illegal export trade in livestock. Unless this constraint is satisfactorily addressed, quarantine concessionaires will find it difficult to operate the quarantines as viable businesses.

As suggested in Phase 1 report and agreed by the Ministry (MOLF), some of the new facilities could be developed as captive facilities and others as service providers. As clarified by the Investment Commission, captive facilities could be developed by foreign investors because these are not classified as service providers.

As required by the MoLF, a limited tender for Ethiopian livestock exporters would be floated. It is suggested that in case of captive facilities, the bidders may be allowed to partner with a foreign investor, especially one from an importing country. This is desirable because the required capital investment is high for a single Ethiopian investor. Also, investment by citizen(s) of an importing country could minimize bans and other disruptions to trade.

Institutional: The development of a QZ should be promoted in order to attract investors.

It will be important that local authorities allocate land for production of fodder for the quarantines. For each, up to 1,200 hectares of good irrigable land with access to abundant supplies of surface or ground water will be required.

10.8 Financial aspects

Successful development of Ethiopian quarantine facilities would substantially boost livestock exports from the country and would enhance the credibility and acceptance of them in importing countries. Royalties accruing to Government from the facilities are also significant and could be ploughed back into development of the livestock sector, for example by financing the SMC schemes for import-promoting TAD vaccinations.

10.9 Risk allocation

Table 57. Risk allocation

Concessionaire	Government
• Revenue risk/business risk	• Nonperformance risk
• Acceptance risk	• Monopoly and cartel risk
• Fodder availability risk	• Default on agreement risk
• Transportation risk	

10.10 VfM

VfM is a key requirement for use of a PPP in Ethiopia (the MoFEC draft “Policy for the Use and Implementation of Public-Private Partnerships – Supporting Economic Development in Ethiopia” of February 23, 2017 and draft “Public Private Partnership Proclamation of 2016”).

The PPP policy document states that “demonstration of this expectation (VfM) is a requirement for projects to use the PPP delivery approach.”

VfM for introduction of PPP arrangements for the export quarantines is adequately demonstrated by:

- Royalty payments from the private partner to the MoLF;
- The private partner completing the many pending upgrading works for the current facility;
- Private partners constructing up to six new, well-designed (avoiding the problems encountered with the existing facilities constructed by the public sector), and internationally compliant quarantines to cope with the expected increased flow of live animal exports. It is most unlikely that the public sector would be able to provide the capital required;
- Introduction of skilled management and well-trained staff by the private partners leading to effective and efficient quarantine operations;
- The concessionaries securing large quantities of good-quality feed; the private sector can provide the required capital and expertise.

11. Financial assessment of livestock markets

11.1 Outcomes of Phase 1

The process used to make final selections of PPP options for municipal abattoirs is summarized in Table 58

11.2 Financial model for livestock markets

Livestock markets are a trading place where prospective buyers and sellers carry out negotiations and trade. It is mandatory to register and pay a fee/tax for the transaction. The Government would like to see better upkeep and maintenance of the markets. PPP is being considered as a way for effective maintenance and for constructing new markets to occur.

The key factors for private-sector involvement in livestock markets are efficient maintenance, professional operation, and full compliance with legislation regarding livestock markets, environmental protection, LITS, LINKS, and animal disease control.

Currently, municipal service fees are charged at livestock markets. Government should determine if part of the fees collection receipts could be shared with the private investor (PPP operator). In the stakeholder consultative workshop, this was thought to be unlikely.

There could be three possible revenue-structuring options for the livestock markets to be developed on the PPP mode:

- Increase the fee and share it with the PPP operator. However, it is doubtful that users would accept this.
- Maintain the current fee and share it between the PPP operator and Government. (This is the option used in the financial model.)
- Government commits to pay the operator a specified amount annually irrespective of the fee rate and receipts.

Under the PPP structure, existing markets would be given as OMO concessions, and the proposed new markets would be given as BOO concessions.

Table 58. The outcomes of Phase 1 and process to identify these outcomes

Livestock markets					
Initial recommendation arising from outcomes of the Phase 1 technical and financial analyses.				Final recommendation arising from opinions of participants at consultative workshop and decision of the MoLF.	
Type of facility	Recommended PPP option	Comments	Procurement	Option	Procurement
For proposed new livestock market facilities	BOT	Must be equipped as required by the new Livestock Marketing Proclamation.	Open tender	BOO	Open tender
For existing facility	OMT	Must be upgraded as above.	Open tender	OMO	Open tender

11.2.1 Rationale for parameters considered in financial model

- **Tariff/fee for trade:** Some of the operational markets and their capacity, charges (tax), etc. are as shown in Table 59.

Table 59. Details of selected livestock markets

Market	Capacity	Mean sales per market day	Fees charged / head	Annual income
Haro Beke	3,000 shoats 2,000 cattle	2,000–3,500 shoats 1,600–2,400 cattle 20–50 donkeys	Shoats ETB 7 Cattle ETB 25 Donkeys ETB 25	480,000
Dera	1,000 shoats 1,000 cattle	900–1,500 shoats 800–1,400 cattle	Shoats ETB 5 Cattle ETB 15 Donkeys ETB 15	1,478,000
Rob Gebya	3,000 shoats 2,000 cattle	2,000–3,500 shoats 1,600–2,400 cattle 20–50 donkeys	Shoat ETB 8 Cattle ETB 20 Donkeys ETB 12	3,722,000

It is evident that markets are inconsistent in their fee rates. It is necessary to bring uniformity to the fee structure for all markets in Ethiopia.

For the purposes of the financial model, the fee structure of Haro Beke livestock market has been adopted. For other markets, the volume varies depending on location and season. Various assumptions have been used in the financial analyses and described in the models.

It is proposed that the bidding parameter would be the percent share of tax collection that the operator would pass on to Government.

- **Salary:** Based on prevailing rates of salary and wages in Ethiopia, certain assumptions have been made. These are shown in the financial model.
- **Other expenses:** The costs of the following have been included in the financial model: overhead (ETB 0.05 million), maintenance (ETB 0.025 million), supplies of chemicals and other consumables (ETB 20,800), training (ETB 0.05 million), and administrative (ETB 0.04 million) expenses. These costs have been taken for Year 1 in the financial model. The costs have been inflated at 5% per year.
- **Loan tenure and capital structure:** Livestock markets have a long gestation period. A 20-year financial model has been developed. The payback period is typically around 5 years, and a loan tenure of 10 years has been used. Private-sector banks in Ethiopia can provide loans for up to 15 years' tenure.
- **Interest rate:** Livestock markets are categorized as service-sector units by the Investment Commission of Ethiopia. Since this sector is not under the purview of the Commercial Bank of Ethiopia, a Government-owned bank, it would be funded by private-sector banks. The interest rate indicated by private-sector banks for such projects is 14% to 16%. For the financial model, a rate of 15% per annum has been used.
- **Cost of equity:** In the absence of capital markets, the cost of equity would be based on the expected return on equity by the prospective owners. Since the interest rate is 15%, and a risk premium of 3% is assumed, plus a further 2% for perceived risk related to early-stage

PPP projects, the cost of equity is pegged at 20%. The equity IRR for the financial model is benchmarked at 20%.

- **WACC:** Assuming an interest rate of 15% and a tax rate in Ethiopia of 30%, the tax-adjusted cost of debt is 10.50%. Considering a debt proportion of 70%, the WACC is 13.35%. For calculation of NPV, a discount rate of 14% has been considered. Further details are presented in 9.5 and Table 47.
- **Tax:** The corporate tax rate in Ethiopia is 30%. Livestock markets would not enjoy any tax holiday or tax concession. Hence, the regular tax rate has been used.

11.2.2 Financial model for BOO and OMO models

BOO: The financial model for BOO is based on the above parameters. The capital expenditure for recently developed markets (USAID/ADCI-VOCA) was ETB 5 million. This figure has been used as the base cost in the financial model.

OMO: Existing operational abattoirs would be given away as OMO concessions. As indicated in the Phase 1 report, a repair and restructuring expense of ETB 1 million has been envisaged for the existing markets. This figure has been used for the financial model.

Summary data from the livestock market models are presented in Tables 60, 61, and 62.

Table 60. Summary financial output from livestock market models, by PPP type

PPP option	% share of revenue to Govt.	Project IRR	Equity IRR	NPV @ 14% (million ETB)	Payback period years/ months	PV of royalties to Govt. (million ETB)
BOO	30	17.98	20.11	1.38	5/9	0.75
OMO	62	18.02	20.60	0.25	5/4	0.75

Table 61: Break-even point for livestock markets, by PPP option

PPP option	Break-even point (% capacity)	Animal equivalents per market day
BOO	47	1,200 cattle, 1,650 shoats, 25 donkeys
OMO	34	820 cattle, 1,200 shoats, 20 donkeys

The summary estimates of financial performance shown in Table 62 indicate that, given the assumptions made, PPP for livestock markets would be less profitable for the private partner than the quarantines and abattoirs. By year 20, annual profit after tax rises to ETB 0.22 million.

Technical feasibility was demonstrated in Phase 1 but is dependent on resolution of the issues raised in 5.2, 5.10, and 5.16.

Table 62. Summary financial details for first 5 years of operation: OMO, in millions of ETB

Parameter	Year				
	1	2	3	4	5
Capacity utilization (%)	60	70	80	90	100
Revenue	2.23	2.34	2.46	2.58	2.71
Less: Revenue to Govt.	1.38	1.45	1.52	1.60	1.68
Net revenue	0.85	0.89	0.93	0.98	1.03
Total expenses	0.58	0.64	0.71	0.78	0.85
Profit before interest	0.26	0.25	0.23	0.20	0.18
Interest	0.11	0.10	0.09	0.08	0.07
Profit before depreciation	0.15	0.15	0.14	0.13	0.11
Depreciation	0.05	0.05	0.05	.05	0.05
Profit before tax	0.10	0.09	0.08	0.07	0.06
Tax	0.03	0.03	0.03	0.02	0.02
Profit after tax	0.07	0.07	0.06	0.05	0.04

11.3 Tariff structure review

Livestock markets in Ethiopia impose different levels of tax per trade. A national policy to standardize these is required. Also, a policy to recommend the proportion of the taxes/fees collected that should be shared with the PPP concessionaire is required.

11.4 Capital expenditure update

Capital expenditure would be funded by the concessionaire through a mix of equity and debt. Livestock markets are not considered a service operation by the Investment Commission of Ethiopia. As a result, it is not a priority lending area for the Government-owned Commercial Bank of Ethiopia. Loans would be available through private-sector banks. The loan component could be up to 70% of the total capital requirement.

11.5 Revenue collection

Currently, market fees are collected from the traders at a municipal revenue office inside the market. The system may be continued as it is. However, if there is to be sharing of revenue between Government and the PPP operator, an escrow account should be established to promote transparent accounting. Digitalization of the accounting system is highly recommended.

11.6 Implementation issues

- **Legal:** Illegal bush markets are a threat to livestock markets. They not only hamper fee revenue but also compromise the identification of animals for exports (LITS) and tracing of sanitary measures. Strict enforcement of Proclamation 819/2014 is required.
- **Economic driver:** Users see the markets just as a trading ground, so it is necessary to familiarize the users with the value of markets beyond livestock trading such as LITS and provision of incidental facilities such as retail stores, animal health posts, veterinary pharmacies, livestock requisite shops, tea shops, etc. Livestock market concessionaires should

be encouraged to provide accommodation for, and attract, small entrepreneurs who would pay an agreed rental for use of the latter. This would not only expand the livestock trade but also generate additional income.

11.7 Regulatory and institutional issues

Regulatory: Except for the strict implementation of Proclamation 819/2014 and integration of LITS and LINKS, there are no further legislative/policy issues that would affect the development of livestock markets on PPP mode.

11.8 Financial aspects

Successful redevelopment of livestock markets would substantially boost the acceptance of livestock from Ethiopia as it would facilitate identification through LITS. Markets would be financially self-sustainable if a part of fee collections were used for maintenance and repair.

11.9 Risk allocation

Table 63. Risk allocation

Concessionaire	Government
• Revenue risk/business risk	• Nonperformance risk
• Illegal trade risk	• Monopoly and cartel risk
• Livestock availability/natural issues-related risk	• Default on agreement risk

11.10 VfM

VfM is a key requirement for use of a PPP in Ethiopia (the MoFEC draft “Policy for the Use and Implementation of Public-Private Partnerships – Supporting Economic Development in Ethiopia” of February 23, 2017 and draft “Public Private Partnership Proclamation of 2016”).

The PPP policy document states that “demonstration of this expectation (VfM) is a requirement for projects to use the PPP delivery approach.”

VfM for introduction of PPP arrangements for the export quarantines is adequately demonstrated by:

- Ensuring full collection of all fees and thereby reducing subsidies currently paid by municipalities for market operations. Increased market throughput can be expected as a result of the measures outlined in 5.16, which will increase fee collections;
- The private partner completing the pending upgrading works for existing markets and constructing new, well-designed (with all required facilities) and compliant facilities. It is most unlikely that the public sector would be able to provide the capital required;
- Introduction of skilled management and well-trained staff by the private partners will lead to effective and efficient quarantine operations;
- The concessionaires, as business persons, attracting a range of revenue-generating (rental income) small businesses to serve the needs of traders. These could include an animal health clinic, a pharmacy, a livestock requisites shop, and bars/restaurants/cafés, etc.

12. Financial assessment of Sanitary Mandate Contracting (SMC)

12.1 Financial assessment

The relative total costs of vaccinating one small ruminant by the private and public sector were calculated after collection of data from the contractors and *woreda* veterinary offices. Public costs are presented in Table 64.

The agreed fee paid to the private contractor per small ruminant vaccinated with the two vaccines (PPR and sheep and goat pox) was ETB 1.60, which clearly included a profit margin for the contractor (estimated actual contractor's costs were in the order of ETB 1.12 per animal vaccinated).

Table 64. Costs of public-sector vaccination

Public-sector costs	Total (ETB)
Manpower	21,873.33
Fuel	6,000.00
Vaccination program and associated cost	
Refresher training manpower	17,035.67
Refresher training refreshment	17,641.27
Vaccine transportation staff cost	1,487.07
Vaccination team cost	164,893.67
Fuel cost	55,823.26
Cold chain and contingency cost	19,249.40
Monitoring of Project Management Unit	
Staff cost	16,341.67
Fuel cost	45,000.00
Car	
Maintenance	34,988.60
Depreciation	32,146.00
Consumables	7,580.00
Seconded staff	7,534.42
Total	447,594.35
Number of animals vaccinated	192,494.00
Cost per animal	2.33

This was a pilot SMC, and special arrangements were made to facilitate implementation by the private contractors. The EVA contributed ETB 0.17 per animal vaccinated to cover training costs and donated consumables valued at ETB 0.04 per animal vaccinated, giving a total contribution of ETB 0.21 per animal.

This additional cost would not be incurred in the “real world” where readiness (trained staff, all equipment and consumables, etc.) on the part of private contractors would be assumed.

It is concluded that there is a cost savings per animal vaccinated to the public sector when vaccination is contracted to the private sector.

The opinions of livestock owners were solicited through focus group discussions with the following results:

- Livestock owners were delighted with private-sector performance. There was very good coverage (all animals presented were vaccinated), timely service (early in the day with no waiting), efficiency (numbers of animals vaccinated per unit time), and effectiveness (no clinical disease occurred after vaccination but was seen in non-vaccinated areas);
- The public sector received some criticisms, including: sometimes vaccinates in times of drought or after disease has occurred; achieves poor coverage (not all presented animals are vaccinated); and campaigns are not carried out every year.

12.2 The future

There are many opportunities for private-sector delivery of public-good services using SMC. These include:

- For FMD vaccinations as part of a national FMD control policy;
- For PPR and sheep and goat pox vaccinations to complement the EU-funded Support Horn of Africa Resilience (SHARE) program that includes a PPR eradication component;
- Rabies vaccinations. A good model has been developed in Tigray where, with the support of the RAB, private veterinarians undertake annual rabies vaccination programs in towns and cities with dog owners, covering the costs of both the vaccine and a service fee;
- Implementation of the small ruminant ecto-parasite control program, and;
- Anthrax vaccinations in disease “hot spots” where interested livestock owners would pay all costs.

12.2.1 FMD control

Discussions in the MoLF are ongoing to develop a cost-effective national control strategy for FMD with the aims of (i) protecting exports of live animals and meat, and (ii) safeguarding the emergent dairy sector.

It appears that regular vaccinations using a bivalent vaccine (A and O) will be used in the highland dairying areas. A quadrivalent vaccine (A, O, South African Territories (SAT) 1, and SAT 2) will be used in the pastoral areas, which are the major source of export livestock.

12.2.2 Pastoral areas

There are some seven to eight million cattle in the pastoral areas. These would be vaccinated five times in each two-year period. Due to the relatively unsophisticated nature of pastoralists and the importance of complying with conditions imposed by live animal importers (for example, animals should be sourced from a “zone that is free of foot and mouth disease where vaccination is practised”), Government must cover all costs of FMD vaccination.

Estimates of the costs of vaccinating cattle in pastoral areas are presented in Table 65.

12 OIE Terrestrial Animal Code, Article 8.8.3 and Chapter 4.3.

Table 65. Estimated costs—assumptions used

Variable	Unit	Value
Number of teams per contractor	Teams	10
Capital equipment per team	ETB	284,050
Annual depreciation capital equipment per team	ETB	28,405
Other equipment per team	ETB	80,500
Annual depreciation other equipment per team	ETB	26,833
Miscellaneous annual expenses (training, salaries, etc.)	ETB	190,000
Miscellaneous per team	ETB	19,000
Variable costs per team per day	ETB	2,952
Cattle vaccinated per team day	Number of cattle	1,000 ¹³
Cattle vaccinated per contractor per year	Number of cattle	250,000
Cost of vaccinating one bovine	ETB	3.93
Margin		25%
Margin per vaccination	ETB	0.98
Amount charged to government per animal vaccinated	ETB	4.92
Potential annual gross margin per contractor	ETB	245,800
Number of vaccinations per year to cover annual depreciation	Number of vaccinations	26,860

These data indicate that the service fee per animal vaccinated would be ETB 4.92. The cost of the vaccine as delivered to the contractor must be added to this.

The “break-even point” would be an annual total of 26,860 vaccinations per year.

12.2.3 Highland dairy cattle

Summary details of estimated numbers of dairy cattle and holdings, by system, are presented in Tables 66 to 69 (Livestock Master Plan (LMP), 2014), from which it is obvious that large increases in both are envisaged. Thus, there should be significant potential for involvement by private animal health services.

Table 66. Numbers of dairy cattle in the improved family dairy system, by year

Dairy system	Number of crossbred dairy cattle (in thousands)						
	(Base year) 2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	% change
IFD*	453	777	1,296	2,006	2,920	4,044	793%

*IFD is “improved family dairy.”

¹³ PPR teams in the pilot SMC vaccinated 2,400 animals per day. For cattle, take 50% of this, which is 1,200, then take 1,000 as a conservative estimate. In the PARC/PACE (Pan African Rinderpest Campaign/Pan African Control of Epizootics) projects, over 1,500 cattle were vaccinated per team day.

Table 67. Numbers of holdings in the improved family dairy system, by year

Number of households in highland mixed (crop-livestock) rainfall sufficient (MRS) zone	2015/16	2016/17	2017/18	2018/19	2019/2020
	372,630	594,535	829,326	1,077,717	1,340,465

Table 68: Numbers of cattle in specialized dairy farms, by year

Population	(Base year) 2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	% change
Small specialized dairy farm (SDF)	286,147	350,244	428,699	524,728	642,267	786,134	175%
Medium SDF	40,000	42,933	48,772	55,405	62,940	71,500	79%
Total	326,147	393,177	477,471	580,133	705,207	857,634	163%

Table 69. Numbers of specialized dairy holdings, by year

Units	(Base year) 2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	% change
Small SDF	57,229	70,049	85,740	104,946	128,451	157,227	175%
Medium SDF	400	429	488	554	629	715	79%

Most dairy cattle will be in small herds. This will significantly reduce the number of animals that can be vaccinated per team per day due to time taken to make individual farm visits (compared to pastoral areas where herds will be gathered at common vaccination points). For the improved family dairy (IFD) farms, the mean number of cattle per herd is two head in 2015/16, rising to three head in 2019/20.

For the IFDs, it is assumed that one vaccination team of two persons could visit ten holdings per day and thus vaccinate a mean of 25 head of cattle.

In the specialized dairy farms, there is a mean of 5 head per holding in the small units and 100 head in the large units.

For the small SDFs, one vaccination team of two persons could visit ten holdings per day and vaccinate 50 cattle per day. For the large SDFs (where handling facilities should be good), a team could visit four holdings per day and thus vaccinate 400 cattle per day.

Using the above data and assuming ten teams per contractor, the estimates of cost per animal vaccinated were estimated. Details are presented in Table 70.

As milk production is a profitable venture, owners of dairy herds will be expected to pay for the cost of FMD vaccination. It is unlikely that 100% of cattle owners will pay for vaccination as a proportion will opt to be “freeloaders.” They intend to benefit, at no cost, from the reduction in FMD incidence brought about by vaccination of cattle of their paying neighbors. High levels of public awareness and societal pressure will reduce the number of freeloaders.

Table 70. Estimates of FMD vaccination service charge, by dairy herd type

Herd type	Cost per animal	Margin	Service fee per animal*
IFD	103	26	129
Small SDF	52	13	64
Large SDF	6	2	8

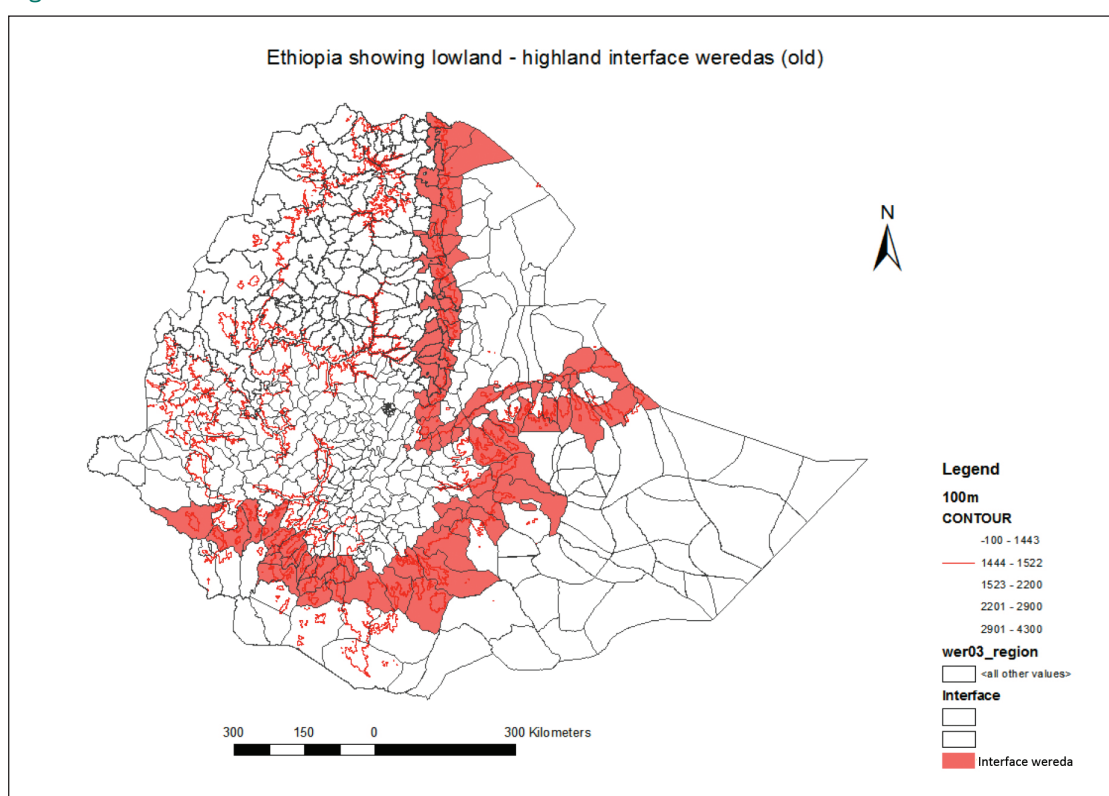
*Total charged would be service fee plus cost of one dose of bivalent vaccine.

These estimates, based on realistic assumptions, do discriminate against the small dairy units. Unfortunately, crossbred dairy cattle will suffer far more serious clinical disease than the local animals. A Government policy of paying all costs of vaccination in these small units is strongly recommended.

The larger commercial units should pay all costs, with possibly the large SDF units paying significantly more than the cost price to help defray the high charges of vaccination in the small SDF units.

12.2.4 SMC and the SHARE program

There could be potential for SMC to participate in the SHARE PPR program; for example, if it were decided to establish a barrier to stop spread of infection between the lowland and highland small ruminant populations—by mass vaccination along the interface *woredas*. These *woredas* are shown in Figure 8.

Figure 8. The interface *woredas*

There are an estimated six to seven million small ruminants in the identified *woredas*, which, if funding for SMC vaccinations can be found, would provide contracts for four to six contractors. However, this exercise would probably be a “one-off” SMC, and long-term benefits would be minimal.

Ideally, the parameters used for the EVA pilot SMC could be applied in the “real-life” vaccination of the interface *woredas*. However, due to the different management system in some of the interface *woredas* (more settled herds of smaller size), the daily mean number of vaccinations per team day would be reduced.

12.3 Basic requirements for SMC

The basic prerequisites for using SMC to deliver vaccinations for a specified TAD are:

- A long-term national control policy for the TAD to give (i) direction and (ii) an assurance to private contractors of medium-term income flow, thus encouraging them to invest in equipment and business expansion;
- An established Ethiopian Veterinary Statutory Body;
- Availability of enough suitably qualified private veterinary contractors. Currently, it is doubtful that sufficient numbers of qualified contractors are available for regular vaccination of large animal populations. One answer to this would be for existing contractors to train, assist, and sub-contract inexperienced and potential contractors. To encourage this, Government would pay a small extra service fee.
- Available funds at the federal level to pay all costs of SMC.
- SMC units at federal and regional levels.
- Ratification of the Road Map for Rationalising Delivery of Veterinary Services to give the necessary policy underpinning for the MoLF. This would include a strategy to redeploy staff who previously participated in vaccination campaigns to improving delivery of other public-good functions such as disease surveillance, veterinary public health, regulation, etc.
- A standard approach—see 12.4.
- An efficient and effective national animal disease surveillance system to enable real-time disease mapping to inform the location, timing, target populations, etc. for SMC and monitor the effects of the SMC.

12.4 Standard approach to SMC

It would be very useful to develop a standard approach to SMC.

The following outline is proposed.

12.4.1 Responsibilities

Federal veterinary services

- Develop, in close consultation with regional authorities, national policies for target diseases.
- Form a specialist unit (possibly part of the PPP unit) to oversee the SMC process.
- Administer SMC budgets.
- Ensure adequate and timely supplies of vaccine to contractors.
- Ensure availability of funds with which to pay service charges for TAD vaccinations.

Federal and regional veterinary services

- Articulate and implement a common SMC policy.
- Develop a standard SMC contract—see 12.4.2.

- Actively monitor the SMC program and modify as required.
- Oversee the process of SMC.
- Ensure prompt payment of approved invoices.
- Ensure efficient operation of and reporting from the NADSS.
- Provide contactors with copies of agreed standard operating procedures for animal vaccination.

Woreda veterinary services

- Oversee SMC at the *woreda* level.
- In collaboration with regional veterinary services, monitor the performance of SMC contractors, review invoices, and approve as indicated.
- Coordinate and facilitate serological studies carried out by NAHDIC.

NAHDIC

- Carry out sero-surveillance and sero-monitoring as required.
- Promptly provide reports of findings to *woreda*, regional, and federal veterinary services.
- Promptly submit invoices to regional and federal veterinary services.

Private contractors

- Implement the SMC as specified in the contract agreement. This will include:
 - Ensuring that all required transport, equipment (particularly the cold chain), and consumables are available and in serviceable condition;
 - Conducting training of staff as required;
 - Arranging work schedules in consultation with *woreda* veterinary services and implement this, notifying *woreda* veterinary service in advance of any changes;
 - Conducting public awareness campaigns about the private sector vaccinating on behalf of Government, the reasons for and advantages of SMC, the monitoring by Government, and the responsibilities of the three parties.
 - Conducting vaccination campaign
 - Submitting weekly activity reports in required format to *woreda* veterinary services;
 - Submitting invoices in required format and at intervals specified in the contract;
 - Ensuring that vaccination staff fully implement official standard operating procedures, maintain high standard of hygiene, take measures to prevent the spread of infectious diseases between herds/flocks/holdings, and always behave in a polite and courteous manner.
- Must be registered with the Ethiopian Veterinary Statutory Body (“Veterinary Council”) as soon as this is created and becomes functional.

Livestock owners

- Have animals ready for vaccination on time, date, and at the location specified.
- Not bring sick or heavily pregnant animals for vaccination.
- Assist to restrain animals for vaccination.

12.4.2 The SMC contract for vaccination

This legal document should be drawn up in close consultation with the MoLF legal department and should include:

- Name and address of contracting authority (the MoLF or regional RAB as appropriate), name, address, and contact details of contact person;

- Name and address of contractor—a licensed veterinary practitioner/veterinary group/company—name and address of authorized person;
- Vaccine type, number of doses, delivery schedule;
- Timing of vaccination;
- Specification that the vaccine will be delivered, as per schedule, to the contractor by Government free of charge;
- Populations to be vaccinated—location (e.g., specify kebeles), species, age group, estimated number of animals;
- List of responsibilities of each party (as given above)—public sector, private contractor, and livestock owner/keeper.

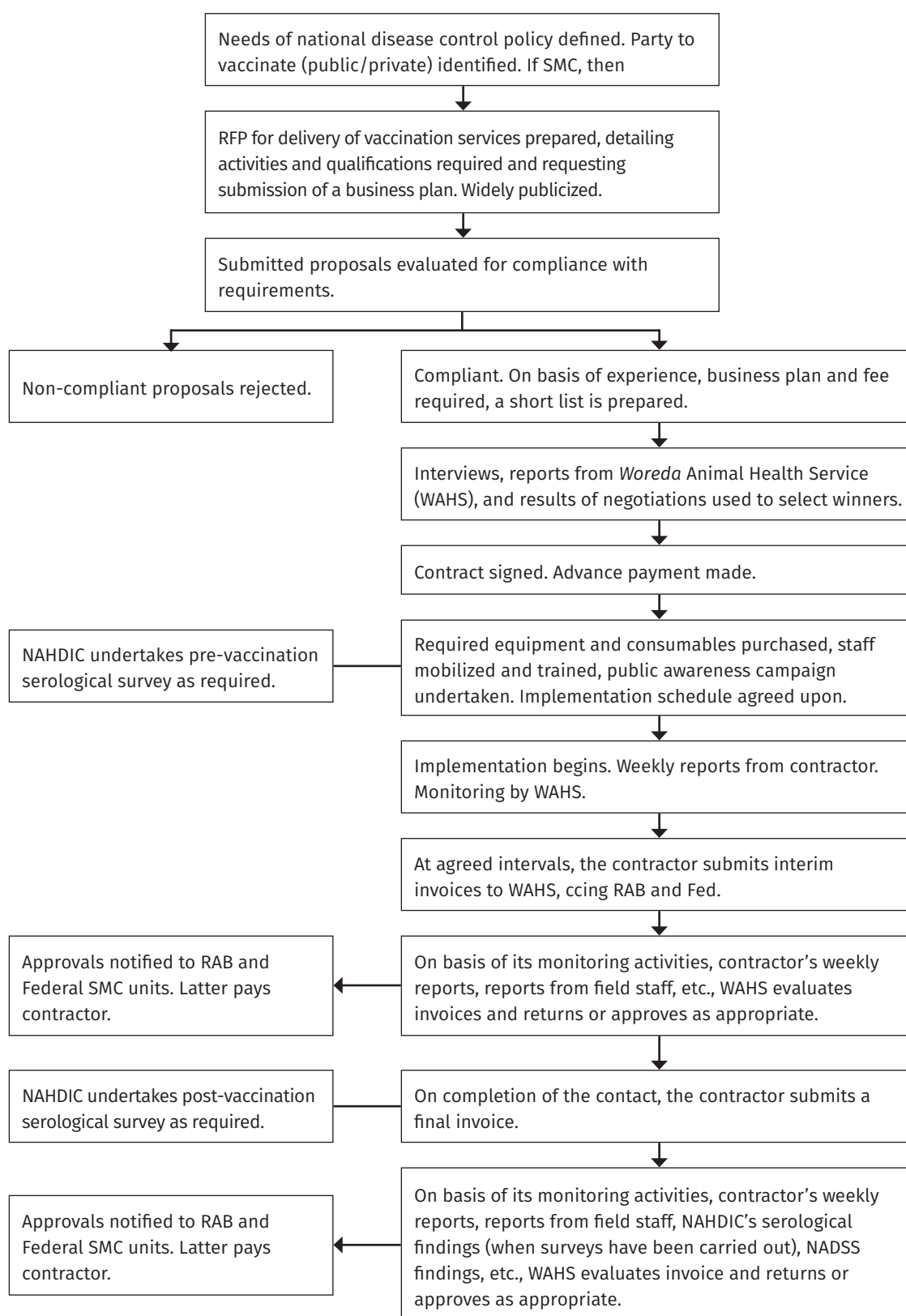
12.4.3 The process

Two processes can be envisaged. The first would be for routine medium-term SMC, say for a period of three to five years. These would be suitable for national disease control strategies that involve regular and predictable vaccinations of entire populations. The other process would be for ad hoc vaccinations; for example, to respond to detection of disease by participatory disease searching or the Animal Disease Notification and Investigation System, other active surveillance methods (e.g., NAHDIC surveys), or indeed from DOVAR 2 (The web-based monthly reporting component of NADSS).

For routine, medium-term SMC, the process described in Figure 9 is proposed.

For the ad hoc (risk-based strategic vaccinations) SMC, it is proposed that a panel of qualified contractors be selected in advance (using the same criteria as given in the routine process) and a framework contract signed by Government and private contractors. This contract would specify all conditions and a fee rate. The fee rate would have been negotiated and vary with species, vaccine(s) to be administered, the animal production system, etc. This fee rate would be a little higher than the one used for equivalent medium-term SMC as an income stream is not assured, and, depending on disease patterns etc., contractors must maintain a constant readiness and be able to rapidly respond to an order from Government to implement a specified vaccination strategy.

Figure 9. The process for routine contracting of medium-term SMC



13. The way forward

The timing of this study was opportune. The MoFEC has recently developed a PPP proclamation and a PPP policy. Implementation of these will promote progress with PPP in the livestock sub-sector. The LMP, which has charted the way and set priorities for development of the livestock sub-sector, envisages an important role for private-sector players.

Furthermore, a Livestock Market Proclamation and plans by the MUDH to facilitate construction of new standard-design abattoirs (four grades) and allied standard operating procedures will ease the integration of PPP into the operation of livestock markets and abattoirs.

The findings of this study have clearly demonstrated the technical and financial feasibility of the three target livestock facilities and SMC for delivery of public-good vaccinations.

However, as repeatedly stated in this report, it will not be possible to implement any of the selected PPP options unless important preconditions are satisfied. These include legislative, policy, and planning issues and are described below.

13.1 Working with the PPP Unit at the MoFEC

Of these, probably the most important is to engage with the newly-established PPP Unit at the MoFEC, which will regulate ALL PPP arrangements in Ethiopia. This unit has prepared a PPP policy and developed a PPP proclamation (ratification of this is expected before the end of 2017).

The contact person at the MoFEC is the Head of the PPP Unit, Ato Abebe Tadesse, mobile telephone number 0911309377.

The process of approval and implementation of PPPs in Ethiopia is outlined in Figure 10.

The following list presents factors that will promote adoption of SMC.

- The proposed EU-funded Livestock Value Chain – Public Private Partnership project (LVC-PPD II) has a budgetary provision for promoting PPPs. Hopefully, this project will start in early 2018, if not before.
- The LMP actively promotes involvement of the private sector in development of the livestock sub-sector and specifically mentions PPP. LMP targets are embodied in the GTP 2.
- The new PPP unit of the OIE, based in Paris,¹⁴ has funding from the Bill and Melinda Gates Foundation (BMGF). Ethiopia is a priority target country for the BMGF; it is therefore possible that the OIE unit could allocate funds for PPP development in Ethiopia, especially for the pastoral areas.
- The International Finance Corporation of the World Bank Group could possibly assist with financing.¹⁵

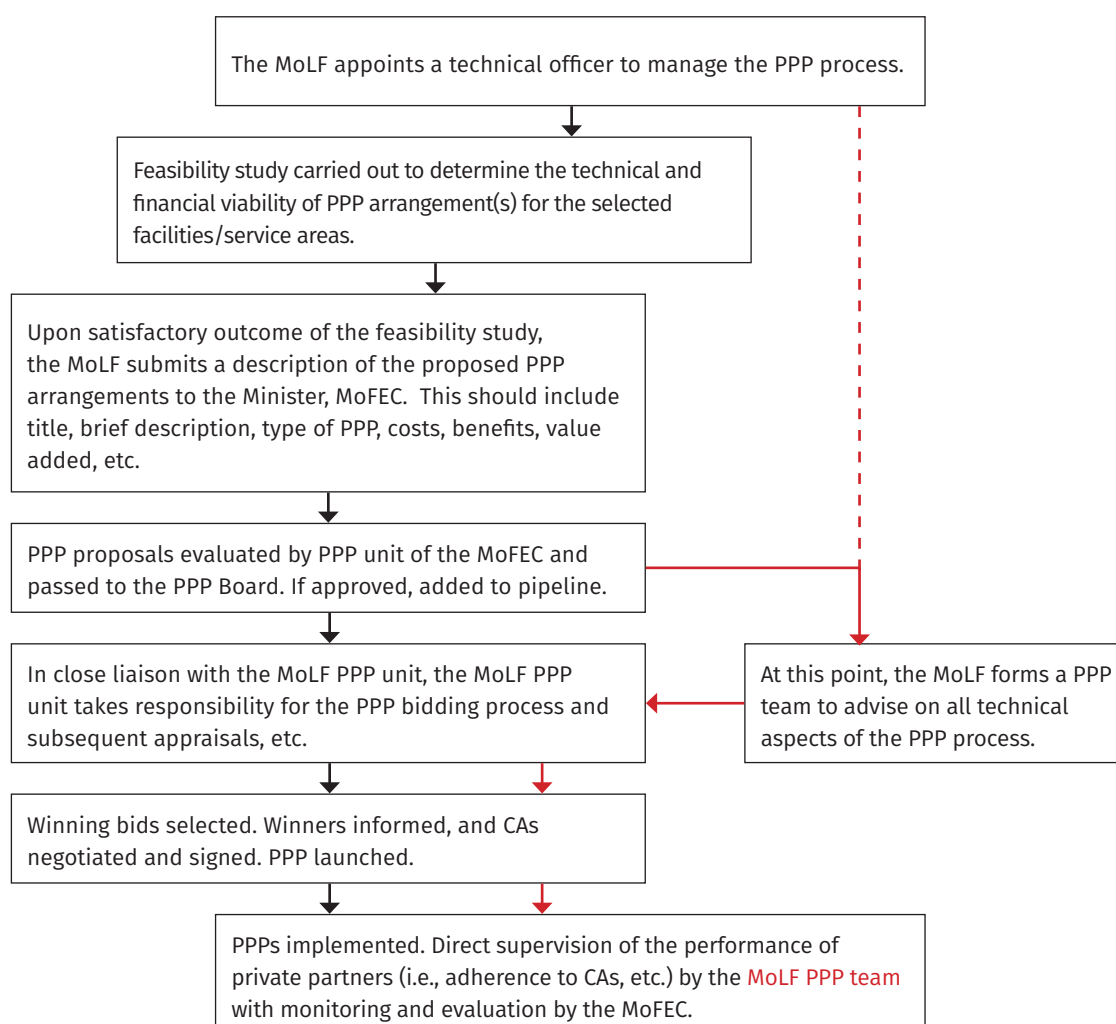
The important points to be drawn from Figure 10 are:

- All PPPs are approved, tendered, regulated, and evaluated by the MoFEC;
- The MoLF must promptly appoint a technical officer to serve as the PPP contact point, liaise with the MoFEC, and advise and assist in moving the PPP process forward;
- As soon as practicable, the MoLF must submit details of the proposed PPP arrangements to the MoFEC for consideration and, hopefully, placement into the implementation pipeline;

¹⁴ Contact person is Ms. Isabelle Dieuzy-Labaye, email i.dieuzy-labaye@oie.int.

¹⁵ Contact person at World Bank Headquarters is Ms. Shino Saruta, email ssaruta@ifc.org.

Figure 10. The PPP process in Ethiopia



- Once a project has been approved by the MoFEC PPP Board, the MoLF must form a PPP team to assume responsibility for the technical aspects of the PPP;
- The MoFEC remains responsible for all legal, financial, and compliance aspects;
- The MoLF is the contracting authority and remains responsible for the technical aspects of the PPP arrangements;
- Without a MoLF contact point with which the MoLF can interact, the process cannot move forward.

13.2 Enablers for PPPs

The following plans/road maps and projects will assist in the establishment of PPPs:

- The proposed EU-funded Livestock Value Chain/Public Private Dialogue Project II has a budgetary provision for establishing PPPs as a means of promoting private-sector involvement in delivery of animal health services;
- The LMP stresses the importance of the private sector to successful development and specifically mentions PPPs. LMP targets are embodied in GTP 2;
- The Road Map for Rationalising Delivery of Veterinary Services¹⁶ includes many references to PPPs in the veterinary service delivery system;

¹⁶ Completed and submitted in 2015. No further action has been taken to move this forward—approval, modification, or replacement!

- The PPP unit of the OIE has funding from the BMGF. Ethiopia is a priority target country of the BMGF, and it is therefore possible that the OIE could allocate funds for PPP development in Ethiopia;
- The PPP unit of the MoFEC—see 13.1.

13.3 Pending legislation and policy

Action really is required to address these pending draft documents (the Road Map for Rationalising Delivery of Veterinary Services in Ethiopia, the Proclamation for Establishment of the Veterinary Council of Ethiopia, and the Proclamation for the Protection of Animal Health, Welfare and Veterinary Public Health)—either move them forward in their current form, or amend and then act. Draft proclamations must be submitted for parliamentary approval and draft plans formally approved.

It is very important to note that each PPP CA (the contract that defines the relationship between the public and private partners) must be based on existing legislation. This gives urgency to getting the required legislation in place.

13.3.1 Legislation governing abattoir operations and hygiene

There is a lack of legislation governing hygiene and inspection standards in domestic abattoirs in Ethiopia. A draft Regulation on Meat Hygiene and Safety was prepared in 2013. It is very important that this is ratified without further delay as it is required to define legal standards in the abattoir CAs.

13.3.2 The draft proclamation for the “Protection of Animal Health, Welfare and Veterinary Public Health”

This extremely important piece of legislation was prepared in 2013 and would be the overarching law for veterinary services. It awaits submission for approval by Parliament.

This proclamation is important for PPPs as it would provide a legal basis for CAs and help resolve the current and harmful confusion regarding municipal-level mandates for inspection services at local abattoirs. Who is responsible for veterinary public health inspections, local veterinary authority staff or municipal staff? And what is the role of the Food, Medicine and Health Care Administration and Control Agency of the Ministry of Health? It will be important to resolve these issues in advance of implementing any PPP arrangement for abattoirs.

Several much-needed regulations were prepared in 2012–2014 under the aegis of this draft proclamation, including:

- The Prevention and Control of Animal Disease Regulation—required for SMC;
- The Animal Identification, Movement Control and Traceability Regulation—required for LITS and livestock market throughput;
- The Veterinary Control of Import and Export Regulation—required for export quarantines;
- The Control of Food Safety and Quality of Primary Animal Products Regulation—required for abattoirs;
- The Animal Welfare and Control of Stray Animals Regulation—required for abattoirs.

These regulations await approval.

13.3.3 Veterinary Council of Ethiopia

There is a draft proclamation for the establishment of the Veterinary Council of Ethiopia and to regulate veterinary professionals and para-professionals. This is required to assure professionalism and adherence to a code of professional conduct by SMC contractors.

13.3.4 The NADSS

Municipal abattoirs, export quarantines, livestock markets, and sanitary mandate contractors must be integrated into the NADSS.

13.3.5 Agreement with the Djibouti authorities

An agreement needs to be made with the Djibouti authorities to (i) enable quarantining and certification of Ethiopian livestock at Mille (and not in Djibouti as at present), and (ii) provide a holding area in which to keep Ethiopian livestock pending shipment. A reasonable number of days' stay must be specified to allow for shipping delays. Unless these conditions can be agreed to the full satisfaction of Ethiopian livestock exporters, there will be no opportunity for PPP at the Mille Quarantine Facility.

13.3.6 Veterinary Rationalisation Road Map

This was submitted for approval in 2015 and provides a strong policy basis for involvement of the private sector in delivery of veterinary/livestock services. This will be required as a guide for, among many other actions, redeployment of public *woreda*-level animal health staff as a possible consequence of SMC vaccination programs.

This road map awaits official endorsement.

13.4 Conclusion

The MoLF is responsible for moving all of the above forward. There is much work to be done.

Without these actions, there will be little or no legal underpinning for the PPP CAs. This would be a serious deficiency. Not only would formal standards be missing but also substantial and complex future amendments to CAs would be required as and when proclamations and regulations are brought into law.

