



Ethiopia Sanitary & Phytosanitary Standards and Livestock & Meat Marketing Program (SPS-LMM)

Final Report (2005-2011)

**Norman Borlaug Institute for International Agriculture
of the
Texas A&M University System**

**The Ministry of Agriculture (MoA)
of the
Federal Democratic Republic of Ethiopia (FDRE)**

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ACRONYMS

AI	Avian Influenza
APHIS	Animal and Plant Health Inspection Service
APHRD	Animal and Plant Health Regulatory Directorate
CAHW	Community Animal Health Workers
CNRIT	Center for Natural Resource Information Technology
EIAR	Ethiopian Institute for Agricultural Research
ELISA	Enzyme Linked Immuno-sorbent Assay
ELTA	Ethiopian Livestock Traders' Association
EMDTI	Ethiopian Meat and Dairy Technology Institute
EMPEA	Ethiopian Meat Professional Exporters Association
EVS	Ethiopian Veterinary Services
FMD	Foot and Mouth Disease
FAO	Food and Agriculture Organization
GL-CRSP	Global Livestock – Collaborative Research and Support Program
GLP	Good Laboratory Practices
GMP	Good Manufacturing Practices
GoE	Government of Ethiopia
HACCP	Hazards Analysis and Critical Control Points
ISO	International Standards Organization
IR	Intermediate Results
KSA	Kingdom of Saudi Arabia
LIMS	Laboratory Information Management System
LINKS	Livestock Early Warning and Knowledge System
LQMS	Laboratory Quality Management System
MENA	Middle East-North Africa
MoA	Ministry of Agriculture
MoARD	Ministry of Agriculture and Rural Development
MoT	Ministry of Trade
MoFA	Ministry of Foreign Affairs
NAHDIC	National Animal Health Diagnostic Investigation Center
NAHRC	National Animal Health Research Center
NEPRP	National Emergency Preparedness and Response Plan
NVI	National Veterinary Institute
OIE	World Organisation for Animal Health
PCR	Polymerase Chain Reaction
PLI	Pastoralist Livelihoods Initiative
PVS	Performance of Veterinary Services
QMS	Quality Management System
SOP	Standard Operating Procedure
SPS	Sanitary & Phytosanitary Standards
SPS-LMM	Sanitary & Phytosanitary Standards and Livestock & Meat Marketing Program
TAD	Transboundary Animal Disease
TAES	Texas Agricultural Experiment Station

TAMUS
UAE
USAID
USDA
UGITSC

Texas A & M University System
United Arab Emirates
U.S. Agency for International Development
U.S. Department of Agriculture
Utuba Gumi International Trade Share Company

EXECUTIVE SUMMARY

The USAID-funded Ethiopia Sanitary & Phytosanitary Standards and Livestock & Meat Marketing (SPS-LMM) program worked in close collaboration with public institutions and private operators to dramatically increase meat and live animal exports from Ethiopia between 2005 and 2011. From a base of \$27 million in formal live animal exports and \$18.5 million in meat exports in 2005/06, the program helped the country reach \$148 million in live animal exports and \$63 million in meat exports in 2010/11. These increases—241% in the value of meat exports and 442% in the value of live animal exports—reflect an increase in volumes exported (a doubling of meat exports and near-tripling of live animal exports), an increase in the value per MT of meat and head of livestock, and, in the case of live animals, an increased formalization of the livestock trade. Meat exports more than doubled (from 7,917 MT to 16,877 MT), while official live animal exports nearly tripled (from 163,375 head to 472,045 head) between 2005/06 and 2010/11.

Over the life of the program, Ethiopia rapidly expanded its exports to traditional markets such as the Kingdom of Saudi Arabia (KSA), the United Arab Emirates (UAE) and Egypt, while also diversifying into new markets. Between 2006 and 2011, Turkey, Jordan, Viet Nam, China, Kuwait, Oman, Qatar, Angola and Comoros all imported Ethiopian meat products for the first time. Over the same period, Bahrain, Kuwait, Oman and Lebanon all officially imported Ethiopian live animals for the first time. Some of these new importing countries rapidly ramped up volumes, such as Turkey, which became the third largest importer of Ethiopian meat products after the UAE and Saudi Arabia. Other new markets expanded more slowly, but even relatively small volumes of imports reflect a new willingness from importing country authorities to recognize Ethiopian SPS certification systems—a highly significant development.

This rapid increase in exports is a testament to the determination of the Government of Ethiopia (GoE) and the investments of private meat and live animal exporters, but would not have been possible without USAID funding for the SPS-LMM program. Implemented by the Borlaug Institute, Texas A&M University System (TAMUS), SPS-LMM helped the public and private sectors achieve their objectives by providing technical expertise to strengthen animal health and SPS certification systems and upgrading private operators' skills in animal feeding, processing, marketing and exporting.

Coordination and collaboration were the modus operandi of the SPS-LMM program. The program team worked closely with relevant government agencies, providing them with technical support to help them fulfill their mandate and create an enabling environment for meat and livestock exports. The SPS-LMM technical team comprised Ethiopian experts (three veterinarians, three livestock marketing specialists, a livestock production specialist and a communication officer and editor) as well as short-term senior advisors in feedlot nutrition and management, meat technology, food safety, veterinary diagnostics and epidemiology and laboratory quality management systems (QMS).

The program's activities were organized along two objectives:

- Objective 1: Improve capacity of Ethiopian veterinary services to undertake SPS and related activities in support of increased livestock and meat exports.
- Objective 2: Improve Ethiopia’s capacity and competitive advantage for meat and livestock exports.

Under the SPS-related objective, the program made the following important contributions:

- **Supported the creation and technical capacity building of the Animal and Plant Health Regulatory Directorate (APHRD)**, which houses the federal Veterinary Services, and built Ethiopia’s capacity for bilateral SPS negotiation with importing countries. Today, APHRD is responsible for animal health regulatory issues in Ethiopia and competently serves as an interlocutor with trade partners on SPS-related trade issues.
- **Evaluated options to meet SPS requirements** and developed alternative strategies, including compartmentalization and commodity based approaches. Today, Ethiopia meets the SPS requirements of most Middle East – North Africa (MENA) countries and is developing two international standard livestock quarantine stations near the borders with Djibouti and Somaliland.
- **Improved Ethiopia’s veterinary laboratory services**, including diagnostic capacity, quality management and information management systems, regional networking and cost recovery scheme. Today, the National Animal Health Diagnostic and Investigation Center (NAHDIC) is serving as the OIE’s reference laboratory for East Africa for Newcastle Disease and other high-mortality poultry diseases, and is being evaluated by SANAS for ISO 17025 accreditation.
- **Strengthened livestock disease surveillance** and reporting through national surveys for Foot and Mouth Disease (FMD) and Rift Valley Fever (RVF). Today, Ethiopia has succeeded in lifting trade bans imposed by MENA countries¹—a testament to the country’s improved capacity for SPS-related certification and negotiation as well as the strong disease surveillance and monitoring systems that helped lift trade bans from UAE, Saudi Arabia and Egypt during the life of the program.
- **Updated animal health laws** through technical support to APHRD in drafting regulations, proclamations, SOPs and guidelines. Today, Ethiopia is updating animal health regulations, procedures and systems to comply with international standards.
- **Improved cold chain management of meat exports** through technical assistance, provision of equipment to abattoirs and negotiations for a cold store at Bole International Airport. Today, the cold chain for meat products, which starts at the abattoirs and goes via refrigerated trucks through a cold store at the airport on to importing countries, enables meat exports of higher quality and longer shelf life.
- **Introduced HACCP in export abattoirs**. Today, Ethiopia has one HACCP-certified export abattoir, with another in process of certification. Other abattoirs are also in the process of establishing HACCP systems, and APHRD is monitoring their progress.
- **Strengthened feedlot health management practices** through trainings and the relocation of feedlots out of Adama town. Today, Ethiopia has more efficient and

¹ Officially, the UAE still bans Ethiopian live animal exports; however, export data reports indicate significant volume of livestock exports to the UAE in recent years.

well-managed feedlots that help showcase Ethiopia's commitment to animal health management required for strong SPS certification systems.

- **Strengthened public institutions** through capacity building, financial and technical support, and involvement in program activities. Today, Ethiopia's SPS certification systems are internationally accepted, with a competent APHRD regulating and overseeing SPS issues, a regionally networked NAHDIC supporting disease surveillance and diagnostics, and a National Veterinary Institute (NVI) producing and importing animal vaccines.

Under the marketing objective, the program:

- **Developed strategic end markets for Ethiopian meat and livestock** through support for high-level trade missions to 10 countries, participation in the Gulfood Fair and the development of the DVD, *Quality Meat from Ethiopia*, and other promotional materials. Today, Ethiopia has 17 trading country partners for its meat exports, up from 7 in 2005/06, and 13 trading partners for live animal exports, up from 8 in 2005/06.
- **Enhanced capacity for meat exports** through the collaborative development and implementation of the GOE approved *Comprehensive Plan for Supporting the Meat Export Industry*, including technical trainings and international observation missions for feedlot and export abattoir operators. Today, Ethiopia has 7 operating export abattoirs with functioning capacity more than double that in 2005/06 and a highly knowledgeable and skilled group of private sector operators.
- **Increased supply of export quality animals** the introduction of dairy beef, and the provision of technical advice in feedlot design and management. Today, Ethiopia's feedlots are better designed, better managed and increasing weight gains and cost-effectiveness by feeding total mixed, best cost ration to younger animals and export abattoirs are operating at 62% of installed capacity, up from 31% in 2005/06.
- **Increased transparency and reduced transaction costs in the livestock market chain** through establishment of National Livestock Market Information System (NLMIS) and technical support for Utuba Gumi, a livestock marketing share company including Borena pastoralists as shareholders, which can serve as a model for marketing companies in other pastoral areas.
- **Served as gateway for export market development and investment** in Ethiopia's meat and livestock industry through the hosting of business delegations. Today, foreign companies are increasing investments in Ethiopia's livestock and meat industry, while others are evaluating investment options.
- **Strengthened public institutions and sectoral associations** through capacity building, financial and technical support, and involvement in program activities. Today, within the Ministry of Agriculture, the Ethiopian Meat and Dairy Technology Institute (EMDTI) has strengthened technical and business skills to support private operators as well as manage the NLMIS. Private sectoral associations have been strengthened, with the Ethiopian Meat Producers-Exporters Association (EMPEA), the Ethiopian Livestock Trader Association (ELTA) and the Ethiopian Animal Feed Industry Association (EAFIA) providing important advocacy, information, promotional and business services to their members.

Sustainability was a driving consideration in the SPS-LMM approach to program implementation from day one. The program invested significant time and resources consulting stakeholders, identifying needs and capacity gaps and building the capacity of local institutions and organizations to fulfill their mandate. The relevant government agencies, institution(s) and association(s) were involved as active participants or co-organizers in every training, every needs assessment, and every study tour organized by the program. As a result, SPS-LMM leaves behind effective governmental agencies and institutions and technically skilled and business-savvy local private sector operations which have a strong sense of ownership and responsibility for continuing the positive trajectory of growth for the Ethiopian meat and livestock export industries long after the end of SPS-LMM.

I. SPS-LMM BACKGROUND

1. Origin of the program

Livestock is an important economic resource and an essential source of livelihoods for approximately 80 percent of Ethiopia's rural population (FAO/WFP, 2010). With a national herd of 51.8 million cattle, 33 million sheep, 30 million goats and 2.5 million camels (SPS-LMM and EMDTI, 2011), the livestock sector also has the potential to contribute significantly to national economic growth. In addition, with Ethiopia's comparative advantage for exports due to proximity to the Gulf States (which import many head of livestock and large volumes of meat each year), the sector also has the potential to bring in critical foreign exchange earnings.

In 2004, the Ethiopian livestock sector's potential to generate foreign exchange earnings was largely unrealized, as the country had exported just 3,317 MT of meat and 41,966 head of livestock through formal channels in the previous year (2003/04). Recognizing this untapped potential, the Government of Ethiopia (GoE) developed a five-year livestock sector development plan, with an emphasis on meat production and exports. USAID pronounced itself in strong support of the Ethiopian government's plan, and in October 2004, Agriculture Minister Addisu Legesse traveled to the US on a USAID-sponsored mission, together with USAID/Ethiopia Mission Director Bill Hammink. During this mission, two specific priorities for increasing exports were identified: (1) Meet international SPS requirements and (2) Produce/market export quality animals and meat products. These priorities formed the basis for the Sanitary & Phytosanitary Standards and Livestock & Meat Marketing (SPS-LMM) RFA that was issued in May 2005.

The \$6,999,961 Cooperative Agreement for the SPS-LMM program was awarded to the Texas Agricultural Experiment Station of the Texas A&M University System (TAES/TAMUS)² in August 2005. The total budget was later increased to \$9,255,461 through the addition of \$1,255,500 for highly pathogenic avian influenza (HPAI) activities and a \$1 million bridging grant that extended SPS-LMM through FY 2011.³

2. Ethiopia's meat and livestock export sector in 2005/06

In the 2005/06 Ethiopian fiscal year⁴, Ethiopia exported 7,917 MT of meat and 163,375 head of livestock, earning a total of \$45.8 million. Exports of both meat and live animals had been on the rise for several years but remained far below their potential, and gains were fragile as Ethiopia's weak SPS certification systems made the country susceptible to

² In 2008, the Norman Borlaug Institute for International Agriculture was established and TAES was renamed Texas AgriLife Research, with a new logo. For the sake of simplicity and consistency, the program continued using TAMUS and the TAES logo on reports and publications.

³ SPS-LMM joined several other programs in USAID's five-year plan (FY 2006-10) working in support of the Ethiopian government's livestock sector objectives, including the Ethiopian Dairy Development Program (EDDP) and the Ethiopian Sheep and Goat Productivity Improvement Program (ESGPIP). In FY 2006, the USAID provided additional funding through the Famine Fund for the Pastoralist Livelihoods Initiative (PLI).

⁴ The Ethiopian fiscal year runs from July 8 to July 7.

disease-related trade bans. Trading partners were few in number. Meat exports were mainly limited to chilled shoat carcasses and were destined primarily to low-income guest workers in the Kingdom of Saudi Arabia (KSA) and the United Arab Emirates (UAE). Official livestock exports represented only a fraction of total livestock exports and were primarily limited to cattle, with nearly all sheep, goat and camel exports through informal trade channels.

The GoE had placed a high priority on increasing livestock and meat exports and was committed to supporting the sector through an enabling business environment for private operators. Yet critical constraints remained, particularly with regards to meeting international SPS requirements. The country lacked a strong regulatory body to serve as the Competent Authority for SPS-related issues. Efforts to improve Ethiopia's SPS image through the development of disease-free zones requiring ring vaccination were being considered, but high costs and difficulty of implementation made such initiatives appear unrealistic. Animal health laws, regulations and certification capabilities did not meet requirements for international trade. The federal veterinary lab was focused on research rather than service provision for the livestock sector. Together, these constraints impeded Ethiopia's efforts to meet international SPS requirements.

Private sector operators faced significant internal constraints as well, including:

- Import restrictions based on SPS requirements imposed by importing countries
- Insufficient and inconsistent supply of price competitive, export quality meat and livestock
- Lack of capacity for cattle slaughter and for cold chain processing and packaging export quality beef products
- Lack of capability for cost effective, cold chain transport of meat products by road and sea for delivery to Middle East and North Africa (MENA) and other international markets
- Limited knowledge of market preferences for type and quality of meat products and lack of established and profitable contracts with meat importers in international markets

It is into this context that the SPS-LMM program cooperative agreement was signed in August 2005.

3. SPS-LMM goal and objectives

Goal. The SPS-LMM Program goal is to increase exports of meat and livestock to benefit Ethiopian livestock producers and exporters and to promote national economic development.

Objectives. Two complementary objectives contribute to the program goal—one SPS-related objective and one marketing objective, each of which had a set of intermediate results (IRs).

Objective 1: Improve capacity of Ethiopian veterinary services to undertake SPS and related activities in support of increased livestock and meat exports. Under this

objective, the SPS-LMM program worked to increase the capacity of veterinary services, improve national capacity for diagnosing export-limiting diseases, improve local vaccine production, improve Ethiopia's capability to comply with importing countries' standards, and establish an SPS certification system for meat and livestock exports.

Objective 2: Improve Ethiopia's capacity and competitive advantage for meat and livestock exports. Under this objective, the SPS-LMM program worked to improve the efficiency and effectiveness in export marketing, increase production and improve the cost effectiveness of production, and enhance demand for Ethiopian livestock and meat in target markets.

In addition to these two core objectives, the SPS-LMM program also supported activities aimed at HPAI surveillance, prevention and diagnosis.

Throughout the two core objectives and the additional HPAI activities, the SPS-LMM approach was catalytic in assisting the GoE and private stakeholders in identifying problems, establishing priorities, planning, allocating resources and implementing the various strategies.

"The SPS-LMM program is the first of its kind (in the last 35 years) that is totally focused on improving Ethiopia's meat export capacity. The progress made so far has been focused on identifying core problems, providing technical support and recommending solutions. These valuable recommendations require translation into reality, and without the technical support of the Program, are not likely to materialize."

- Yacob Aklilu, SPS-LMM Midterm Evaluation, 2008 (p. 7)

4. Start-up activities in 2005/06

Despite difficulties with TAMUS' formal registration in Ethiopia⁵, the SPS-LMM program accomplished several important start-up activities in 2005/06. First among these (following the recruitment of senior staff) were a series of assessments and consultations. Program staff visited the National Animal Health Research Center (NAHRC), the National Veterinary Institute (NVI), regional laboratories, export abattoirs, livestock markets, and the Ethiopian Meat Producers and Exporters Association (EMPEA). They held extensive discussions and consultations with Agriculture Minister and Deputy Prime Minister Ato Addisu Legesse and newly appointed State Ministers for Agriculture, Dr. Abera Deressa, and Agricultural Marketing, Ato Yacob Yala, as well as Ministry of Agriculture and Rural Development (MoARD) department heads. SPS-LMM then held a launch and planning workshop with over 80 public and private stakeholders in March 2006.

In support of the SPS objective, the program organized initial trade missions to major trading partners UAE and Egypt to discuss SPS requirements for meat and livestock exports, and made plans for subsequent trips to Saudi Arabia, Jordan and Lebanon. Senior SPS-LMM staff evaluated regional veterinary and diagnostic laboratory capabilities to service SPS compliance and recommended an expanded role for NAHRC, as described in IR 1.2 below.

⁵ TAMUS' status as a US university did not fit within any of the GOE's categories for registration and therefore necessitated an exceptional agreement. With support from senior GOE officials, this agreement was obtained and TAES/TAMUS was formally registered in May 2006.

Livestock and meat marketing activities included the initiation of analyses of livestock supply and marketing and a survey of livestock feed resources. SPS-LMM also conducted an inventory of feedlots and in-depth evaluations of export abattoir and feedlot operations, and organized a livestock and meat marketing study tour to Botswana

Year One Avian Influenza activities included the procurement and shipment laboratory supplies and protective clothing and the organization of a two-week HPAI training course for veterinarians and laboratory technical staff.

II. SPS-LMM ACTIVITIES AND OUTPUTS

Objective I: Improve capacity of Ethiopian veterinary services to undertake SPS and related activities in support of increased livestock and meat exports.

The expansion of meat exports depends on meeting importing countries' SPS requirements and related concerns about livestock and meat traceability; disease surveillance, monitoring, quarantine and diagnostic systems; abattoir quality management systems; among others. Ethiopia, in 2005, lagged far behind competitors such as Brazil, Australia, India and others, which had already met these requirements. The USAID-funded SPS-LMM program's assistance was designed to address these concerns and boost Ethiopia's capacity to manage SPS issues. In each of the activities described below, SPS-LMM worked closely with the Ministry of Agriculture and relevant federal agencies and institutes—the Animal and Plant Health Regulatory Directorate (APHRD), National Animal Health Diagnostic and Investigation Center (NAHDIC) and NVI—as well as regional veterinary services. Through close collaboration, SPS-LMM staff and consultants supported and strengthened the relevant agencies' capacity to meet the international requirements for livestock and meat exports. Table 1 summarizes the evolution of Ethiopia's SPS capacity between 2005 and 2011.

Table 1. Ethiopia's SPS evolution, 2005 to 2011

SPS capacity in 2005/06	Key program interventions	SPS capacity as of Aug 2011
Veterinary services and regulations		
<p>In 2005:</p> <ul style="list-style-type: none"> Ethiopian Veterinary Services (EVS) were not staffed and structured to international standards. Animal health laws and regulations were outdated and not in line with OIE recommendations. 	<p>SPS-LMM:</p> <ul style="list-style-type: none"> Supported the creation of APHRD, modeled after USDA/APHIS, and assisted the agency in developing capabilities to ensure that exported meat and livestock meet SPS requirements of importing countries Supported APHRD in developing SOPs and guidelines and drafting proclamations and regulations on food safety and animal health and welfare Supported preparations for PVS assessment of EVS by the OIE 	<p>In 2011:</p> <ul style="list-style-type: none"> APHRD (including federal VS) is responsible for animal and plant health regulatory issues in Ethiopia and serves as i interlocutor in bilateral SPS-related trade negotiations. Veterinary services and systems have been recognized by as many as 15 importing countries EVS were assessed by OIE PVS team in May 2011. Based on the assessment of the PVS evaluation mission, Ethiopia was rated as a country with "a very rapidly improving animal health system of commendable quality".

SPS capacity in 2005/06	Key program interventions SPS certification	SPS capacity as of Aug 2011
<p>In 2005:</p> <ul style="list-style-type: none"> Ethiopia lacked a credible SPS certification system and was considering the difficult and expensive task of establishing disease-free zones. Ethiopia lacked international standard quarantine facilities 	<p>SPS-LMM:</p> <ul style="list-style-type: none"> Designed a two-phase SPS certification system based on the compartmentalization and commodity-based approaches. Conducted cost analysis and risk analysis and evaluated pilot trial of two-phase system. Assisted site selection and design for two international standard quarantine stations near borders with Djibouti and Somaliland. Supported APHRD in developing OIE-compliant SPS certificates Strengthened biosecurity and health management in feedlots for export animals 	<p>In 2011:</p> <ul style="list-style-type: none"> Construction has started on one quarantine station, with the second due to begin in the coming months Djibouti has agreed to allow Ethiopian SPS certified animals to be exported through Djibouti Port without re-quarantine in Djibouti SPS certificates which meet OIE requirements are in use The 2-phase SPS certification system proved technically impractical. The pilot trial provided important lessons for improving capabilities for meeting SPS requirements of importing countries, including the option for the commodity approach to SPS certification of meat products
Disease surveillance and diagnostic capacity		
<p>In 2005:</p> <ul style="list-style-type: none"> Ethiopia's disease surveillance and diagnostic systems were poor NAHRC focused activities on research and did not have sufficient capacity to handle the high volumes of specimens tested for TAD surveillance and SPS certification The country's regional labs were not networked with the federal lab or with each other OIE-required disease outbreak monitoring reports were submitted by only 30-35% of woredas 	<p>SPS-LMM:</p> <ul style="list-style-type: none"> Supported NAHRC/NAHDIC's transfer from EIAR to MoARD with expanded mandate to service the animal health needs of livestock sector Supported national FMD and RVF surveillance Helped establish LABNET linking NAHDIC with 13 regional labs Applied TAES' experience to help establish QMS standards for ISO 17025 at NAHDIC Supported identification, procurement and customization of LIMS software suited to NAHDIC's needs Helped develop a cost recovery scheme for NAHDIC's purchase of diagnostic kits and other consumables Assisted APHRD in developing strategy to improve national disease surveillance and reporting, and training regional staff in surveillance, monitoring and reporting TADs disease monitoring reports. Trained trainers from APHRD, NAHDIC and veterinary faculties in use of GIS and GPS for disease surveillance 	<p>In 2011:</p> <ul style="list-style-type: none"> NAHDIC has been designated by OIE as East African regional reference laboratory for poultry diseases. NAHDIC has established LIMS to manage large volumes of diagnostic data LABNET coordinates planning for national diagnostics and central procurement of consumables and diagnostic kits for NAHDIC and regional labs NAHDIC's ISO 17025 initial assessment for accreditation is expected in October 2011 Disease monitoring reports are submitted regularly by 47% of woredas, a significant increase albeit with room for further improvement, particularly in pastoral woredas

SPS capacity in 2005/06	Key program interventions	SPS capacity as of Aug 2011
Trade bans		
In 2005: <ul style="list-style-type: none"> Ethiopia experienced TAD-related trade bans, including a longstanding rinderpest ban from Saudi Arabia. The country and did not have surveillance and diagnostic data to argue against trade bans SPS-related trade bans limited and disrupted meat and formal livestock exports to major MENA markets (Saudi Arabia, UAE and Egypt) 	SPS-LMM: <ul style="list-style-type: none"> Organized high-level SPS-related trade missions to open or re-open markets in Saudi Arabia, the UAE and Egypt Supported national surveillance for FMD, sample collection and analysis, and development of national TAD control strategy, including vaccination, to reassure importing country authorities 	In 2011: <ul style="list-style-type: none"> Trade bans were lifted by KSA, UAE (for meat only) and Egypt Ethiopia exported the highest-ever number of live animals through formal channels to major markets (Saudi Arabia, UAE and Egypt) as well as new ones including Jordan, Bahrain and Kuwait
Meat quality and cold chain management		
In 2005: <ul style="list-style-type: none"> Ethiopian meat exports were of low quality, with a short shelf-life and prone to dark cutting due to improper animal/meat handling procedures and poor cold chain management Abattoirs paid inadequate attention to HACCP; none were HACCP certified 	SPS-LMM: <ul style="list-style-type: none"> Assessed abattoirs' HACCP needs and developed checklist for APHRD inspectors to use in monitoring abattoir operations Supported two abattoirs in HACCP accreditation (to serve as models for others) Worked with the MoA and EMPEA for the re-opening of a cold store for meat at Bole Airport Trained airport cargo and cold store employees, and abattoir workers in hygienic handling and cold chain management of meat products 	In 2011: <ul style="list-style-type: none"> Modjo Modern Export Abattoir is HACCP certified; Luna certification expected in October, 2011 The Fresh Port cold store at Bole Airport is operational and exclusively serving chilled meat products from export abattoirs

IR 1.1. Increased capacity of veterinary services

With funding from USAID, SPS-LMM's activities to increase the capacity of veterinary services involved the creation of a new regulatory agency (APHRD) and support to this agency in technical capacity and policy development as well as strengthening capabilities for disease surveillance and reporting by the regional veterinary services.

1. Creation of and support to APHRD

SPS-LMM supported the creation of the Animal and Plant Health Regulatory Directorate, a new federal regulatory agency within the State Ministry for Agriculture. In May 2007, the program sponsored a high-level delegation mission to the US Department of Agriculture (USDA)'s Animal and Plant Health Inspection Service (APHIS), with recommendations from this mission leading to the establishment of the APHRD. This agency, which also houses the federal Veterinary Service, is responsible for all transboundary animal and plant health issues, representing Ethiopian interests in trade negotiations and at the OIE, and ensuring that Ethiopian exports meet the SPS requirements for international trade.

Technical capacity strengthening. Upon the creation of APHRD, SPS-LMM seconded two senior Ethiopian experts—one veterinarian and one plant health specialist—to organize the Directorate and provide strong leadership to the federal veterinary and plant health services. SPS-LMM also assisted APHRD in an internal assessment using the OIE Performance of Veterinary Services (PVS) tool. The assessment identified weaknesses and provided benchmarks against which to measure progress in reorganizing and strengthening veterinary services at all levels. SPS-LMM assisted APHRD in preparing a five-year strategic and performance plan for improving Ethiopian veterinary services.

One of the gaps identified in the OIE PVS assessment was the need for a veterinary council to register and license private and public veterinarians and para-professionals. According to the OIE, the official veterinary authority of a country is the only body responsible for certifications for livestock and livestock products destined for export. The person(s) responsible for exercising this authority must, however, be appropriately qualified and certified as competent by the national accreditation body. Ethiopia did not have an autonomous statutory body to regulate the veterinary profession, register veterinary surgeons and veterinary practitioners, and regulate professional education and professional conduct, and was therefore unable to meet the requirements for accreditation by the OIE. SPS-LMM organized a consultative workshop and supported APHRD in drafting a proclamation and subsidiary regulation for the Establishment of Veterinary Council and in preparing a draft Code of Ethics for the Council. This was one of several proclamations drafted with SPS-LMM support, as outlined below.

The program also assisted APHRD in developing a computer-based animal health information database, which is critical to managing surveillance data and monitoring transboundary animal diseases (TADs). In May 2011, the official OIE PVS assessment was conducted. The OIE evaluation team rated Ethiopia as a country with “a very rapidly improving animal health system of commendable quality” and described the country’s veterinary services as having “fruitful and excellent veterinary practices”. The team lauded the development of EVS strategic and performance plans; the publication of proclamations, regulations, SOPs and guidelines; and the national strategic plans for Foot and Mouth Disease (FMD) and Rift Valley Fever (RVF) surveillance. SPS-LMM’s support for these activities is described below.

Proclamations. SPS-LMM supported APHRD in drafting the following proclamations:

What is the relevance of proclamations? The case of veterinary drugs.

Animal inputs such as veterinary drugs or feed are subject to stringent international standards in order to ensure that they are effective in controlling disease and that exported animals or meat do not contain harmful levels of drug residues or toxins. In Ethiopia, the Ministry of Health’s Drug Administration and Control Authority (DACA) was responsible for veterinary drugs, but was unable to regulate their distribution and use at grassroots levels throughout the country—a constraint that had long affected animal disease prevention and control. SPS-LMM helped APHRD persuade the Minister for Human Health to transfer the administration and control of veterinary drugs and biological products from the Ministry of Health to the Ministry of Agriculture. The transfer was approved in 2009 and made official through the Proclamation for the Registration, Control and Administration of Veterinary Drugs, Biological Products and Feed Additives and the associated regulation. SPS-LMM also provided technical support for the creation of the new authority within the Ministry of Agriculture.

- Meat Hygiene Proclamation. This proclamation was approved by the Ministry of Agriculture's legal department and management, and was submitted to the Council of Ministers for approval in June 2011.
- Livestock and Livestock Products Import and Export Control Proclamation. At the time of writing (August 2011), this proclamation was still under review by the Ministry of Agriculture.
- Proclamation for the Establishment of Veterinary Council in Ethiopia. This proclamation was approved by the Ministry of Agriculture's legal department and management, and was submitted to the Council of Ministers for approval.
- Proclamation for the Registration, Control and Administration of Veterinary Drugs, Biological Products and Feed Additives (see text box above). This proclamation was approved by the Council of Ministers and is awaiting final promulgation by the Parliament.

Regulations. SPS-LMM veterinarians and two local consultants assisted APHRD in drafting the following animal health and food safety regulations:

- Registration of Veterinary Drugs, Biological Products and Animal Feed
- Prevention and Control of Animal Diseases
- Meat Hygiene and Safety
- Animal Movement and Traceability
- Livestock and Livestock Products Import and Export Control
- Registration and Licensing of Veterinary Professionals and Para-Professionals

The draft regulations were reviewed during consultative meetings organized by MoA/SPS-LMM with government professionals and private operators, revised and handed over to APHRD. At the time of writing, the majority of these regulations were under review by the MoA.

Standard Operating Procedures (SOPs) and guidelines. The program helped APHRD upgrade the practices of the private sector in order to ensure that diseased animals do not enter the export value chain and risk contaminating other animals. Together with APHRD, SPS-LMM trained over 100 livestock traders and feedlot operators on pre-purchase inspection, identification of TADs symptoms and lesions, and related issues. The program also developed feedlot health management guidelines for APHRD's use in promoting animal nutrition and health management practices. These were designed to reduce stress in movement from rangeland to feedlots, reduce the incidence of diseases of intensification, and enhance export animals' appetites and immune systems.

In total, SPS-LMM assisted APHRD in preparing 15 SOPs and guidelines, namely:

- Pre-Purchase Inspection Guideline
- Animal Handling Guideline
- Biosecurity Guideline
- Phase I and II SPS Facility Construction Guidelines
- Export Abattoir Construction Guidelines
- Ante-Mortem Inspection Guideline

- Meat Refrigeration And Handling Guideline
- Meat Inspectors and Inspector Veterinarians Guideline
- Meat Handling Guideline (abattoir)
- Meat Handlers' Personal Hygiene Guideline
- Meat Inspection Guideline
- Meat Transport and Storage Guideline (airport)
- Hygiene, Dressing and Carcass Handling Guideline
- Quarantine Station Operational Guideline
- Livestock Disease Outbreak Guideline
- Feedlot Health Management Guideline

APHRD distributed the guidelines and SOPs to meat and livestock exporters and APHRD field inspectors.

Quarantine Act. SPS-LMM supported APHRD in drafting a Quarantine Act for prevention and control of the introduction, establishment or spread of animal diseases in Ethiopia. By the end of the project, the Act had not yet been approved, but it was hoped that approval would be given during the following fiscal year.

International animal health certificates. At the start of the program, Ethiopia's animal health certificates lacked credibility, as they did not contain proper OIE wording and formats, which exposed them to easy forgery. SPS-LMM assisted APHRD in developing international animal health certificates based on OIE model certificates. The certificates, which cover live animals, meat and products of animal origin, meet OIE requirements as well as those of importing countries. SPS-LMM assisted with the training of 43 inspectors on the use and documentation of the certificates. APHRD supplied them to all meat inspection and quarantine offices. As of May 2011, Ethiopia's new international animal health certificate was in use throughout the country.

2. Strengthening of disease surveillance and reporting at the federal and regional levels

At the start of the program, compliance with OIE requirements for animal disease surveillance was constrained because only 30-35% of woredas submitted disease monitoring reports on a monthly basis. Reporting from the lowland pastoralist areas, source of 90-95% of export animals and endemic location for most transboundary animal diseases, was particularly poor. In response to this challenge, SPS-LMM assisted APHRD in drafting a strategy to improve national disease surveillance and reporting. The strategy includes collecting monthly animal health information from woreda animal health services, regional laboratories, and major city municipal and export abattoirs and linking field and laboratory services so that outbreaks are properly reported and investigated. The draft strategy was critically reviewed during a consultative stakeholders workshop and subsequently adopted by APHRD. SPS-LMM also assisted APHRD in preparing a Memorandum of Understanding (MoU) for cooperation between the Directorate and regional bureaus of agriculture on surveillance, reporting and emergency responses to transboundary animal diseases. The MoU, which requires disease reporting as a core

activity for woreda animal health personnel in each region, was signed by all Regional and City Administrative Council Bureaus of Agriculture.

In collaboration with SPS-LMM, FAO and regional governments, APHRD trained 289 regional animal health personnel on international reporting requirements, the importance of surveillance data, procedures for filling disease outbreak formats and agency strategies to improve disease surveillance and reporting at national levels. Following the training, the number of woredas sending disease outbreak reports to APHRD increased considerably, with 47% of woredas reporting on a monthly basis in 2010. This increase is expected to improve the coordination of surveillance, prevention, control and eradication programs for transboundary animal diseases. However, further improvements are necessary, particularly in the pastoral areas, in order to meet international standards which require that 80% of local districts submit monthly reports.

In a complementary intervention, SPS-LMM worked with partners from the Pastoralist Livelihoods Initiative (PLI) program to address the roles of community animal health workers (CAHWs) in disease surveillance and reporting.

IR 1.2. Improved capacity for diagnosing export limiting diseases

SPS-LMM supported NAHDIC in developing capacity for diagnosis and reporting of transboundary animal diseases and in improving diagnostic services at the regional labs, and, together with the Faculty of Veterinary Medicine, conducted studies on livestock morbidity/mortality in dairy farms and in export abattoir holding grounds.

1. Support to NAHDIC in developing capacity for diagnosis and reporting of TADs

At the start of the program, SPS-LMM recommended that the National Animal Health Research Center (NAHRC) be given an expanded role in supporting an internationally credible SPS certification system for meat and livestock exports. These recommendations helped lead to NAHRC being transferred from the Ethiopian Institute of Agricultural Research (EIAR) to the Animal Health Services Department in the Ministry of Agriculture, effective July 2006. This transfer was highly significant in that it changed the institute's mandate from research to service provision.

Following its transfer to the Ministry of Agriculture, NAHRC became the National Animal Health Diagnostic and Investigation Center in March 2007. SPS-LMM staff participated in developing terms of reference for NAHDIC, including the provision of diagnostic services, investigation of disease outbreaks, systematic surveillance, leading/assisting the regional laboratories, and national

efforts directed towards prevention and control of TADs. The program then provided significant support to NAHDIC in establishing a laboratory quality and information management system, meeting requirements for ISO 17025 accreditation, and expanding

“SPS-LMM played a key role in bringing together regional, federal and NVI officials to design a strategy for surveillance of FMD and control of other major TADs, for emergency preparedness and contingency plans for RVF, to determine global vaccine requirements and to build a consensus on a two-phase system approach for SPS.”

- Yacob Aklilu, SPS-LMM Midterm Evaluation, 2008 (p. 30)

capacity to support surveillance and rapid response to outbreaks of TADs, including FMD, RVF and HPAI as described below.

Establishment of Laboratory Quality Management System (LQMS) and ISO accreditation. SPS-LMM provided substantial support to NAHDIC in preparing for ISO accreditation. The program supported NAHDIC in meeting LQMS standards required for ISO 17025 accreditation; support entailed the development of a Quality Systems Manual, training in Good Laboratory Practices (GLP), compliance with ISO 17025 standards, and preparation for external assessments.

The Quality Management Systems Manual was a critical first step in the standardization of diagnostic activities. Prepared with technical input and support from senior program staff and advisors, the manual is congruent with ISO 17025 and provides a framework for quality control, standard operating procedures, staff safety and health, equipment maintenance, purchase of reagents, handling of specimens, etc. SPS-LMM trained NAHDIC staff in the application of the quality management systems procedures and organized visits to NVI and the Quality Standard Authority of Ethiopia (QSAE) to enhance staff knowledge of Good Laboratory Practices and QMS modalities, including such critical procedures as the regular calibration of equipment. The program also engaged Air Filter Maintenance Service, a South African company, to work with NAHDIC in calibrating their safety cabinets and hood equipment in order to improve their efficiency, personnel safety and compliance with ISO 17025 standards. As a result of SPS-LMM support, NAHDIC made significant improvements and now strictly applies SOPs in its diagnostic tests, manages databases and monitors supplies efficiently, and generally applies sound quality management/control procedures throughout the laboratory's operations.

SPS-LMM engaged an experienced ISO auditor, John Slade, for a pre-audit of NAHDIC in September 2009. Over the next year, Mr. Slade assisted NAHDIC staff in developing and documenting QMS procedures followed by a second on-site evaluation in July 2010. SPS-LMM experts and advisors continued to assist NAHDIC during 2010-11 in preparations for the final accreditation assessment by the internationally recognized authority, SANAS (South African National Accreditation Services) in October 2011. ISO 17025 accreditation for NAHDIC will significantly increase the international credibility of Ethiopia's SPS certification system.

Laboratory Information Management System (LIMS) development. An SPS-LMM consultant assessed NAHDIC's information technology infrastructure (along with NVI's) and made specific recommendations in terms of software and management systems for the LIMS. Following these recommendations, the program hired an Ethiopian IT specialist to customize Lab Collector software to

Why is LIMS important?

With increased requirements for SPS certification, the number of diagnostic tests to be run by NAHDIC was set to increase rapidly to several hundred thousand tests per year, according to the Growth and Transformation Plan. The institute was not prepared to cope with these volumes, as it did not have an electronic system for managing the data generated by the tests. In the past, the lack of such a system had severely affected both the quality and the efficiency of Ethiopia's diagnostic services. Hence the establishment of a computer-based LIMS was absolutely critical.

NAHDIC's requirements and train NAHDIC staff in its use. This system will enable efficient inventory control, data management and results communication, thereby strengthening disease monitoring systems and increasing the country's preparedness in the event of a major animal disease outbreak.

As a result of NAHDIC's application of LIMS and good laboratory practices as well as implementation of QMS standards for ISO 17025, the center was designated by the OIE as the reference laboratory for Newcastle Disease and other high-mortality poultry diseases in the Horn of Africa (described further in the Avian Influenza section, below).

Disease surveillance and diagnosis. SPS-LMM supported the Ministry of Agriculture in developing surveillance systems for trade-sensitive transboundary animal diseases such as RVF and FMD, both of which led to trade bans on Ethiopian livestock during the life of the program. SPS-LMM also assisted the Ethiopian Government in obtaining official OIE clearance from Rinderpest, cause of a lengthy trade ban from Saudi Arabia. These activities are described in the text box below.

Combating transboundary animal diseases to protect against trade bans: RVF, FMD and Rinderpest

RVF surveillance and diagnosis. Seasonal Rift Valley Fever outbreaks in Kenya in 1989 and 2006 resulted in the UAE banning livestock and meat imports from all Horn of Africa countries, including Ethiopia. SPS-LMM supported MoARD in surveying for RVF along the borders with Kenya and Sudan, supplied diagnostic kits for use in certification of small ruminants for carcass exports or rapid testing during suspected outbreaks, and contributed to the development of a National Contingency Plan to enable early warning, investigation and surveillance during high-risk flooding seasons. The plan was adopted by MoARD and immediately put into effect. In September 2008, when the Food and Agriculture Organization (FAO) and the World Health Organization (WHO) warned of a potential RVF risk, NAHDIC and regional laboratories surveyed potential risk areas with questionnaires, collected serum samples, and found no incidence of RVF in the surveyed areas. The availability of current and credible RVF epidemiological surveillance data enabled Ethiopian officials to argue authoritatively against further trade bans.

FMD surveillance and diagnosis. For many years, Ethiopia lacked an effective preventive FMD vaccine. The disease has multiple strains, and therefore an effective vaccine has to be cross-matching, i.e. addressing each of the strains. Developing such a vaccine was critical because concerns over FMD are high in importing countries, as exemplified by Egypt's FMD ban on meat and livestock imports in 2006. In order to address this need, SPS-LMM provided technical and financial support for a countrywide sero-epidemiological surveillance and outbreak investigation. The surveillance data identified five different FMD strains (sero-types), thereby providing useful information for the formulation of a multivalent vaccine (described further under IR 1.3 below). The program also sponsored training courses on FMD diagnostic techniques for senior staff members at NAHDIC (the Institute's director and the head of FMD diagnostic services) at the World Reference Laboratory for FMD (Institute of Animal Health) in the UK.

Rinderpest eradication verification. SPS-LMM assisted MoARD in compiling evidence of Ethiopia's freedom from Rinderpest through the preparation of a comprehensive Rinderpest eradication verification and application dossier, covering vaccination efforts, eradication strategies and surveillance results over the past 18 years as well as future emergency preparedness arrangements. In May 2008, the OIE Scientific Commission for Animal Diseases in February declared Ethiopia free from Rinderpest in accordance with the OIE Terrestrial Animal Health Code. This provided Ethiopia with a powerful argument for lifting Saudi Arabia's Rinderpest trade ban on Ethiopian cattle imports, and the ban was unofficially lifted. In August 2011, the UN announced that Rinderpest had been eradicated worldwide.

Cost recovery scheme. Laboratory testing for animal disease requires diagnostic kits, reagents and other consumables, many of which must be imported to Ethiopia. Early in the program, SPS-LMM procured serological (ELISA) and molecular (PCR) diagnostic kits for FMD, RVF and HPAI in anticipation of their need for supporting SPS certification and disease surveillance and control. NAHDIC used the kits to undertake country wide surveillance testing cattle for FMD, investigate high-mortality poultry disease outbreaks as per the National Emergency Preparedness and Response Plan (NEPRP) for HPAI, and survey for RVF in high risk pastoral areas.

In the long run, depending on donor-funded programs to supply essential laboratory consumables such as diagnostic kits is not sustainable, particularly as SPS requirements become more stringent and the number of required tests increases. SPS-LMM and NAHDIC experts therefore developed a cost recovery scheme to recover costs for laboratory services rendered to commercial producers, traders and exporters. The scheme targets commercial operators including feedlots, live animal exporters, export abattoirs, dairy farms, poultry farms, etc., while exempting smallholder subsistence farmers in mixed crop/livestock production settings and pastoralists. The objective is to recover costs through service charges and thereby to improve and sustain the quality of laboratory diagnostics for transboundary animal disease outbreak surveillance, prevention and control.

2. Diagnostic services improvements at regional labs

At the start of the program, SPS-LMM evaluated regional veterinary and diagnostic lab capabilities to identify gaps hindering diagnostic service delivery and SPS compliance, then conducted a series of interventions designed to address the identified constraints.

Establishment of LABNET. The program supported the establishment of LABNET as a common platform to link NAHDIC with Ethiopia's 13 regional laboratories. The first LABNET meeting identified gaps that hinder animal disease diagnosis, such as shortage of consumables/kits, disparate test methodologies and SOPs, and the lack of participatory planning and central procurement of reagents/chemicals from reputable suppliers. NAHDIC was mandated to plan central procurement annually based on LABNET demand, monitor harmonization of test SOPs, and organize systematic visits in regional labs for experience sharing and harmonization of activities.

How does LABNET improve Ethiopia's diagnostic capacity?

At the start of the program, Ethiopia lacked a cohesive national veterinary lab system. NAHDIC (then NAHRC) and the regional laboratories were not formally connected, which negatively affected technical linkages, standardization of diagnostic activities, definition of ecology-based priorities, provision of supplies and information exchange. LABNET provided a common platform to enable all of these exchanges and more.

Technical assistance to regional labs: SPS-LMM conducted an assessment of ten regional labs and found that although they had expensive diagnostic equipment, in many

cases this equipment was either not installed or functional, laboratory supplies were deficient and laboratory technician skills were inadequate to meet SPS certification requirements. Of the ten labs, four (Assela, Bahir Dar, Dire Dawa and Mekelle) were selected to serve as models for regional diagnostic centers. These laboratories received essential supplies from NAHDIC, introduced good laboratory practices and SOPs, and participated in training from SPS-LMM on FMD serological and AI virus detection assays. Following the training programs, technicians were able to run FMD diagnostic assays independently.

SPS-LMM also identified the five regional laboratories with the greatest requirements for SPS certification of export livestock (Asela, Bahir Dar, Dire Dawa, Mekelle and Soddo). The program trained staff from these laboratories on the use of diagnostic tests for FMD and provided imported diagnostic kits. Finally, SPS-LMM and NAHDIC provided hands-on training on calibration and maintenance of equipment and SOPs for diagnostic testing for PPR, FMD and CBPP at selected labs, including the newly established labs at Semera and Jijiga to serve the Afar and Somali pastoral regions.

IR 1.3 Improved production of vaccines

Export animals are vaccinated for a variety of diseases per the requirements of importing countries. Depending on the country of destination, cattle may be vaccinated for FMD, CBPP, LSD, anthrax, blackleg and pasteurellosis; sheep for PPR, pox and pasteurellosis; goats for PPR, pox and CCPP; and camels for anthrax.

1. Projection of Ethiopia's vaccine needs

SPS-LMM worked with NVI to assess Ethiopia's vaccine requirements for export animals, project the country's needs, determine the cost effectiveness of producing FMD vaccine locally versus importing it, and prioritize production needs based on prevailing strain types. Based on the findings of the FMD countrywide surveillance by NAHDIC and SPS-LMM, NVI decided on a plan to develop capacity to include all prevailing FMD strains in the multivalent vaccine, while continuing to import vaccine in order to serve current needs for vaccination for the major strains. In addition, NVI decided to prioritize the local production of bacterins (to combat diseases such as *E. coli*, *Salmonella*, *Pasteurella* and enterotoxaemia), while continuing to import, at least in the near term, viral vaccines (to combat diseases such as Rotavirus and certain strains of FMD).

Vaccine production. For domestic production, SPS-LMM provided NVI with a culture of *Manheimia haemolytica* to produce a vaccine against small ruminant pasteurellosis, and assisted NVI in identifying training to develop reliable diagnostic tools for major animal diseases such as HPAI and CBPP.

Vaccine import. SPS-LMM sponsored missions for senior staff and the NVI Director to Indian and Dutch animal drug manufacturers to identify potential sources of vaccines. Through these visits, vaccine manufacturers were identified for various strains of FMD, brucellosis, rabies, pulpy kidney disease, all of which were not produced by NVI. Based on these visits, NVI imported 300,000 doses of a bivalent A and O type FMD vaccines from Indian Immunologicals and the following year from STARRATE, South Africa, and

plans to continue to import FMD vaccine annually, up to one million doses, to support ring vaccination programs country wide.

2. Studies on animal mortality

SPS-LMM sponsored studies by the Faculty of Veterinary Medicine, University of Addis Ababa, on the causes of morbidity/mortality for dairy calves and shoats. Dairy bull calves can serve as a source of export quality beef but suffer from calf diarrhea and pneumonia. Shoats have high mortality rates at export abattoirs' holding grounds. Results from these studies are discussed in the text box at right.

Understanding causes of animal mortality

Dairy calves. The study concluded that many causes of neo-natal mortalities could be prevented through vaccination. SPS-LMM discussed the study results with NVI to identify how best to incorporate these strains in the production of inactivated vaccines (bacterins), and recommended an increase in both vaccine production and import.

Shoats. Preliminary observations found a mortality rate of 5-10% in holding grounds. Clinical examinations indicated that these deaths were caused primarily by respiratory illnesses, and pneumonia in particular. There was also evidence of viral infections such as PPR and parainfluenza. Predisposing factors included parasites, moving pastoral animals to highland ecology and changes in management and feeding patterns as the animals were moved from grazing in the rangelands into the feedlots.

IR 1.4. Improved capability to comply with standards of importing countries

1. Establishment of a quarantine station for live animals

In order to support the GoE's goal of establishing its own international standard export

quarantine, SPS-LMM sponsored an observation mission led by the head of APHRD to the Regional Quarantine in Djibouti in September 2008 to enable first-hand observation of quarantine design, planning and management. The program then assisted APHRD in preparing a concept note for the establishment of quarantine facilities and presented it during a stakeholder consultation meeting in November 2008. SPS-LMM then evaluated potential quarantine sites together with APHRD and developed a Quarantine Station Operational Guideline.

In assessing and recommending potential sites for the quarantine stations, SPS-LMM and APHRD placed a high priority on the availability of sufficient water and feed for the potential numbers of livestock to be kept in the station. On the basis of their recommendations, the GoE authorized the establishment of quarantine facilities in Mille (Afar) and Haroressa (Somali Region) and allocated 40 million birr for their construction. SPS-LMM staff and consultants worked with APHRD to prepare the quarantine station design. Subsequent to the GoE's authorization, two critical issues remained: approval of the facility by KSA and other MENA veterinary authorities, and bilateral negotiation and agreement with the Government of Djibouti for free transit of SPS certified Ethiopian animals through Djibouti Port.

SPS-LMM worked to assist the Ministry of Agriculture in negotiating with Gulf State importers on terms of use for the planned facilities and to promote acceptance of SPS certificates issued by Ethiopian competent authority. During a trade mission in May 2010,

Saudi inspectors agreed to evaluate proposed quarantine services; however, at the time of writing, this evaluation had not yet taken place.

In 2011, SPS-LMM assisted the GoE in obtaining crucial agreement from the Djiboutian government to allow Ethiopian livestock free transit to port through Djibouti. The program worked with the Ethiopian Maritime Affairs Authority (EMAA) and MoA to draft an agreement whereby Djibouti recognizes Ethiopian pre-export quarantine procedures and waives the need for quarantine in Djibouti for SPS certified animals from Ethiopia. The draft agreement was approved by the Government of Djibouti, allowing Ethiopian live animals an immediate transit to the port of exit.

At the time of writing, the construction of the quarantine station is well underway in Mille but delayed in Somali Region awaiting the regional authorities' selection of an alternate to the originally proposed site near Haroressa.

2. SPS/HACCP support to export abattoirs

Support APHRD in implementing HACCP in export abattoirs. SPS-LMM conducted on-site assessments of the export abattoirs in 2006 and 2007 and identified specific needs related to HACCP and the application of Good Manufacturing Practices (GMP). Based on the results of these assessments, the program provided training to abattoir staff and worked with APHRD to develop a checklist for supervising abattoir hygiene and sanitation. APHRD subsequently assigned a lead person responsible for applying the checklist in the regular supervision of the export abattoirs.

In 2008, responding to complaints from importers about “dark cutting” meat and the short shelf life of shoaat carcasses from Ethiopia as well as demands from importing countries’ veterinary inspectors to enforce HACCP procedures, SPS-LMM began providing more intensive support to resolve quality and hygiene constraints. The program organized study tours to observe abattoir operations in India and South Africa; provided training to export abattoirs in meat inspection practices, Good Hygienic Practices (GHP), GMP and HACCP principles; and engaged an Ethiopian HACCP specialist to help two abattoirs obtain HACCP accreditation and serve as a model for others.

As per the seven principles of HACCP, the SPS-LMM sponsored specialist worked closely with the abattoirs to:

1. **Conduct a hazards analysis.** The specialist critically examined the abattoirs’ raw materials, processes and products to determine the

How does HACCP work and why is it important for Ethiopia’s abattoirs?

HACCP is a system of analysis, monitoring and planning that works systematically to prevent food safety hazards throughout a food processing and export chain. Establishing HACCP systems enables a processor to rigorously control every step of the process, identify exactly where and when the risks for bacterial contamination or other problems occur, and take proactive measures to reduce or eliminate them. HACCP accreditation enables an export abattoir such as Modjo Modern to certify to importers that their food safety procedures are in compliance with international regulations. SPS-LMM’s HACCP support to abattoirs, and the abattoirs’ commitment to implementing the recommendations, have significantly improved Ethiopia’s reputation as a meat exporter in a very period of time, as importers have been impressed with the improvements.

- potential meat safety hazards and risks.
2. **Identify critical control points.** The specialist identified stages and processes at every step of the slaughter, chilling, transport and export stages where hazards could occur and where controls could be applied.
 3. **Establish critical limits for each control point.** The specialist helped abattoirs establish minimum limits and requirements at each of the step. These limits focused in particular on hygienic conditions and temperature requirements for meat production to minimize bacterial contamination.
 4. **Establish critical control point monitoring requirements.** The specialist helped the abattoirs institute and maintain controls at each of the identified stages and processes through monitoring systems.
 5. **Establish corrective actions.** The specialist specified the necessary corrective actions to be taken when monitoring reveals that critical control point measures exceed the allowed limits.
 6. **Establish procedures for ensuring the HACCP system is working as intended.** The specialist worked with the abattoirs to fulfill all prerequisite programs in order to ensure that the HACCP system continues to work effectively.
 7. **Establish record keeping procedures.** The specialist worked with the abattoirs to document the HACCP process and establish record-keeping systems.

The two selected abattoirs, Modjo Modern and Luna, followed the specialist's recommendations and, in the space of one year, made significant financial and time investments in HACCP plan preparation and implementation, including renovating and maintaining their facilities, training their personnel, and establishing documentation procedures for monitoring and corrective actions. SPS-LMM sponsored ISOQAR UK, a respected accreditation body for ISO 9001:2000 processes, to conduct a HACCP audit at Modjo Modern Export Abattoir, which in June 2011 became the first Ethiopian abattoir to receive a certificate of HACCP Codex Alimentarius. Both Modjo Modern and Luna (the latter of which is still in the process of preparations for HACCP accreditation at time of writing) will serve as models for scaling up the HACCP system to other export abattoirs.

Airport meat handling and cold chain maintenance. At the request of APHRD, SPS-LMM provided 24 thermometers and pH meters to six export abattoirs in order to ensure that meat is chilled at 2-4 °C, thereby preventing the growth of microorganisms and supporting the first step in the cold chain. Yet one of the most critical of the “critical control points” in the meat export process occurs not at the abattoirs, but at the airport. In May 2006, a new cold storage facility was constructed at Bole Airport's cargo terminal, but its usage was reserved for flower and horticultural export products.⁶ As a result, meat exports were being transferred from abattoirs' chilled trucks into containers in the open air and sometimes sitting on the tarmac while awaiting loading, thereby breaking the cold chain, allowing bacteria to develop and significantly shortening the shelf-life of the meat. This caused significant complaints from importers about meat quality.

⁶ Although the cold store was expected to accommodate meat exports, international SPS regulations do not allow air contact between meat products and horticultural/floricultural products. Since the cold store as designed did not restrict air flow, and due to the higher value of floriculture exports, the airport cargo terminal management decided to avail the facility exclusively to flower and horticulture exports.

SPS-LMM conducted a variety of activities to address this problem. Together with APHRD, the program trained 21 airport cargo terminal employees and export abattoir loaders in personal hygiene and meat handling. The program assisted APHRD in developing SOPs and guidelines on cold chain management during processing, storage and transport and on personal hygiene for meat handlers. Perhaps most importantly, the program led a lengthy, concerted effort to re-open a meat cold store facility at Bole Airport. In 2010, following extensive discussions and negotiations which involved the EMPEA and the high-level officials within the Ministry of Agriculture, Fresh Port, a privately owned cold store facility at the old cargo terminal, signed a contract with Ethiopian Airlines to avail its cold store facility exclusively to meat and meat products. The cold store is now operational, accommodating chilled meat from all export abattoirs, and importers have already recognized the improved quality and shelf-life of Ethiopian meat exports with increased prices. In 2010, visiting UAE veterinary inspectors approved the cold chain management system.

SPS support to municipal abattoirs to improve national SPS credibility and image.

Although municipal abattoirs are not part of the export value chain, veterinary authorities from importing countries do note attention given to the safety of meat products for domestic urban consumers as an indicator of how export meat products are handled. SPS-LMM assisted APHRD in drafting a meat hygiene regulation with standards for facility design, equipment and infrastructure as well as personal and facility hygiene. SPS-LMM also helped APHRD prepare a guideline on hygienic slaughtering techniques for municipal and export abattoirs. Finally, the program supported APHRD in preparing food hygiene and safety posters to provide municipal abattoir workers information regarding meat contamination, personal hygiene and sanitation during slaughter, processing and transporting carcasses and meat products.

3. SPS-focused trade missions

SPS-LMM monitored evolving health regulations and standards in key importing countries and facilitated dialogue at the ministerial level. In 2007-2008, when the Gulf Cooperation Council (GCC) countries—Saudi Arabia, UAE, Bahrain, Kuwait, Qatar and Oman—began developing common model certificates for livestock and livestock products from the Horn of Africa, with exceedingly stringent requirements, SPS-LMM worked with APHRD to review and critically comment on the model certificates during the annual OIE conference for the GCC.

The program organized high-level missions to importing countries to discuss SPS issues and open or re-open markets following trade bans. Missions to three major

“The importance of developing regular contacts can easily be explained by the fact that it was through one of the SPS-LMM sponsored visits that Ethiopia’s provisional Rinderpest-free status was brought to the attention of the Saudi authorities. Reciprocal visits help to put a face to a name. [...] The initiatives taken in this regard, including attempts to get bans lifted, are highly commendable.”

- Yacob Aklilu, SPS-LMM Midterm Evaluation, 2008 (p. 30)

importers who imposed or had ongoing trade bans during the life of the program—Saudi Arabia, UAE and Egypt—were particularly critical and are described in the text box below.

High-level trade missions helped Ethiopia lift import bans

- **A mission to Saudi Arabia** in August 2006, led by State Minister Yacob Yala, addressed the rinderpest ban on Ethiopian livestock. At the Saudi authorities' request, SPS-LMM assisted MoARD in developing a document with a situation report for all major TADs and describing quarantine facilities and procedures, surveillance systems and the overall capacity of the veterinary services. The program then helped coordinate the visit of a Saudi delegation of veterinary and food safety officers to evaluate Ethiopia's export facilities, laboratories and the overall veterinary services performance. **Following the visit, informal approval was given for large numbers of Ethiopian animals imported into Saudi Arabia in the following year (2007/08).** The ban was then lifted after Ethiopia was officially declared free of Rinderpest in May 2008.
- **A mission to the UAE** led by State Minister Abera Deressa following the ban imposed by the UAE on Ethiopian meat imports because of the outbreak of RVF in northeastern Kenya in late 2006. SPS-LMM provided technical and financial support for RVF surveillance, reviewed sanitary certificates and recommended changes to reflect new requirements, and improved MoARD's capacity to address the UAE's SPS requirements. The delegation briefed UAE authorities on the negative results from RVF surveillance in Ethiopia and the measures taken by GOE to detect RVF occurrence. **As a result, the UAE reopened its markets for Ethiopian meat products in September 2007.** Subsequently, three inspectors from the UAE visited Ethiopian export abattoirs, provided new import permits to two new abattoirs and renewed the permits of three existing export abattoirs.
- **A delegation to Egypt** led by State Minister Abera Deressa to address a ban imposed following the unsubstantiated claim that cattle imported from Ethiopia had tested positive for FMD. Following this delegation and subsequent high-level communications between the two countries, Egyptian inspectors and importers visited Ethiopia. As a result of these activities—and, more broadly, as a result of the establishment of a national strategy for controlling FMD, backed by a strengthened APHRD—**Egypt lifted its ban on Ethiopian beef and cattle in 2009.** Although meat exports to Egypt have remained low, live animals exports increased significantly in 2009/10 and 2010/11.

Other missions sponsored by SPS-LMM included follow-up missions to KSA and the UAE as well as trade missions to Yemen, Jordan, Bahrain, Kuwait, Oman and Djibouti, for discussions with government officials, veterinary authorities and private importers regarding health regulations and standards for livestock and meat trade. These missions are discussed under the LMM objective activities

Gulfood Fair participation and SPS improvements lead to opening of Bahrain market

A Bahraini importer met Ethiopian exporters and SPS-LMM staff at the Gulfood Fair in Dubai and became interested in importing livestock from Ethiopia. At the time, Bahrain's Animal Health Directorate did not permit livestock imports from Ethiopia, so the importer requested that Bahraini veterinary inspectors to conduct an inspection in Ethiopia. SPS-LMM worked with the Ministry of Agriculture to coordinate their visits, where inspectors were pleased with what they found. "We are happy with what we have seen here because Ethiopia is already practicing the system we are requiring," said Bahrain's Veterinary Supervisor. The Bahrain Ministry of Agriculture issued the permit for the direct import of meat and live animal from Ethiopia, and a new market was opened.

below, together with several market assessment missions.

The program assisted APHRD in preparing a short profile of Ethiopia’s SPS certification systems in an effort to open up a new market in Jordan—an effort that was successful, as Jordan imported 12,255 head of livestock valued over \$2 million in 2010/11. A combination of SPS-LMM interventions also helped lead to the opening the Bahraini market, through a process described in the text box at right.

As a result of these visits and the improvements made in Ethiopia’s SPS system, the number of countries importing Ethiopian meat and live animals increased from five (Yemen, UAE, KSA, Egypt and Djibouti) by ten additional countries (Jordan, Gabon, Bahrain, Oman, Viet Nam, Kuwait, Turkey, India, Angola and Comoros) between 2005/06 and 2010/11.

IR 1.5. SPS certification system for meat and livestock exports established

Early in the program, consultation with senior Ethiopian government officials and international experts revealed a general consensus that establishing a two-stage disease free export “compartment” system for SPS compliance would be more feasible and cost-effective in the near term rather than developing disease free zones. SPS-LMM designed a two-phase system, based on the compartment approach, to certify that Ethiopian meat and livestock meet importing countries’ SPS requirements. The program also supported APHRD in preparing the legal framework for an enabling environment for the SPS certification system. APHRD adopted associated guidelines and SOPs.

1. Pilot SPS certification system

SPS-LMM collaborated with public, private and civil society stakeholders to pilot the SPS certification system. The program worked with private operators to construct a pilot SPS certification facility in Adami Tulu⁷ and provided hands-on training to animal handlers, feeders and guards at the facility on export market requirements and appropriate animal welfare and production practices. The pilot provided an opportunity for SPS-LMM to begin testing the proposed SPS certification system on 198 bulls initially, with NVI providing equipment and staff from the Adama Quarantine and NAHDIC working to vaccinate animals and test for FMD. The pilot generated crucial feedback that led to important modifications in the protocols for the SPS certification system, as illustrated in the table below.

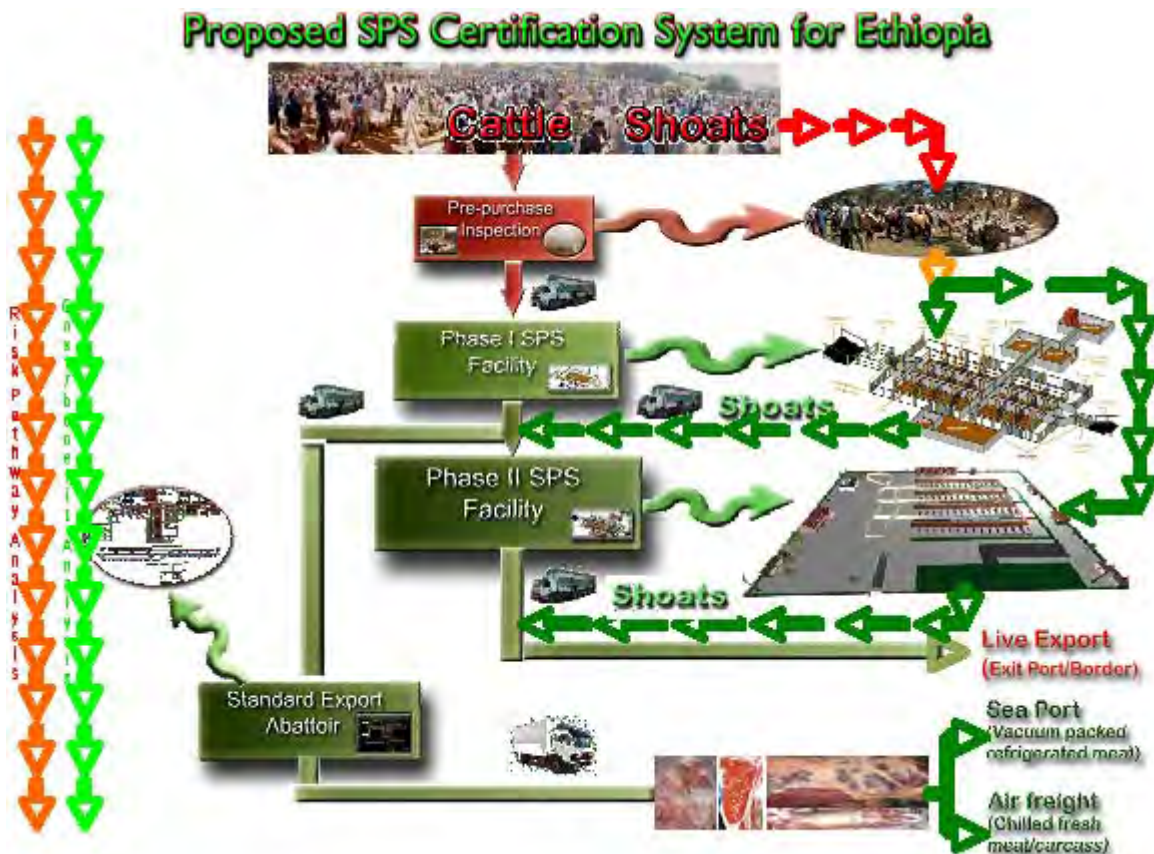
Table 2. Pilot led to important modifications in proposed SPS certification system

Lessons from pilot	Changes to SPS certification system protocols
The original diagnostic test (LPB ELISA) was too cumbersome and expensive to run on a routine basis	Animals will be tested using a simpler but equally effective (for screening positive reactors) diagnostic test (3ABC ELISA)
NAHDIC’s turnaround time for testing samples was too slow to meet SPS certification requirements	NAHDIC should be allowed to collect diagnostic service charges to cover costs for increased staff, equipment and consumables necessary to enable timely delivery of laboratory test results

⁷ Two pilot facilities were initially planned; however, one (near Adama) lacked sufficient water supply and therefore never became operational.

Cattle encounter numerous stresses during movement from range to feedlots, which affect their performance in feedlot.	Additional SOP developed for scoring, early detection and treatments for avoiding morbidity and mortality related to diseases of intensification.
Concurrent developments	Changes to SPS certification system protocols
FMD surveillance revealed five different strains, including SAT strains not previously identified in Ethiopia	NVI should import or locally produce purified FMD multivalent vaccines that are appropriate to the strains endemic at sites in Ethiopia.
The Ethiopian Government decided to open its own international standard quarantine facilities near the borders with Djibouti and Somaliland	Animals for live export should be ear tagged and vaccinated while in feedlots to reach export weight and condition, then transported to Mille for 21 day quarantine before transport to Djibouti port.

The diagram below presents a graphic depiction of the proposed SPS certification system, and was instrumental in building a broad understanding of how the certification system would work.



Under the proposed SPS certification system, cattle would be routed through both Phase 1 facilities (small quarantine units) and Phase 2 facilities (biosecure feedlots), while shoats would go through the Phase 1 facility only. Further details on the proposed system can be found in *Proceedings of the consultation meeting on “two phase SPS certification system” for live animal and meat export from Ethiopia.*

Based on experience from the pilot trial and recommendations from the risk assessment (below), the 2-phase SPS certification system was revised in favor of biosecure feedlots

and international standard quarantine stations near the borders (which makes Phase 1 facilities unnecessary).

2. Support to risk and cost analysis

Risk pathway analysis. SPS-LMM commissioned a risk pathway analysis for the proposed two-phase SPS certification system. The analysis, by ILRI experts, identified critical control points and biosafety risks (i.e. the risks to importing countries from infected live animals and/or meat products) and recommended procedures for compartmentalization and commodity based trade. The study found that the risks of disease transmission from live animal imports could not be eliminated but could be mitigated by effective quarantine procedures. Most importantly, the risk of disease introduction from exporting deboned meat, the “commodity approach,” is negligible.

The results of the risk assessment were presented to professionals from government agencies, livestock and meat exporters, export abattoirs, feedlots, USAID and other stakeholders. During the workshop, consensus was reached on the requirements for live animal quarantine in terms of testing, vaccination and the need for meat export trade under the commodity based approach.

Cost analysis. SPS-LMM commissioned an analysis of the costs and benefits of the proposed two-phase SPS certification approach, entitled “*Enabling Livestock Product Exports from Ethiopia: Understanding the Costs, Sustainability and Poverty Reduction Implications of Sanitary and Phytosanitary Compliance.*” The study, conducted by ILRI and SPS-LMM experts, also included a determination of which costs support primarily private or public goods, and the extent to which costs were currently covered by private and public funding. The major findings are shown in the text box at right.

Cost analysis reveals critical importance of feed prices

The cost analysis found that:

- Feed prices, *not SPS certification costs*, were the principal constraint to the competitiveness of Ethiopian beef and livestock exports in Middle Eastern markets
- Technical interventions related to processing or transport costs have a minor impact on overall profitability
- A scenario with just 21-day Phase 1 quarantine yielded meat that was *more* expensive than with the two-phase SPS system because “Phase-1 only” added costs without adding quality (in terms of finish and weight gain).

Objective II: Improve Ethiopia’s capacity and competitive advantage for meat and livestock exports

Table 3. Ethiopia’s livestock and meat marketing evolution, 2005-2011

Meat & livestock marketing situation in 2005/06	Key program interventions	Meat & livestock marketing situation as of August 2011
Market penetration and demand		
<p>In 2005:</p> <ul style="list-style-type: none"> Ethiopia exported mainly chilled shoat carcasses destined for low-end markets in Middle East (low-income domestic workers) Ethiopian meat received low export prices Exports were highly concentrated, with only 3% of meat exports destined for countries outside of the UAE, KSA, Yemen and Egypt 	<p>SPS-LMM:</p> <ul style="list-style-type: none"> Conducted demand analysis in MENA markets Developed promotional materials (DVD, posters and brochures) Supported participation in Gulfood Fair for 4 years Organized trade missions to 10 Middle Eastern and African countries Supported EMPEA in identifying new markets and buyers, and pricing exports at competitive prices 	<p>In 2011:</p> <ul style="list-style-type: none"> Export prices are significantly higher—suggesting that meat is reaching higher-value markets The market for Ethiopian meat products has diversified, with exports in 2010/11 going to Turkey, Angola, Comoros, Bahrain, Kuwait, China, Jordan and Qatar in addition to the UAE, KSA, Yemen and Egypt
Quality		
<p>In 2005:</p> <ul style="list-style-type: none"> Animal and meat handling procedures were poor, leading to bacterial contamination and poor meat quality The cold chain was broken due to the lack of a cold store at Bole Airport, drastically shortening the shelf-life of meat exports 	<p>SPS-LMM:</p> <ul style="list-style-type: none"> Obtained agreement from FreshPort to avail cold store exclusively for meat at Bole Airport Provided training in hygienic meat handling for abattoir and cargo terminal employees 	<p>In 2011:</p> <ul style="list-style-type: none"> Quality and shelf-life of meat have dramatically improved as cold chain is preserved from abattoirs onto planes for export Importers who previously complained of meat quality from Ethiopia now recognize improvements and pay higher prices
Supply		
<p>In 2005:</p> <ul style="list-style-type: none"> Abattoirs complained of limited supply of export quality shoats, so that they only operated at 31% of installed capacity Low off-take rates through formal trade channels constrained supply Pastoralist traders operated on limited working capital, which led to consignment purchases and/or small volumes 	<p>SPS-LMM:</p> <ul style="list-style-type: none"> Conducted value chain analyses to identify supply limiting production and marketing constraints Supported quality improvements at abattoirs which led to higher prices paid by importers Supported increase in beef production by bringing younger, lighter bulls from pastoral herds and dairy herds for finishing to export quality/weight in feedlots Provided technical assistance to improve feedlot rations and management, improving weight gains, efficiency and feedlot profitability Supported establishment of UGITSC, a livestock trade share company for Borana pastoralists and traders 	<p>In 2011:</p> <ul style="list-style-type: none"> Higher meat prices paid by importers enable abattoir agents to offer competitive prices to pastoralist suppliers, thereby increasing the supply for slaughter. Abattoirs operate at 62% of installed capacity on average. Although off-take rates remain relatively low, the supply of animals for live export and abattoirs has increased due to improved feedlot and abattoir operations and higher prices UGITSC is fattening bulls for export, supplying heifers to highland farmers and providing teff straw and hay from highlands to drought stricken pastoral herds in Borena area Donor and NGO interest in replicating the UGITSC model

Meat & livestock marketing situation in 2005/06	Key program interventions	Meat & livestock marketing situation as of August 2011 in Somali and Afar regions
Meat export operations		
<p>In 2005:</p> <ul style="list-style-type: none"> Ethiopia had four licensed export abattoir operators, operating at 31% capacity on average Good manufacturing practices and HACCP not followed to international standards Export documentation was burdensome, requiring contact with 12 government offices 	<p>SPS-LMM:</p> <ul style="list-style-type: none"> Developed “<i>Comprehensive Plan for Supporting Meat Export Industry.</i>” Trained abattoir managers and staff in good manufacturing practices, quality control, etc. Supported HACCP certification for export abattoirs Established one-window export documentation service for meat exports based at Bole airport Organized study tours for abattoir operators to Botswana, US, South Africa, Kenya and India Supported establishment of new export abattoir operations 	<p>In 2011:</p> <ul style="list-style-type: none"> Ethiopia has seven licensed export abattoirs, operating at 62% capacity on average Abattoirs have significantly improved their operations One export abattoir is HACCP certified, with another in process One-window service at Bole Airport providing document authentication and customs clearance; however, Certificate of Origin service by Ethiopian Chamber of Commerce and Sectoral Associations has reverted to former location.
Feedlot operations		
<p>In 2005:</p> <ul style="list-style-type: none"> Majority of feedlots located within urban areas, creating biosecurity, pollution and human health hazards Most feedlots were poorly designed, with serious drainage problems, sub-optimal feed trough arrangements and insufficient animal handling, loading and unloading facilities Feeding and management practices were neither effective or cost-efficient; rations were unbalanced with excess protein and salt, and deficient energy and some essential minerals. Offtake of export quality cattle limited by drought and seasonal fluctuation in pasture grazing 	<p>SPS-LMM:</p> <ul style="list-style-type: none"> Facilitated relocation of feedlots outside of urban environs Provided technical assistance and training in a feedlot design and management Organized study tours for feedlot operators to US, South Africa, Botswana and Morocco Provided technical support and training in ration formulation and mixing (best-cost total mixed rations) and developed database of types and quality of feed resources in Ethiopia. Provided technical support and business management training to new entrants Encouraged marketing of younger bulls from pastoral herds for finishing in feedlots 	<p>In 2011:</p> <ul style="list-style-type: none"> 44 feedlots relocated (as of June 2011) from urban environs with others in urban environs closed and replaced by new operations. Most new and/or relocated feedlots designed according to SPS-LMM recommendations. Use of best-cost formulation and total mixed rations improved weight gains and feed use efficiency. Numbers of export quality cattle marketed from feedlots throughout year for slaughter and/or live export through formal channels increased
Market information		
<p>In 2005:</p> <ul style="list-style-type: none"> Ethiopian livestock producers, traders, feedlot and abattoir operators lacked timely, reliable livestock market information 	<ul style="list-style-type: none"> Supported MOA and EMDTI in adapting the LINKS/CNRIT livestock market information system to Ethiopian requirements 	<p>In 2011:</p> <ul style="list-style-type: none"> NLMIS established and running under EMDTI management within the MOA
Institutions		
<p>In 2005:</p> <ul style="list-style-type: none"> Sectoral associations had limited capacity to service needs of members, promote and support exports Private operators lacked reliable source of technical services and advice 	<p>SPS-LMM:</p> <ul style="list-style-type: none"> Supported EMPEA and ELTA: trained members in livestock market negotiation, business planning, management and operations, and improved associations' capacity to provide member services EMDTI: staff technical and 	<p>In 2011:</p> <ul style="list-style-type: none"> Sectoral associations capacity strengthened for market promotion, business services, advocacy, credit facilitation and technical assistance to their members EMDTI is empowered to provide technical assistance to

Meat & livestock marketing situation in 2005/06	Key program interventions	Meat & livestock marketing situation as of August 2011
	managerial capacity strengthened and experienced as trainers <ul style="list-style-type: none"> • EAFIA: documented feed resources, trained members in commercial ration formulation, quality and safety 	the private sector producers, feedlot and abattoir operators

IR 2.1 Improved efficiency and effectiveness in export marketing

1. Demand analysis

SPS-LMM gathered information on the demand for beef, sheep and goat meat in the MENA region through trade missions and a demand analysis entitled *Market Opportunities for Ethiopian Meat Exports*. The demand analysis report covered meat imports into potential markets in the MENA region (Gulf States, Lebanon, Jordan, Libya, among others) and West Africa as well as meat exports from Ethiopia's competitors (Australia, New Zealand, Brazil, Argentina, India, Europe, etc.). Key findings in this 2007 report are presented in the text box at right.

SPS-LMM also prepared a report summarizing findings from the countries visited during trade missions, their meat import requirements and trade relations with Ethiopia, major competitors in the markets and market entry strategies. The report also included observations on consumer preferences, product packaging, price competitiveness, meat quality concerns and recommendations.

The report revealed promising opportunities for Ethiopian meat exports to the UAE, Saudi Arabia and Egypt, particularly for chilled shoats carcasses, frozen beef cuts and frozen edible offals. But in order to exploit these potential markets, the Ethiopian exporters needed to improve their capacity for beef carcass fabrication, address quality and food safety concerns and develop cost-effective processing, packaging and transportation systems. These findings were presented to livestock and meat exporters and helped guide the program's support to the sector.

Import substitution. Analysis of meat import data of the years 2004-2009 from Ethiopian Revenue and Customs Authority (ERCA) records showed that Ethiopia imported about 20 tons of meat, spending more than one million ETB equivalent of foreign currency per year on imports. The main reason for these imports is a lack of

2007 demand analysis found Addis Ababa beef retail prices to be "on the high side" of international prices

- International beef prices varied from less than US \$800 to greater than \$5,500/MT and sheep meat prices varied from less than \$750 to greater than \$3,500/MT.
- International prices for fresh chilled meat were usually 50% higher than for frozen meat.
- In large part because of the ETB/US\$ exchange rate, domestic prices for beef in Addis Ababa and surrounding towns in June 2007: approx. \$4,350/MT, were higher than international prices.
- Not until 2010 after the ETB significantly devalued did Ethiopian meat products become competitively priced in international markets.

capacity to supply the required type and quality of meat from domestic sources. SPS-LMM organized a consultative workshop and created a forum of meat producers, supermarkets, star hotels and other importers to develop market linkages and alleviate problems of quality and consistency of supply of locally available meat products.

2. Supply analysis

During 2005, Ethiopian export abattoirs operated at 31% capacity on average, with supply shortages continuing in 2006. SPS-LMM examined factors affecting livestock supply in collaboration with ILRI, EIAR and Amhara BoARD and ARI, and identified the need and opportunities to increase offtake as well as find additional sources of supply (such as dairy beef) in order to increase supply and improve Ethiopia's price competitiveness.

Offtake study. Studies entitled "*Livestock Ownership, Commercial Off-take Rates and their Determinants in Ethiopia*" and "*Live Animal and Meat Export Value Chains for Selected Areas in Ethiopia: Constraints and Opportunities for Enhancing Meat Exports*" were conducted by ILRI, EIAR and SPS-LMM economists with SPS-LMM funding and technical input. These studies analyzed offtake from smallholder and pastoral flocks, mapped the supply sheds for meat and livestock exports, quantified the gross and marketed off-take rates by region and animal species, identified factors affecting the market participation and off-take rates, explored alternative ways of increasing the marketed off-take rates of animals for export abattoirs at competitive prices, and proposed ways of improving the market participation of smallholder livestock farmers and pastoralists. The studies revealed very low net commercial off-takes of (less than 10% per year) from cattle, sheep and goat herds. Results were published as ILRI discussion paper No.2 and ILRI research report No. 9.

Marketing study. The study entitled "*Market Structure and Function for Live Animal and Meat Exports in Selected Areas of Ethiopia*", conducted by EIAR economists with SPS-LMM funding and technical guidance, identified constraints and opportunities for enhancing the efficiency of meat export from Ethiopia. Based on the findings, a focused survey was conducted to assess market participants' behaviors and the constraints to live and markets value chains that limit supply of quality animals for meat export and identify options for improving the performance of the chains. The study report was published as EIAR Research Report No. 79.

Copies of these SPS-LMM-commissioned studies were distributed to pertinent stakeholders and results were used in the development of strategy for government support to the meat industry. Findings were also presented at various conferences, including the 27th conference of the International Association of Agricultural Economists in Beijing.

Amhara Region supply analysis. SPS-LMM sponsored a study of Amhara Region's animal supply levels and marketing systems. This study, entitled "*The Supply, Marketing and Trade of Live Animals in the Amhara Region*," examined live animal trade, including exports to Sudan, and proposed improvements in the market process, identified supplies of dairy beef male calves for fattening and slaughter, highlighted key policy issues related

to increased meat and live animal export, and provided recommendations for marketing strategies and trade policies to improve the economic efficiency of the marketing system. The results were presented to stakeholders in Amhara and other relevant regions, federal government offices and development partners, in order to trigger informed action and decision-making at all levels.

3. Assessment of marketing systems and infrastructure

SPS-LMM sponsored a rapid assessment by EIAR economists of livestock markets in the areas of Bale, Borena, Central Rift Valley, Hararghe and Wollo, thereby complementing findings from the ACIDI/VOCA value chain analyses in Afar and Somali regions. The assessment found that most livestock producers had limited marketing experience and access to accurate information on the value of their stock; that the absence of a uniform, generally used grading system limited marketing efficiency and fairness of pricing; and that the lack of efficient transportation, holding grounds and market facilities led to weight losses and decreases values. Another study, “*Geographic Distribution of Cattle and Shoats Populations and their Market Sheds in Ethiopia*”, by ILRI economists with SPS-LMM funding and technical support, identified production areas, market routes and market sites.

Livestock marketing infrastructure and marketing system database. SPS-LMM inventoried livestock marketing infrastructure (road networks, watering points along stock routes, market locations and infrastructure, holding grounds, feedlots and abattoirs) and set up a database of livestock marketing infrastructure. Between 2008 and 2010, the number of major livestock markets more than doubled, 3 new export abattoirs began operating, and animal health infrastructure and manpower increased significantly.

Information from the database was burned to CDs and disseminated to EMDTI, relevant offices of the Ministry of Agriculture and livestock trader and meat exporters’ associations to be used as supplementary aid in business decision-making.

Support to new market entrants. SPS-LMM worked with EMTDI to identify the basic requirements for entry into the meat/livestock sector and develop guidelines for potential investors in feedlot operations and live animal exports. This work included an assessment of the informal livestock trade in order to better understand the dynamics in the sector and determine how to minimize impact on the formal sector. SPS-LMM also advised new entrants on technical aspects of start-up operations, e.g. how to choose a feedlot site, how to design a feedlot, how to select feeder animals, where to find potential feed resources, how to manage feed formulation and feeding, how to market finished animals, etc.

4. Establishment of National Livestock Market Information System (NLMIS)

Livestock market information systems providing accurate and timely information to the livestock actors along the value chain is important to increasing transparency, reducing non-productive transaction costs and increasing the competitiveness of Ethiopian exports. In 2007, SPS-LMM supported a rapid assessment of livestock market information systems in the highlands (Tigray, Amhara, Oromia and Southern Nations regions) by CNRIT/TAMU which was implementing Livestock Early Warning and Knowledge

System (LINKS) in Ethiopia with support from the USAID GL-CRSP (Global Livestock-Collaborative Research Support Program). Based on their field assessments and recommendations from an LMIS workshop, the LINKS team drafted a report covering the current status of livestock market information systems; needs for highland livestock market information systems and recommendations for a national livestock marketing information system to be managed by the Agricultural Market Information Unit within the Ministry of Agriculture.

At the time, the Ministry of Agriculture was planning an integrated national Agricultural Market Information System (AMIS) for all agricultural commodities including livestock and livestock products. SPS-LMM reviewed AMIS working documents and identified specific requirements for the livestock sector in discussions with Ministry of Agriculture marketing department staff. In 2009, the mandate for livestock marketing was transferred to the Ethiopian Meat and Dairy Technology Institute. SPS-LMM worked with EMDTI and the Ethiopian Society for Animal Production (ESAP) to support the development of the livestock market information system. In 2010, market information software developed by LINKS/CNRIT with USAID funding for use in Mali was evaluated and found to be appropriate to Ethiopian needs. With some modifications, the LINKS software was adopted to support for the national livestock market information system, managed by EMDTI and maintained by the Ministry of Agriculture's IT Unit, using a purpose designed server provided to the IT Unit by SPS-LMM.

Export Market Reports. The Ethiopian Revenue and Customs Authority (ERCA) collects information on meat and live animal exports through formal trade channels; however, the raw data on volume and values are not routinely checked for accuracy or summarized. SPS-LMM screened, analyzed and summarized export data on a quarterly and annual basis for reports on the volume and value of meat and live animal exports disaggregated by species, exporter and importer. Results including tables and graphs were provided to government agencies, private operators, development agencies and others for the purposes of planning and decision-making.

5. Grades and standards for live animals and export meat products

Recognizing that the Quality and Standards Authority of Ethiopia (QSAE)'s Grades and Standards of Live Animals and Meat were not being used in livestock marketing, SPS-LMM convened two technical consultation workshops on live animal and meat grades and standards, involving professionals from governmental and non-governmental and private sector organizations. At these meetings, consensus was reached to improve and popularize the existing grades and standards for live animals and meat. Accordingly, an SPS-LMM-led task force of representatives from QSAE, EMDTI, APHRD, ELTA and EMPEA identified gaps in the existing grades and standards and translated standards into Amharic for popularization and use to facilitate the marketing of meat and live animals.

In addition, SPS-LMM engaged a senior meat science specialist from Texas A&M University System who developed training and reference manuals illustrated with photographs and specifications for wholesale and retail cuts appropriate for international

beef trade. The specialist also trained staff from EMDTI and export abattoirs in beef carcass fabrication.

6. Business plan development training

SPS-LMM trained 52 persons from export abattoirs, live animal exporting firms, feedlots and EMDTI in business plan development. Model business plans were developed for three firms to serve as a template for the others. With subsequent follow up and support from SPS-LMM in collaboration with EMDTI, an additional three export abattoirs and six feedlot operators and live animal exporters prepared business plans, encouraging more firms to prepare their own plans to guide their business operations.

IR 2.2 Increased production and improved cost effectiveness

1. Feeding and conditioning systems

SPS-LMM helped identify the types and quality of feed resources available in different parts of Ethiopia and transform the feeding and management practices of the feedlot operators from a traditional to a knowledge-based feeding and management system.

Assessment of locally available feed resources. SPS-LMM staff and consultants worked with regional authorities to evaluate opportunities to increase commercial livestock feeding and meat production. The program conducted an assessment of locally available feed resources in Oromia, SNNP, Amhara and Tigray Regional States. The findings of the assessments in Oromia and SNNPR were published in a report entitled *Feed Resources for Producing Export Quality Meat and Livestock in Ethiopia: Examples from selected woredas in Oromia and SNNP regional states*. In addition, the findings of the assessments in the four regions were published on a CD. The CDs and printed copies of the reports were distributed to governmental and non-governmental organizations and to the private actors in the livestock and meat export value chain. These resources, which describe the types and quality of feed resources available in each region, serve as a valuable input for best-cost ration formulation and designing feeding plans for feedlots and other livestock operations, as well as supporting research and development activities.

Feed analytical capacity and feed information systems improvement. SPS-LMM supported ILRI and EIAR in developing a Feeds Composition Database, a web-based database of the nutritive values of various feed resources in Ethiopia. The database is available on <http://www.vslp.org/FeedDB.html>. An additional Feeds Resources database, providing information on the nutritional value of approximately 400 Ethiopian feed resources summarized from over 1,500 entries compiled from the literature, is also available at <http://www.vslp.org/ETHFeedLit/Default.asp>. In a complementary activity, SPS-LMM supported ILRI in developing and updating a broader feed information system for sub-Saharan Africa with a database of the nutritive values of more than 590 feed resources throughout the region, including many from Ethiopia. The *SSA Feeds: A Feed Information System for Sub-Saharan Africa* database can be accessed at <http://www.vslp.org/SSAFeed/Default.asp> and is also available on CDs.

CDs, posters and leaflets providing information on Ethiopian feed resources are used in best cost ration formulation and for designing appropriate feeding management practices.

Study on local feed supply. SPS-LMM chaired the working group of Ethiopian experts preparing the document *Livestock Feed Resources in Ethiopia: Challenges, Opportunities and the Need for Transformation*. The report serves policy makers and other pertinent actors as a source document for actions to improve livestock feed supply in the country.

Best cost ration and total mixed ration formulation. Feed is the most expensive input in feedlot operations, responsible for up to 90% of the cost of weight gain. Thus, reducing feed costs—by identifying best cost feed ingredients and formulating best cost rations—pays a big dividend in feedlot operations. SPS-LMM’s senior advisor for nutrition and feedlot management formulated cost effective rations based on local feedstuffs, provided computer programs, and trained Ethiopian nutritionists and feedlot operators in best cost ration formulation, feedlot design and management. The program supported the establishment of the Nutrition Forum, a network of Ethiopian nutritionists from local research organizations and universities, to work as a source of professional expertise to advise feedlot operators and feed processors on best cost ration formulation and feedlot management.

One aspect of best cost ration formulation is the use of total mixed rations as opposed to feeding the roughages and concentrates separately. SPS-LMM conducted a demonstration on the benefits of total mixed rations and provided technical assistance to feedlots using locally available feed resources. The program also prepared an instructional leaflet in English and Amharic to serve as a quick reference for feedlot and other commercial livestock operators.

The importance of appropriate technology

The lack of an appropriate chopper was a major limitation in the adoption of total mixed ration use. Importing choppers was too expensive and logistically impractical. In order to address this constraint, SPS-LMM supported the local manufacture of a prototype roughage chopper. With the program’s encouragement, Selam Technical and Vocational College designed and manufactured a prototype chopper to be used for chopping roughages and big chunks of oilseed cakes to convenient size for proper mixing with concentrate feeds. The chopper was performance tested and found to be very powerful and efficient.

Commercial feed production support. Inadequate and inconsistent supply, low quality, and high price of feeds constrain the productivity and profitability of commercial livestock operations. Commercial feed production to support the expanding commercial livestock feeding industry could be business opportunity for Ethiopian farmers. SPS-LMM provided technical advice to operators and to investors seeking to engage in feed production. And worked with the Ethiopian Animal Feed Industry Association (EAFIA) to identify major animal feed supply problems and develop recommendations for their solutions.

SPS-LMM collaborated with EAFIA in training 20 feed manufacturers in best cost ration formulation, use of total mixed rations, and addressing feed quality and safety issues and the special needs of different categories of livestock producers. The program also presented the draft legislation on the Registration, Control and Administration of

Veterinary Drugs & Feed (see IR 1.1 above) and encouraged EAFIA members to take part in enriching and supporting the draft legislation.

Dairy beef development. Dairy cross male calves could be an excellent source of high quality beef for the export market; however, many do not survive past a few weeks of age because farmers are reluctant to raise them on the valuable milk. SPS-LMM introduced the utilization of dairy cross bulls as a source of export quality beef and supported development through pilot trials and trainings of dairy producers, cooperative leaders and development workers on rearing and management of dairy cross calves. The program financed the construction of a model calf nursery, conducted a pilot trial with calves from the Ada'a Dairy Cooperative, and linked the cooperative with feedlot operators to take the calves through growing and finishing phases.

SPS-LMM also worked with EMDTI on a feeding trial to evaluate the potential of Holstein cross bulls for production of export quality beef. The bulls were slaughtered after reaching 400+ kg target weights, with the following key findings:

- Dairy cross bulls were fast growing, potentially reaching 400+kg live weight by two years of age
- Dressing percentage of dairy cross bulls exceeded dressing percentage of local breeds.
- Beef from the younger dairy cross bulls was superior in terms of tenderness and palatability to beef from 4-5 year-old local breed bulls.

SPS-LMM also sponsored an observation mission to Morocco for Ethiopian dairy and feedlot operators as well as EMDTI representatives and regional cooperative promotion agencies to learn from the successful experiences of Moroccan dairy beef production, with particular emphasis on the collection of young calves, nursery management and rations for growing and finishing phase of dairy beef production. Emphasis was also given to successful practices integrating the business of feed and milk processing with the dairy beef production.

Feedlot operator training. In order to enhance their technical and managerial capability, the program trained over 400 feedlot operators and employees, together with exporters and development workers, in various aspects of feedlot management. Training topics included feedlot design, best cost ration formulation and feeding management, selection and purchase of feeder animals, labor selection and training, animal handling and transport, animal health care and bio-security issues, record keeping and cost accounting, livestock trade and marketing of finished animals. The program also collaborated with EMDTI and APHRD in providing on-site training in practical feedlot management to the owners and employees of 20 feedlots as model feedlots for application of standard feedlot management practices.

Feedlot operators and livestock producers were also taken to Texas, Botswana, Morocco, South Africa and India for study tours of feedlots and meat industry operations. These visits enabled the private sector operators to observe best practices in feedlot and meat industry operations including vertically

“The study tours to Botswana and Texas comprising government officials, exporters, feedlot operators and cooperative members were instrumental in bringing about changes in perception.”

- Yacob Aklilu, SPS-LMM Midterm Evaluation, 2008 (p. 30)

integrated operations and dairy beef production operations, particularly in Morocco, which gave them an opportunity to better understand the business. As a result of the trainings and observation missions, significant improvements have been observed in feedlot design, ration formulation and feeding management, record keeping and overall business operation.

Technical manuals. SPS-LMM prepared, published and distributed:

- *A Dairy Beef Production* manual in English and Amharic to dairy producers, MoARD, Regional BoARDS and other stakeholders.
- *A Feed Resources and Feeding Management* manual in English, Amharic, Afan Oromo and Tigrigna to feedlot operators, dairy producers and development workers as well as pastoral feed resources management training for Afar region. The manual provides detailed description of the types and nutritional quality of locally available feed resources, providing important sources of information for ration formulation and feeding management in the respective regions.
- *Ethiopian Export Beef Cuts* manual (for promotion of Ethiopian beef cuts for export)
- *Fabricating the Ethiopian Beef Carcass for Export* (for training in beef carcass fabrication)
- *Best Cost Ration Formulation and Feeding Management* information leaflet in English and Amharic
- *Feeding to Produce Export Quality Ethiopian Beef: Requirements and Recommendations* manual in English and Amharic
- *Feedlot Design and Management: Requirements and Recommendations* manual in English and Amharic

These manuals and information leaflets were distributed to feedlot and meat industry operators, livestock producers, exporters and development workers.

2. Slaughter, processing and packaging meat for export

To reach the GOE export target of 30,000 MT of meat exports, Ethiopian meat exporters faced the challenge of significantly expanding slaughter, fabrication (de-boning) and vacuum packaging to support exports of boneless beef in addition to the prevailing exports of primarily chilled shoit carcasses.

SPS-LMM helped evaluate the cost effectiveness of equipment and technology requirements for carcass fabrication, vacuum packaging and chilling/freezing for export meat products, and advise abattoir owner/operators on equipment purchase and train staff in use of equipment and technologies. In 2007, an SPS-LMM consultant assessed the seven existing export abattoirs' capacity for cattle slaughter, processing and vacuum packaging to produce export-ready chilled or frozen boneless beef cuts. Based on the expected costs for each abattoir to upgrade its own infrastructure, staff and management to the necessary levels for beef fabrication, the consultant recommended that the exporters in the Modjo-Bishoftu area pool resources to establish and operate a single Export Processing Center. This jointly used center could serve as a cost-effective and internationally competitive option for fabricating and boxing beef for shipment to international markets. However, the establishment of a joint facility was not agreed by all

potential users, and the recommendation was not initiated. Subsequently in 2010-11, new export abattoirs were opened in Mekelle and B'Dar with significant capacity for cattle slaughter and carcass fabrication.

SPS-LMM's Meat Technology Advisor provided hands-on training and demonstrations in export beef cut and packaging at export abattoirs, providing opportunities for the 37 participants from export abattoirs, EMDTI, local abattoirs and butchers to practice the new techniques extensively. The program also developed the illustrated *Ethiopian Export Beef Cuts* manual for use in merchandising Ethiopian beef products with buyers in importing countries.

SPS-LMM consultants advised the export abattoir operators and their staff in meat processing equipment requirements and methods for meeting international standards for hygiene and worked with APHRD in 2010/11 to evaluate newly constructed abattoirs for compliance with HACCP and SPS requirements for international meat exports.

3. Export processes and procedures

Transport systems. In 2007, SPS-LMM engaged an international transportation specialist to assess the requirements and options for expanding cold chain transport of meat by air and surface/sea to MENA and other export markets. He evaluated the cost and logistical advantages of stuffing 20- or 40-foot refrigerated containers at the abattoirs, transporting containers on Genset-equipped trailers to Djibouti for loading on container ships that provide scheduled service to MENA and West African markets. The consultant recommended the development of land/sea cold chain transport for Ethiopian meat products because of the significantly lower cost than air transport and the limited air cargo capacity available from Ethiopia. The implementation of these recommendations, primarily for deboned beef cuts, required the establishment of markets and fabrication of sufficient quantities of export beef cuts to justify contracting refrigerated containers.

SPS-LMM organized a meeting on cold chain transport of meat products to international markets involving representatives from export abattoirs and MAERSK to inform meat exporters with regarding costs and services for land and sea transport in refrigerated containers. The cost for shipping by land/sea in refrigerated containers is 35-40% less than air cargo; therefore, meat export, especially beef, will be more cost competitive if shipped by land/sea to import markets. Subsequently, Luna Export Abattoir used MAERSK to ship frozen shoat offal from Modjo to Viet Nam, demonstrating technical feasibility of using refrigerated containers for shipping meat products. In September 2010, Abergelle Export Abattoir began shipping frozen boxed beef in refrigerated containers by road/sea from Mekelle to Angola via Djibouti Port.

SPS-LMM also evaluated options for improving transport of live animals by trucks to meet international animal care standards, reduce weight loss and damage to meat and hides during trekking and improve the competitiveness of Ethiopian livestock export sector. Results and recommendations from the study *Live Animal Transport Services in Ethiopia: Current practices and future options* were presented at the 17th Annual ESAP Conference in September 2009 and published in the society's proceedings.

4. Support to the Ethiopian Meat and Dairy Technology Institute

The Ethiopian Meat and Dairy Technology Institute was established in 2007 to provide training, demonstration and consultancy services in livestock production, meat and dairy products handling, processing and marketing to improve the productivity and profitability of the commercial livestock systems and help ensure that Ethiopia's livestock and livestock products are globally competitive. SPS-LMM, working with the Institute to strengthen its operational capacity,

- Identified capacity building and staff training needs, and provided training and equipment (eg, beef carcass fabrication and meat pH meters)
- Provided technical expertise in identifying priorities and curricula for training of feedlot and dairy operators. Reviewed EMDTI's training modules and involved EMDTI as co-organizer and co-provider of training programs on beef fabrication, pastoral feed resources management, feedlot feeding and management, dairy beef production and livestock marketing and related topics.
- Involved EMDTI experts in training programs for animal health personnel and supported the institute in the preparation of training materials on pre-purchase inspection, animal handling, farm bio-security, slaughter and dressing techniques, meat handling, refrigeration and transportation, laboratory techniques and food safety.
- Involved EMDTI experts in the establishment of NLMIS.
- Supported the dairy beef production feeding trial and developed plan for follow up trial from calf nursery to finishing phase.
- Sponsored the participation of EMDTI senior specialists in the Gulfood Fairs 2010 and 2011 as well as trade and observation missions to Morocco, South Africa, Kenya, Oman and India.
- Assisted EMDTI staff in developing a national export business plan as well as its own annual work plans and budget
- Trained EMDTI staff in feedlot design, feedlot management, best cost ration formulation and mixing, animal handling and general animal welfare principles and dairy beef production.
- Trained EMDTI experts in techniques to improve their capabilities to train others.
- Supported EMDTI experts for training in commercial meat processing and business plan development at Farmers Choice headquarters operations in Nairobi, the most successful international meat processing and exporting operation in east Africa.

5. Pastoral productivity and marketing

SPS-LMM worked to strengthen the productivity and marketing systems of pastoralists, who produce over 90% of Ethiopia's livestock and meat exports.

Observation visits for pastoral community leaders to feedlots and export abattoirs and establishment of market linkages. SPS-LMM provided opportunities for pastoralists to meet with representatives of export abattoirs, feedlot operators and live animal exporters to discuss issues related to supply of export quality animal at the right time and develop sustainable market linkages with buyers. The observation visits involved 25 pastoral community leaders from Oromia region and 28 pastoral community leaders from Somali, Afar and SNNP regions. The participants visited export abattoirs, a

feed processing plant and feedlots. Meetings between the live animal and meat exporters and pastoralists provided opportunities for developing direct market linkages.

Training for pastoral area marketing facilitators. SPS-LMM trained 48 market facilitators (including government cooperative promoters) from Oromia, Somali, Afar and SNNP regional states in business planning, livestock market information, record keeping and management and general marketing concepts. The training program included observation visits to export abattoirs and feedlots supplying live animal export sector.

Feed resources preservation and management training. 68 pastoralists and extension workers from pastoral areas of Afar, Oromia and SNNP Regions were trained on feed resources preservation, management and utilization. The purpose of the training was to mitigate feed related crises during prolonged dry seasons and droughts in the pastoral areas and to improve productivity of pastoral herds and flocks through feed resource conservation and strategic feeding and management practices. Because of local language differences, proximity and ease of handling the training in smaller groups, the training for the different regions was handled separately. Trainees expressed appreciation for the relevance and timeliness of the training and pledged to put the knowledge and skills into practice and to pass it on to other pastoralists. The Oromia Pastoral Areas Development Commission pledged to include the main focus of the training into their regular activities.

Commercial de-stocking of drought threatened areas. Drought in the pastoral lowland areas threatens the livelihoods of the pastoral community, especially as the cycle of the recurrent droughts becomes shorter and shorter. The Borena rangeland was affected by the droughts in 2007/2008 and more recently in 2010/2011. SPS-LMM staff served in leadership positions on taskforces responding to drought-caused emergencies. Responding to most recent drought, MoA established a commercial de-stocking taskforce with representatives from various MoA departments, the Commercial Bank of Ethiopia (CBE), the Road Transport Authority, the Oromiya Pastoral Area Development Commission, ELTA and SPS-LMM. Following a field assessment of the drought situation, MoA facilitated merchandised credit of ETB 29.5 million, of which ETB 21 million was disbursed by the CBE to four leading livestock exporters. Approximately 14,000 cattle were purchased from Borana pastoralists as part of the commercial de-stocking intervention. Feeding guidelines for use during drought emergency and transport of live animals were also prepared by SPS-LMM staff.

IR 2.3 Enhanced demand for Ethiopian livestock and meat in target markets

1. Marketing plan

Concerned about the decline in meat exports in 2006/07, the Export Coordinating National Committee (ECNC) instructed the Ministry of Agriculture to develop a plan for the expansion of meat exports. The Minister of Agriculture requested that SPS-LMM lead the taskforce that developed the “*Comprehensive Plan for Supporting the Export meat Industry*” in August 2007 that was subsequently endorsed by the ECNC. SPS-LMM was then requested to coordinate implementation of this plan. In consultation with the EMDTI and live animal and meat exporters, SPS-LMM assisted development of annual export

action plans which were approved by MoARD and ECNC. The annual targets and realized exports are presented in Table 4.

Table 4: Annual export targets and actuals

Year	Meat exports			Livestock exports		
	Targets	Actual exports	%	Targets	Actual exports	%
2008-09 vol	10,000 MT	7,468 MT	75%	424,000 head	214,683 head	51%
2008-09 value	\$45.4 m	\$26,581,000	59%	\$85.3 m	\$52,691,000	62%
2009-10 vol	15,891 MT	10,183 MT	64%	357,000 head	333,752 head	93%
2009-10 value	\$56 m	\$34,002,000	61%	\$83.3 m	\$90,708,000	109%
2010-11 vol	27,780 MT	16,877 MT	61%	582,698 head	472,045 head	81%
2010-11 value	\$100 m	\$63,226,000	63%	\$150 m	\$147,877,000	99%

The meat export targets were ambitious because they were based on assumption of major increases in beef exports from the new export abattoirs in Mekelle and B’Dar, which have combined capacity for producing more than 500MT boneless beef per week for export. In fact, plant openings were delayed so that principal meat exports continued to be chilled shoat carcasses from the export abattoirs in the Modjo-Bishoftu area. Nevertheless, export growth was both steady and significant, with exports each year exceeding the previous year’s targets. Live animal exports through formal channels were less than targets; however, the increase in the value of exported animals (see Outcomes section below) has enabled Ethiopia to meet or exceed ambitious live animal export value targets in the last two years.

2. Promotional campaigns for Ethiopian meat products

SPS-LMM worked closely with the Ministry of Agriculture in a promotional campaign for Ethiopian livestock and meat exports. The program contracted a local media firm to develop a promotional DVD entitled “*Delicious and Quality Meat from Ethiopia*” in Amharic, English, Arabic and French. The program distributed copies of the DVD to Ethiopian diplomatic missions in 15 countries, key Ethiopian exporters and GoE officials. SPS-LMM also developed five commodity posters (Ethiopian cattle, sheep, goats, camels and meat) as well as brochures in English and Arabic promoting Ethiopian meat and livestock. These materials—DVD, posters and brochures—were printed and distributed for promotional purposes at the Gulfood Fair and to ministerial offices, private operators engaged in livestock and meat export, chamber of commerce and sectoral associations, and provided to Ethiopian diplomats based in embassies and consulates in the major importing countries..

Gulfood Fair participation. SPS-LMM facilitated the participation of meat exporters and MoA at the Gulfood Fair in Dubai, one of the largest food and agriculture fairs in the world. The first year (2008), the Ethiopian delegation participated as attendees with the goal of contacting buyers and acquainting themselves with the promotional strategies of competing exporters from other countries. In 2009, MoA and meat exporters (Luna, Helmex, Organic and Abergelle) participated as exhibitors at the fair. SPS-LMM coordinated, financially supported

“I created contact[s] with 32 customers interested in importing Ethiopian sheep, goats and cattle, and have continued the negotiations with six of them after returning back home. Among the six, three came to Ethiopia and visited my facilities to start importation of live animals.”

- Ethiopian exporter following 2011 Gulfood Fair

and developed promotional materials (the DVD, posters and brochures described above) for the exhibit.

In 2010 and 2011, participation was even greater, with Ethiopian delegations that included representatives from export abattoirs, feedlot/exporters, MoA, MOT, MoFA, EMDTI and SPS-LMM. SPS-LMM arranged tastings of roasted Ethiopian mutton as well as coffee ceremonies that attracted as many as 400 visitors daily to the Ethiopian pavilion. Participation in the Gulfood Fair provided exporters with new business contacts and experience with negotiating and concluding contract agreements. For instance, in 2011, Ms Terhas Arefaine, commercial manager for Luna Export Abattoir, reported having met 44 potential buyers, initiated business deals with 12 importers and signed contracts with four of them.

3. Trade missions and meetings

Trade missions. SPS-LMM organized trade missions to major markets for Ethiopian meat and livestock products, including Egypt, the UAE, Yemen and Saudi Arabia. The program supported one representative each from EMPEA, ELTA as well as senior representatives from MoA. Other members of EMPEA and ELTA joined the missions at their own expense. Objectives were to identify SPS and HACCP requirements in discussions with responsible government officials, to strengthen business ties with meat and livestock importers and, in some cases, to lift trade bans (as described in the SPS section above). A brief description of the agenda and outcomes of each trip is outlined below:

- **Egypt** (May/June 2006): the program sponsored an SPS-related trade mission aiming to lift the FMD-related ban. This mission (described in the SPS section above) and subsequent high-level communications led to Egyptian inspectors and importers visiting Ethiopia, and eventually to the ban being lifted in 2009. Ethiopia's official live animal exports to Egypt increased by a factor of 8 between 2008/09 and 2009/10 and rose to a high of 73,040 in 2010/11.
- **UAE** (May/June 2006 and again in January 2007): after an initial mission to learn about SPS requirements, a second trip was conducted to present RVF surveillance data and argue for the lifting of the import ban imposed in January 2007. The ban on meat imports was lifted in September 2007 and UAE's meat imports from Ethiopia tripled in the following years, from a low of 2,643 MT in 2006/07 (when the trade ban was applied) to 8,379 MT in 2010/11. Although the ban on live animal imports had not yet been formally lifted as of September 2011, Ethiopia's live animal exports to the UAE increased from just 11,266 head in 2006/07 to 161,852 head in 2009/10.⁸
- **Yemen** (August 2006): this mission enabled Ethiopian veterinary officials to better understand Yemen's SPS requirements, which tend to be less strict than those of the

⁸ According to Ethiopian Customs and Revenue Authority data, Ethiopia's live animal exports to the UAE in 2010/11 were 36,294 head, down from 161,852 in 2009/10. However, this apparent drop may be due to the reclassifying of animals exported to the UAE via Somalia as exports to Somalia. During the same one-year period, official live animal exports to Somalia rose from 39,029 to 100,278. In fact, all Ethiopian live animal exports to MENA countries first transit through Somalia, Djibouti, Sudan and, less often, Kenya; therefore, ERCA data on country of eventual destination is based on information provided by the importers and/or exporters.

GCC countries. Although exports of live animals to Yemen declined over the life of the program, this likely reflects an increase in direct exports to final markets, as Yemen had traditionally served as a re-export hub for live animals to GCC countries.

- **Saudi Arabia** (August 2006): the program organized an SPS-related trade mission to present Ethiopia's clearance (provisional at the time) of Rinderpest by the OIE. Saudi officials agreed to review the ban and the country's meat imports from Ethiopia increased from 2,836 MT in 2006/07 to 5,059 MT in 2010/11. Official live animal imports increased sevenfold in the space of one year, from 20,042 head in 2006/07 to 144,055 head in 2007/08. Imports then slowed slightly, to 89,699 head in 2010/11.

The following trade missions were conducted to potential new market countries in order to assess demand for Ethiopian meat, identify SPS and other import requirements, and develop help Ethiopian exporters develop business contacts.

- **Bahrain** (April 2008): a trade mission was organized to explore opportunities in the Bahraini market. Although this mission did not directly lead to export relationships, the market was subsequently opened thanks to business linkages created during the Gulfood Fair in 2010 and a subsequent visit by Bahraini veterinary inspectors. In 2010/11, Bahrain imported 3,449 head of livestock—its first live animal imports from Ethiopia in three years.
- **Kuwait** (April 2008): SPS-LMM organized a trade mission to identify new market opportunities. Following the trade mission, representatives from a major food company in Kuwait visited Ethiopia for discussions with meat exporting firms regarding imports of frozen meat and joint ventures with the export abattoirs. SPS-LMM facilitated their field visits and discussions with GoE officials, development partners and live animal and meat exporters. Kuwait then imported its first shipment of Ethiopian meat products in 2008/09, with volumes steadily increasing in subsequent years to 235 MT in 2010/11.
- **Cote d'Ivoire and Ghana** (February 2008): SPS-LMM sponsored a trade mission to identify new market opportunities.
- **Democratic Republic of Congo (DRC)** (August 2009): SPS-LMM participated in a COMESA-sponsored market assessment. Substantial demand for frozen beef, offal, fish and poultry meat was identified, but realizing the export potential was limited by high air cargo costs.

Although the trade missions to West and Central African countries (Cote d'Ivoire, Ghana and DRC) did not lead to immediate marketing relationships due to high costs associated with shipping over long distance, they yielded important information about markets with less stringent SPS requirements than MENA countries and may be explored in the future.

Trade meetings in Ethiopia. SPS-LMM facilitated visits for interested importers and officials responsible for SPS requirements in importing countries to evaluate slaughter, processing and transport operations and to discuss trade linkages with exporters and MoA officials. These visits, which often occurred as follow-on to trade missions or contacts made through Gulfood Fairs, provided Ethiopian exporters with an opportunity to showcase their facilities and operations. Over the life of the program, SPS-LMM assisted

arrangements for foreign delegations from Saudi Arabia, Egypt, Bahrain, Kuwait, Oman, Lebanon, India and Spain, linking them to Ethiopian exporters and relevant GoE officials.

SPS-LMM also hosted delegations of potential investors from India, Saudi Arabia, Kenya and other countries who were interested in export related business opportunities in Ethiopia. Some of these investors have made firm commitments in the livestock sector, while others continue to assess opportunities.

4. Enabling policies and institutional development to support export

As part of the *Comprehensive Plan for Supporting Export Meat Industry*, SPS-LMM identified needs and proposed changes to policies that impede export of Ethiopian livestock and meat products. In addition, the program sponsored observation missions to India, the US, Kenya and South Africa for private sector and government officials so that they could learn from the experiences in export market development and promotion and support provided to exporters; identify opportunities for collaboration; and observe livestock procurement and pricing modalities, production and processing technologies and marketing practices. In India, information gained in 2010 from the experience of APEDA (Agricultural and Processed Food Products Export Development Authority) was particularly relevant to evaluation of EMDTI mandate and responsibilities and developing recommendations for strengthening EMDTI capacity. In addition, the team learned important lessons from the development of India's commercial meat industry, which were pertinent to the Ethiopian private sector, government market promotion and regulatory bodies.

Export documentation services. Ethiopian meat producers and exporters complained about the complexity, time required and costs for export documentation services. Organizations involved in issuing export permits included the Ministry of Foreign Affairs (MoFA), Ministry of Health, Ministry of Agriculture, Commercial banks, Customs Authority, Ethiopian Chamber of Commerce and Sectoral Association (ECCSA), Transit Enterprises, Islamic Secretariat and importing country embassies.

In response to this need, SPS-LMM worked with the Ministry of Agriculture to facilitate the establishment of a one-window export documentation service at the Bole International Airport in January 2007. This service initially included customs clearance, Certificate of Origin and document authentication. Later, the ECCSA discontinued its provision of the Certificate of Origin at the airport due to the low volume of demand and moved this service back to its original location in another part of the city. However, customs clearance and document authentication—which had previously necessitated a visit to MoFA—are still available at the airport, both provided by the Customs Authority.

Reducing live animal exports through informal channels. SPS-LMM convened a series of meetings with ELTA members and GOE officials addressing the impact of illicit trade on legal exports and mechanisms to contain trade through informal channels. Traditionally, informal trade routes were primarily by trekking animals from pastoral areas into Kenya and Somalia; however, in 2009, cattle from feedlots in the Adama-Modjo area were illegally transported by trucks to Somali ports for export to Arab

Peninsula. SPS-LMM facilitated face to face meeting involving ELTA, major export operators, the Minister and State Minister of Agriculture, and Ethiopian Revenue and Customs Authority. From this meeting, an official ban was placed on illegal livestock movement from Ethiopia, with movements requiring official documents indicating the source and destination of the animals. Enforcement of this ban had some effect; however, the greater factors reducing illicit trade were the opening of new markets, the realignment of Birr exchange rate and the increase in prices offered to producers by abattoir agents, feedlot operators and live animal exporters, which provided a financial incentive for pastoralists and small-scale traders to market animals through formal rather than informal channels.

Support to exporter associations. In 2009, SPS-LMM engaged an experienced Ethiopian consultant to evaluate needs and advise the ELTA and EMPEA Boards and members on measures to strengthen the associations' effectiveness in serving their members and in developing financial self-sufficiency. SPS-LMM provided technical and financial support to enable the associations to implement the consultant's recommendations and take on a greater role in supporting live animal and meat export. The program also provided office space and internet linkage for ELTA and EMPEA on the same floor as the SPS-LMM office. With SPS-LMM support, ELTA also opened a branch office in Adama (where many of the association's members have their feedlot operations) and provided important business services to its members, including market information gathering, government advocacy, credit facilitation, coordination of commercial de-stocking in pastoral areas, and rehabilitation of Adama feedlots. As a result of these improved services, ELTA's registered membership increased from 38 in 2006 to 87 in 2011. EMPEA, which in 2011 had seven members, began collecting a check-off fee of 10 ETB for every MT of meat exported from each of its members, thereby setting a precedent for fee-based services and placing the association on the path toward self-sufficiency.

Livestock marketing share company. The lack of operating capital and difficulty in securing loans from private banks often means that livestock traders collect animals from pastoralists on consignment, without payment until the animals are exported and traders are paid by importers. Pastoralists must wait for months for their payments.⁹ In instances where traders do pay upon purchase, their capital is tied up for long periods of time as they wait for the animals to be exported, which affects the vibrancy of the trade from pastoral areas.

As one of its efforts to improve the effectiveness of the livestock marketing chain, SPS-LMM supported the creation of the Utuba Gumi International Trade Share Company (UGITSC). UGITSC's 68 members include pastoralists, livestock traders and community members from Borena—all shareholders in the locally based marketing company.

SPS-LMM staff and consultants assisted in the development of a management and governance plan and a five-year business plan, provided strategic business advice, and

⁹ The credit issue affects livestock trade throughout Ethiopia with the exception of sales to abattoirs, which generally pay cash on delivery of animals.

assisted the company with business linkages. In addition, SPS-LMM facilitated the recovery of ETB 8.8 million (approximately 675,000 USD in March 2010) owed by a trader to Borana, Gabra and Guji pastoralists, channeling the return of funds through UGITSC—an activity that built awareness and created goodwill and trust for UGITSC among Borena pastoral communities. Today, UGITSC sells shoats and Boran bulls to export abattoirs for a consignment fee, supplies heifers to highland farmers, and supplies hay from highland areas to pastoralists facing feed shortages. The company's long-term plans include the supply of feed and veterinary drugs to pastoralists as well as the modernization of livestock marketing in Borena through the establishment of holding grounds and abattoirs, the introduction of modern livestock trucks, and other marketing-related investments. NGOs working to support Borena pastoralist livelihoods have expressed interest in linking livestock marketing cooperatives to the trade share company as well as replicating the model in other regions.

Rehabilitation and relocation of Adama feedlots. Adama city and its suburbs are the center of commercial feedlot operations in Ethiopia and a major supply source for bulls exported to the MENA region. A joint survey by SPS-LMM and the Ministry of Agriculture in 2006 identified 148 small to large-scale commercial feedlots within Adama city, generally located in poorly drained areas with inadequate manure disposal. These conditions reduced weight gains and even led to deaths. Moreover, this concentration of feedlots in high density residential areas was a public health hazard and source of environmental pollution. These concerns led the local, regional and federal government officials to order the relocation of feedlots away from the city with SPS-LMM support. The program supported relocation efforts by coordinating the relocation activities, including site selection and study of alternative sources and costs for water for the relocation sites. SPS-LMM senior advisors and experts instructed engineers on the basics of feedlot layout to ensure good drainage, advised feedlot operators on feedlot design to improve feed utilization, and trained feedlot workers in biosecurity, animal handling and feedlot waste management.

With SPS-LMM support, 44 feedlots were moved out of Adama city to nearby rural areas. This relocation has provided, and will continue to provide, significant benefits to public health and pollution control in Adama as well as improved Ethiopia's reputation in international markets for SPS related biosecurity management.

Vertically integrated commercial beef industry. At the request of the MoA, SPS-LMM supported a feasibility study of a vertically integrated commercial beef industry encompassing cow/calf breeding, stocker/feeder (including feed resources), beef harvest/processing and cold chain transport/marketing. In addition, the program organized a high-level mission to Farmers Choice in Kenya, considered to be the best meat processing and exporting operation in East Africa, and observation missions to South Africa for private sector operators and the public development agents to obtain first hand knowledge on vertically integrated beef production operations. Although the Ministry of Agriculture ultimately decided not to pursue the vertically integrated beef industry initiative, mission participants gained useful insights into feedlot design and management, beef fabrication, food safety and carcass grading and related matters.

HPAI objective: Improve HPAI surveillance and diagnostic capacity

Concerns about the human health risks from the emerging HPAI global epidemic led USAID to support improvement of Ethiopian rapid response capabilities in the event of a HPAI outbreak in Ethiopia. Although Ethiopia never had a confirmed case of Avian Influenza, the nearby countries of Djibouti, Sudan and Egypt have all reported HPAI outbreaks in domestic poultry, with Egypt particularly hard hit by the disease¹⁰. Strengthening surveillance and diagnostic systems for HPAI was therefore a major priority for the GoE as well as USAID. From 2005 to 2007, SPS-LMM trained NAHDIC lab technicians and, with supplemental USAID funding, procured HPAI surveillance and diagnostic supplies. In October 2007, USAID, recognizing the synergies between the requirements for rapid response to HPAI and those for rapid response to FMD and other trade related animal diseases, requested TAMUS to expand assistance to include strategic planning and support to federal, regional and local authorities for early detection and rapid response to HPAI outbreaks. In April 2008, SPS-LMM coordinated development of the HPAI Response Workplan and presented it to regional and federal stakeholders, including BoARDS and Emergency Operation Centers, veterinarians, experts from NAHDIC, APHRD and the Health Communication Partnership (HCP). Throughout these HPAI activities, SPS-LMM coordinated closely with APHRD as well as other donors and stakeholders addressing HPAI, including the EU, AU-IBAR, ILRI, FAO, IFPRI and GOE agencies responsible for the Integrated National Action Program (INAP) for HPAI.

IR B.1. Field and laboratory experts trained on surveillance, investigation and control of HPAI and related poultry diseases. SPS-LMM provided training to veterinarians from 12 regional laboratories and field services in HPAI diagnosis, postmortem examination, sample collection and handling.

In 2008, SPS-LMM conducted an outbreak simulation exercise for staff from regional and federal veterinary services (including laboratories), public health officials and private poultry sector operators. The goal of this exercise was to improve the national Emergency Preparedness and Response Plan (EPRP) for HPAI. During the exercise, participants addressed how to investigate potential outbreaks, mobilize stakeholders and communities, contain an outbreak, restrict poultry movements and marketing, cull flocks, dispose of carcasses and disinfect infected premises. Following the simulation, SPS-LMM advisors critiqued results and made recommendations to improve the speed and the comprehensiveness of the response.

In 2009, SPS-LMM provided training on post-mortem diagnosis of HPAI and other poultry diseases for veterinary staff working at commercial poultry farms and government multiplication centers. The training covered safety procedures, clinical examination and observation, necropsy procedures, specimen collection, and interpretation of findings. The program also sponsored the participation of three veterinarians who were leading HPAI rapid response teams in a 5-day WHO/FAO training in Kenya covering risk factors for the spread of avian influenza viruses.

¹⁰ HPAI is endemic to Egypt.

IR B.2. Nationwide reporting system for AI and related poultry disease outbreaks strengthened. SPS-LMM worked with HCP (Health Communication Partnership) to develop posters and cue cards to help community members recognize HPAI symptoms, with the goal of enhancing detection and reporting rates for suspected HPAI cases. The program then worked with HCP and NAHDIC to train staff from 11 regional laboratories, who in turn trained 108 woreda staff on the use of the cue cards as an awareness raising and extension tool for local communities.

SPS-LMM collaborated with regional bureaus of agriculture in Oromia and Amhara to train animal health professionals from high poultry density woredas in poultry farming and diseases. In collaboration with HCP and regional agriculture bureaus, SPS-LMM also supported the training of 950 community-level animal health workers, development agents and public health extension workers.

The program's activities in support of poultry disease outbreak investigations revealed a high incidence of diseases such as Newcastle Disease, Gumboro and Coccidiosis that cause substantial mortality in the government's multiplication centers as well as backyard flocks. These findings highlighted the need for a comprehensive poultry health program combining epidemiological data collection and disease surveillance, prevention and control. In response to this need, SPS-LMM worked with ILRI to compile information on poultry farm locations and movements and migratory bird movements as well as marketing information and environmental data. Data were then entered into a dynamic *Spatial Distribution and Production Environment Descriptors of Poultry Farms in Ethiopia* database. The database, which is managed, updated and utilized by APHRD, contributes to the development of a comprehensive poultry health program.

A 2009 consultative meeting organized by AU-IBAR's Support Program to the Integrated National Action Plans (SPINAP) with SPS-LMM support identified several surveillance priorities, including surveillance of live bird markets, commercial poultry and border areas in order to enable early detection of possible HPAI incursion.

IR B.3. Federal diagnostic capability for HPAI virus (H5N1) strengthened

SPS-LMM procured HPAI diagnostic kits and supplies for NAHDIC to conduct primary testing and confirmative assays on poultry and wild bird samples. Kits were also distributed to regional laboratories and staff trained on their use. In 2007, the program trained NAHDIC and NVI staff in conducting real-time PCR using PCR equipment purchased for NAHDIC through USAID funding to the FAO. SPS-LMM also trained NAHDIC staff on laboratory safety while investigating HPAI and other zoonoses, and sponsored an assessment of NAHDIC's biosafety system by a South African consultant. The consultant identified the need for NAHDIC's equipment to be certified as part of the ISO 17025 certification process.

In May 2011, OIE designated NAHDIC as the reference laboratory for Newcastle Disease and other high-mortality poultry diseases in the Horn of Africa. This recognition, supported by FAO and AU-IBAR, was the result of NAHDIC's implementation of QMS

standards for ISO 17025, adaptation of LIMS and application of good laboratory practices—all supported by SPS-LMM.

IR B.4. Capacities for early detection and response to incursion of HPAI virus developed

With funding from USAID, SPS-LMM supported federal and regional veterinary services, including 10 laboratories, for HPAI surveillance, including investigation of disease outbreaks in domestic poultry and wild birds as well as the systematic surveillance of live bird markets, commercial farms, borders and other potential risk areas.

In response to a request from MoARD, SPS-LMM coordinated development of the plan entitled *Emergency Preparedness and Response to Minimize the Impacts of Transboundary Animal Diseases in Ethiopia*. This plan aims to help secure government and donor funds for predefined effective early reaction activities.

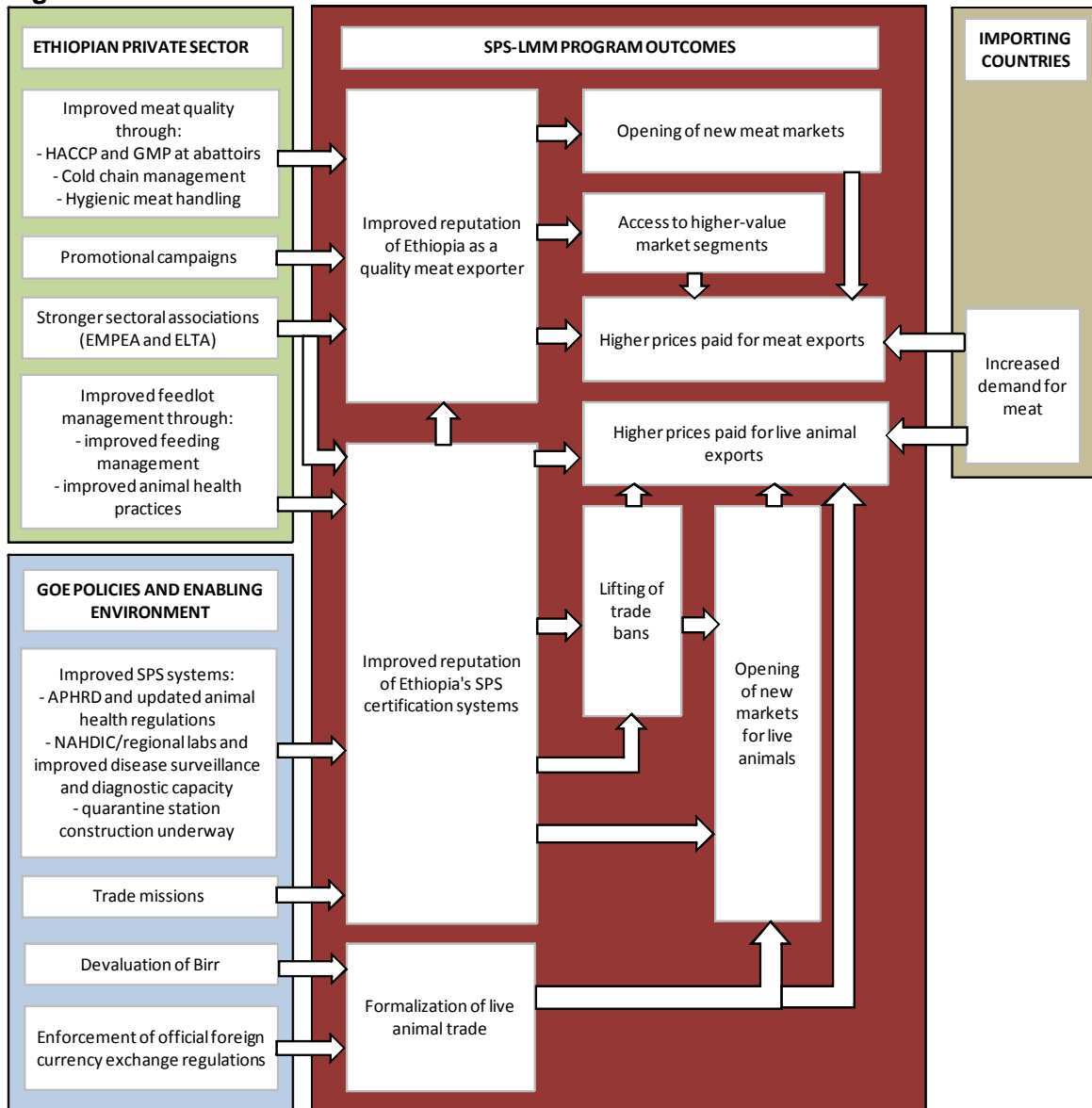
IR B.5. Awareness among stakeholders of consequences of HPAI and need for rapid response to outbreaks created

SPS-LMM worked closely with HCP to create awareness of the consequences of HPAI and the importance of surveillance among stakeholders and communities. Activities included sensitization workshops, training of managers of government-owned poultry multiplication centers and commercial farms on biosecurity, posters and cue cards in local languages (described above), and the development of a communication strategy in consultation with APHRD.

III. OUTCOMES

Between 2005/06 and 2010/11, Ethiopia’s meat exports more than doubled in volume, while formal live animal exports nearly tripled. Increases in foreign exchanges earnings from exports were even more impressive. SPS-LMM’s catalytic efforts in support of the Ministry of Agriculture’s export promotion strategy through problem identification, priority setting, strategic and tactical planning and implementation contributed to these increases. Figure 1 below illustrates SPS-LMM support to both the private and the public sector which contributed to improving Ethiopia’s reputation as an exporter of livestock and meat, lifting of trade bans, opening of new markets and increasing foreign exchange earnings from meat and live animal exports.

Figure 1. SPS-LMM interventions and outcomes



As illustrated in Figure 1, the increases in livestock and meat exports were the result of a combination of SPS-LMM interventions that included:

Direct support to the private sector, in the form of:

- **Improved meat quality.** Training in Good Manufacturing Practices and the implementation of Quality Management Systems and HACCP at the abattoirs, together with improved cold chain management and training in hygienic meat handling practices, contributed to significant improvements in meat quality.
- **Improved feedlot management.** Training in feedlot design and management, feeding management—including best-cost total mixed rations—and animal health support significantly improved the cost-effectiveness of feedlots, and thereby increased their competitiveness.
- **Stronger sectoral associations.** Support to the EMPEA and ELTA enabled them to provide important business services to their members and increase the sector’s overall competitiveness.
- **Promotional campaigns.** Development and distribution of the DVD, *Quality Meat from Ethiopia*, and other promotional materials, together with trade missions and annual participation in the Gulfood Fair, enabled exporters to showcase their improvements in quality and promote their products to potential importers. Business contacts were initiated and linkages were created that helped to open new markets.

Support to the GoE in creating an enabling environment for livestock and meat exports, through:

- **Improved SPS systems.** SPS-LMM’s contribution to the creation of APHRD, the updating of animal health regulations and proclamations, capacity building of NAHDIC and regional laboratories to improve disease surveillance and diagnostic capacity, and support for quarantine station construction were all critical in improving Ethiopia’s SPS systems.
- **Trade missions.** Program-sponsored trade missions enabled face-to-face talks between Ethiopian veterinary authorities and importing country authorities, and provided the opportunity to both learn about importing country requirements and highlight measures taken by GOE to ensure the SPS compliance of Ethiopian livestock and meat exports.

Concurrent developments. Several concurrent developments also supported increased exports. The first two factors are on the supply side (enabling environment factors), while the last is on the demand side (from importing countries):

- **Increased demand for meat** in international markets, which contributed to increased meat prices and incentivized foreign buyers to follow up contacts with Ethiopian exporters.
- **Devaluation of the Ethiopian birr** (from 8.65 ETB = 1 USD in 2005 to approximately 17 ETB = 1 USD in 2011) significantly improved the price competitiveness of Ethiopia’s exports.
- **Strict enforcement of official foreign currency exchange regulations**, which led to an equalization of exchange rates between the official rate and the black market rate, thereby removing a major incentive for informal exports.

Outcomes. Together, these factors contributed to significant improvements in Ethiopia's international reputation as an exporter of quality meat and live animals, which in turn led to:

- **Opening of new markets and market segments.** More countries are recognizing Ethiopia's SPS systems and allowing direct imports for the first time. Trade bans have been lifted and new markets have opened to imports from Ethiopia, while existing trading partners have significantly increased their imports. With improved quality and longer shelf-life, Ethiopian meat products have entry to higher-value markets.
- **Formalized trade of live animals.** Cost-effective feedlots have attracted increased numbers of animals from pastoral areas into formal trade channels. In addition, increased competition between abattoirs and live animal exporters has driven up the price of shoats in formal markets.
- **Higher export prices for meat and live animals.** Higher prices are the result of all of the above: improved meat quality and shelf-life, access to higher-value markets, increased formalization of the live animal trade, and increased demand for meat in international markets.

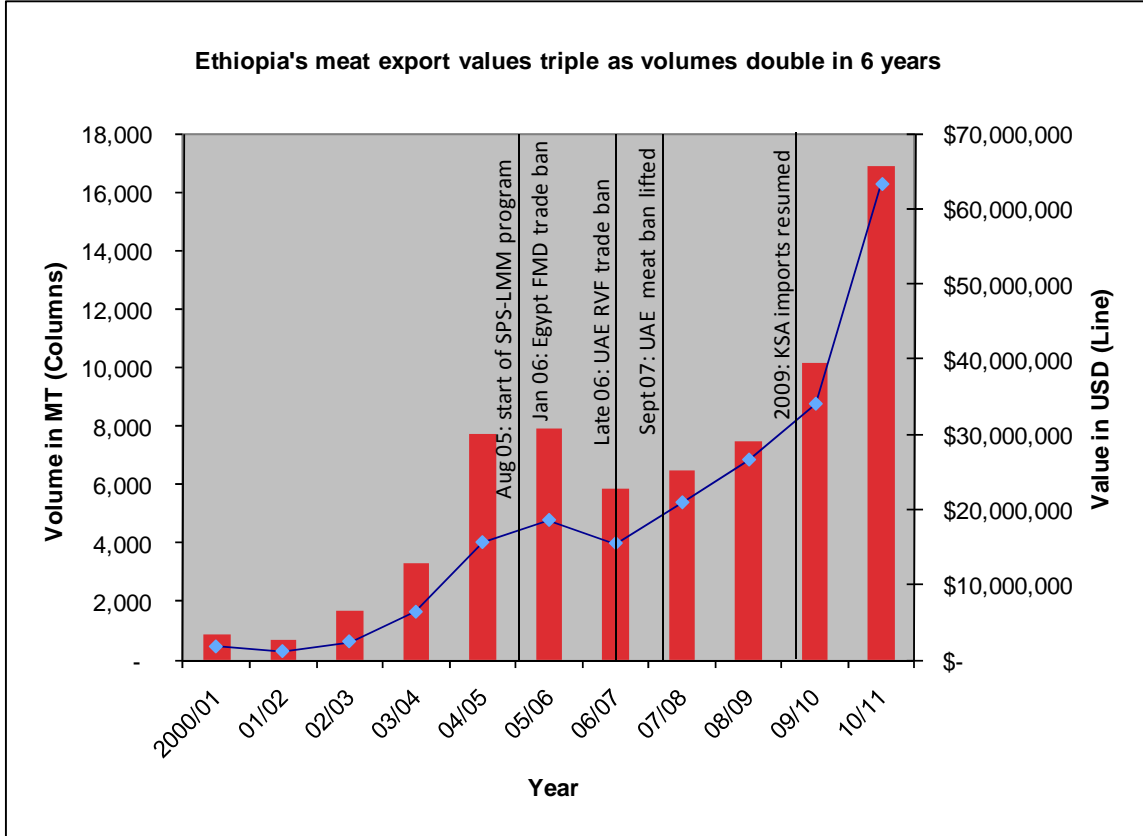
Further details and analysis on the expansion of meat and live animal exports are provided below.

1. Increases in meat exports

Increase in volume and value of exports. Over the period of SPS-LMM implementation, Ethiopia's meat exports rose from 7,917 MT to 16,877 MT (Figure 2). This 113% increase in export volumes over six years represents a 17% compound annual growth rate (CAGR). After a devastating import ban from Egypt in January 2006 following an outbreak of FMD erroneously attributed to Ethiopia, Ethiopia's meat exports decreased, then slowly began increasing, finally increasing dramatically between 2009/10 and 2010/11 as a result of new business contacts, HACCP improvements at the abattoirs, better cold chain and quality management, and other positive developments supported by SPS-LMM.

Higher-value exports. The average value of meat exports increased significantly over the life of the program. From base of \$2,344 per MT in 2005/06, the average FOB price rose to \$3,746 in 2010/11. This is a result of a combination of factors, including an increase in meat prices internationally (in 2010/11 in particular) and the concerted effort made by meat exporters—led by the EMPEA—to preserve the cold chain throughout the export process, thereby improving meat quality and shelf-life and increasing prices. The price increase also suggests that Ethiopian meat is reaching higher-value market segments within importing countries. With average meat prices of \$4,217/MT and \$4,079/MT respectively for 2010/11, UAE and Saudi Arabia were Ethiopia's highest-value markets at the end of the program. Whereas Ethiopian meat traditionally targeted low-income guest workers in these countries, these high prices suggest that trade missions and promotional campaigns, together with substantive improvements in meat quality, shelf life and reputation for meeting international HACCP/SPS requirements, brought Ethiopian meat exports to the attention of more demanding and higher-paying consumers.

Figure 2. Ethiopian meat exports



Source: Ethiopian Revenue and Customs Authority

Figure 3. Ethiopian meat exports by destination 2010/11

Expansion of importing countries and penetration of higher-value markets.

The great majority of Ethiopia’s meat exports (80% of total volume) in 2010/11 went to the UAE and Saudi Arabia (Figure 3). These traditional markets for Ethiopian meat accounted for the majority of the growth in exports between 2005/06 and 2010/11. However, expansion in new markets was significant, accounting for 31% of the increase in exports. In 2005/06, only 4% of exports were to countries other than the UAE, Saudi Arabia and Egypt. By 2010/11, 19% of exports were to new importing countries, including Turkey, Angola, Comoros, Bahrain and Viet Nam (Figure 4).

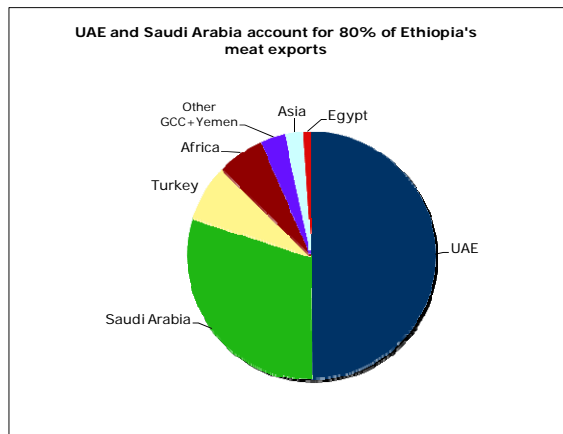
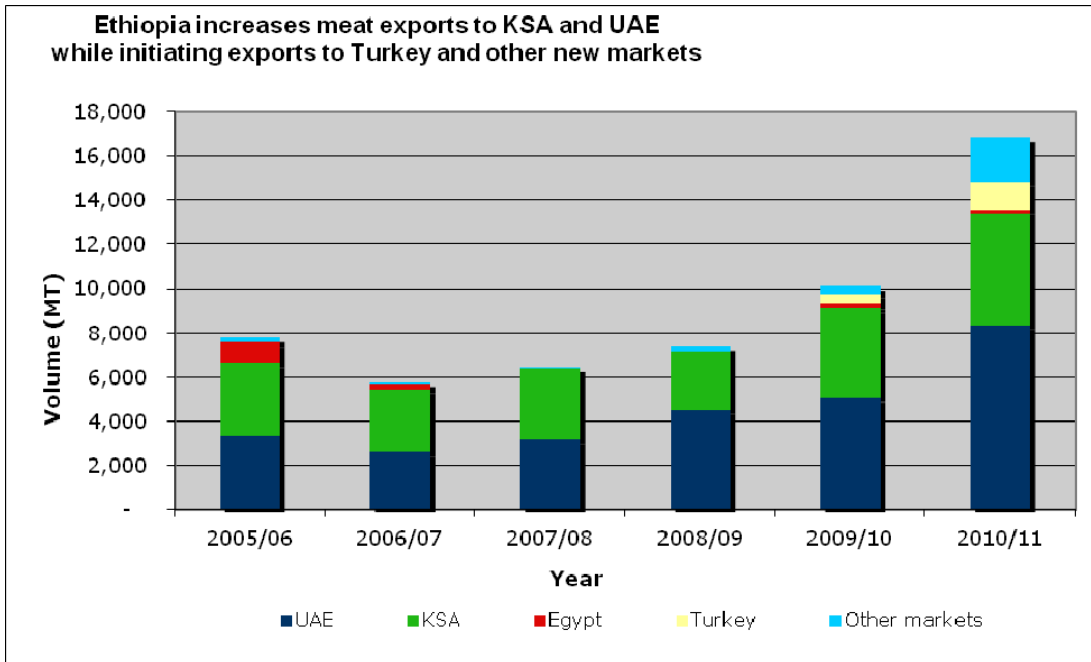


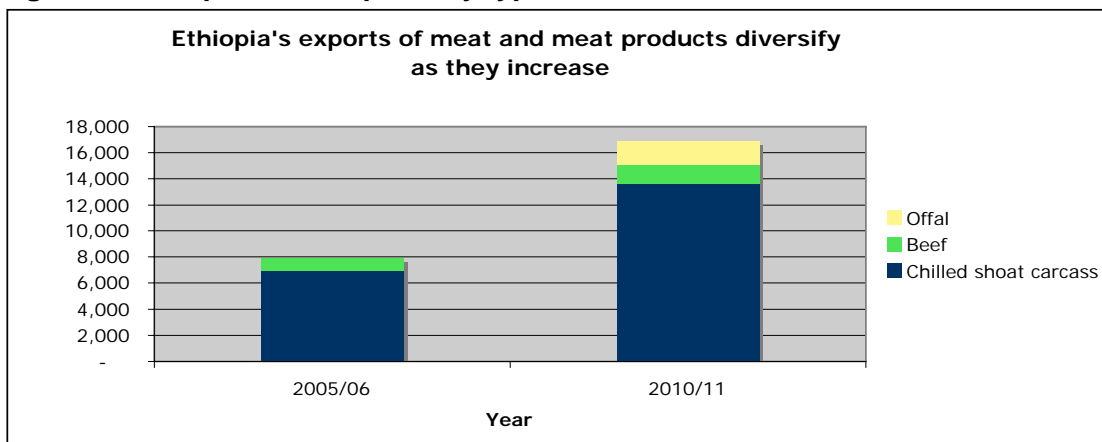
Figure 4. Ethiopian meat exports by destination, 2005/06 – 2010/11



Source: Ethiopian Revenue and Customs Authority

Increase in beef and edible offal exports. The doubling of Ethiopia’s meat export volumes was due primarily to an increase in chilled shoat carcass exports, but, as Figure 4 shows, exports of beef also increased, while edible offal exports—nearly non-existent in 2005/06—made up nearly 10% of the volume exports in 2010/11. Although offals had a lower value than meat exports (average offal prices were \$1,254/MT in 2010/11, compared to \$4,183/MT for chilled shoat carcasses and \$2,764/MT for beef), they offer an important opportunity for additional foreign exchange earnings from the Ethiopian export abattoirs which can meet international HACCP and SPS standards.

Figure 5. Ethiopia meat exports by type, 2005/06 and 2010/11



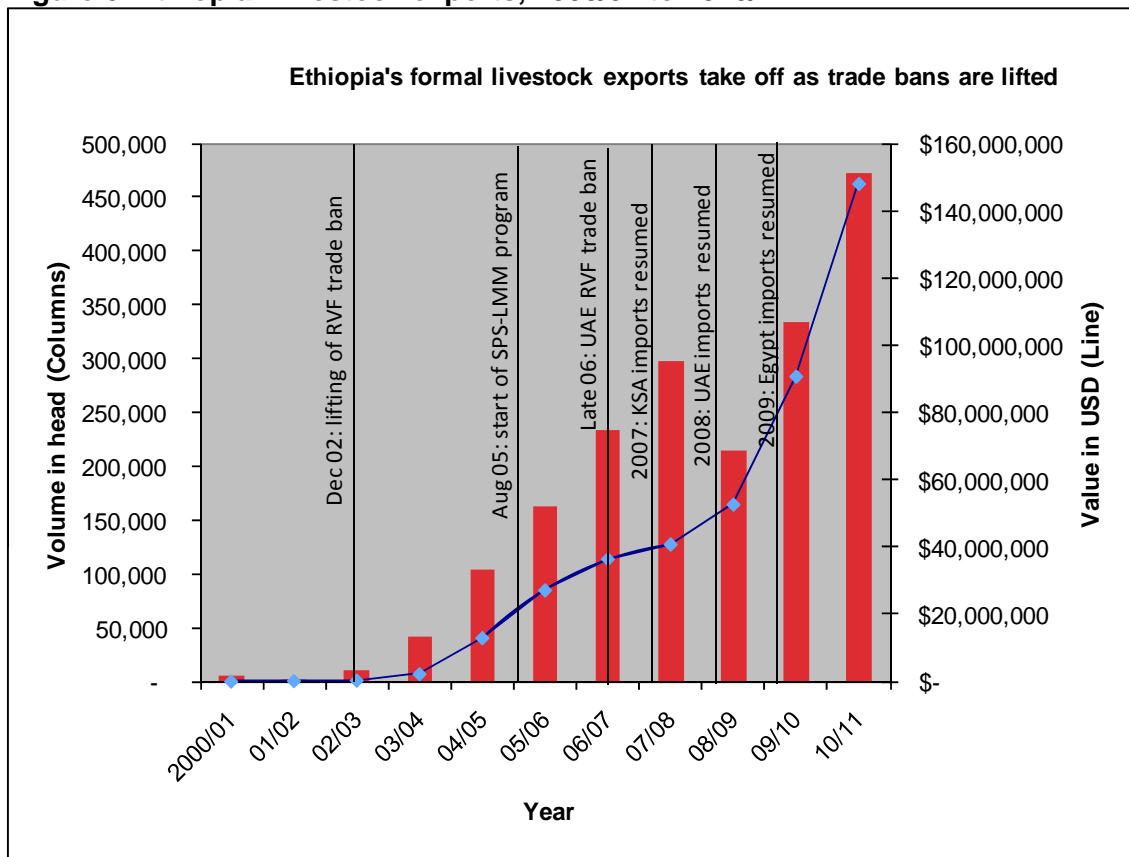
Source: Ethiopian Revenue and Customs Authority

2. Increases in live animal exports

Increase in volume and value of exports. Ethiopia’s official livestock export figures rose rapidly over the life of the program (Figure 6): from 163,375 head in 2005/06, export

volumes increased by 189% to 472,045 in 2010/11, reflecting a CAGR of 19%. The value of livestock exports rose even more dramatically, from \$27 million in 2005/06 to nearly \$148 million in 2010/11—representing a total growth rate of 442% and a CAGR of 39%. This increase was due in part to increased prices for meat animals worldwide and increased international confidence in Ethiopia’s SPS certification systems. However, the more likely reason is that abattoirs and feedlot operators exporting through formal channels competed for sheep, goats and cattle from pastoral herds with the traditional traders exporting live animals through informal channels. And these exporters were willing and able to pay higher prices for animals which met their export quality requirements.

Figure 6. Ethiopian livestock exports, 2000/01 to 2010/11



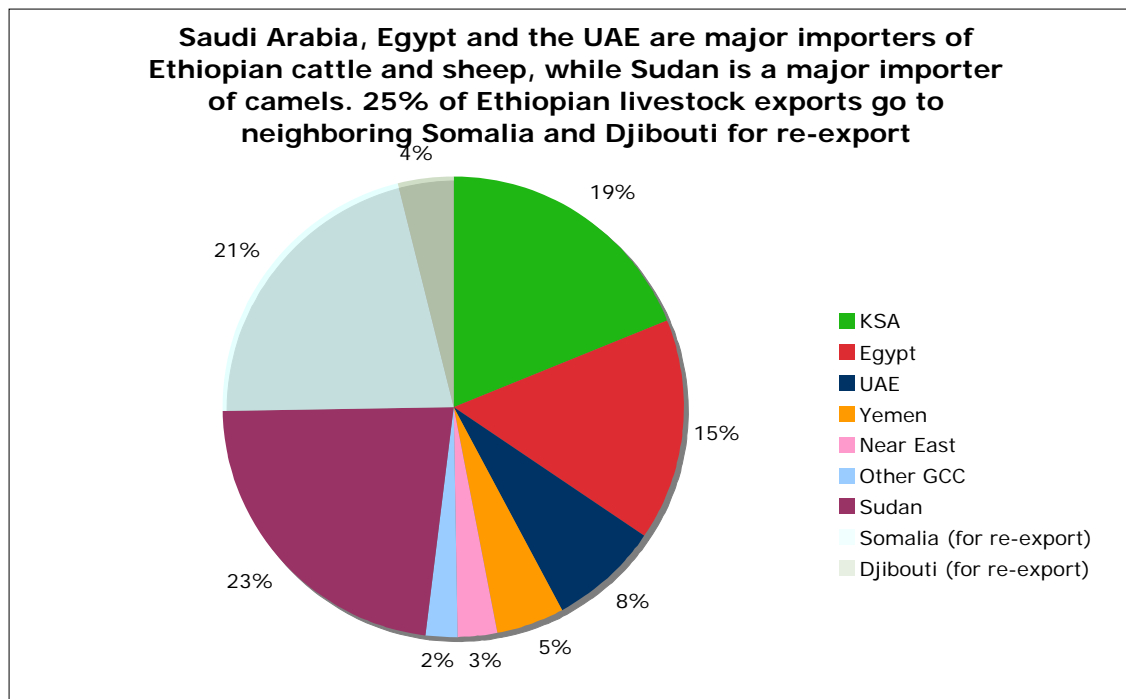
Source: Ethiopian Revenue and Customs Authority

The significant increase in official figures for live animals exported is due both to an expansion of total live animal exports and an increasing formalization of the livestock trade. In 2005/06, it was estimated that 328,000 cattle and 1.1 million sheep and goats were being exported informally across Ethiopia’s borders (Belachew Hurrissa as cited in Jabbar, Negassa and Gidyew 2007), and it is likely that informal trade still accounts for the majority of animals exported from Ethiopia, albeit on a decreasing basis as a proportion of total exports. Over the course of the program, SPS-LMM worked to support more formalized trade through the recognition by importing country veterinary authorities of SPS certification by APHRD as the Ethiopian Competent Authority, through support

for ELTA, and through the increase in number and cost-effectiveness of feedlots producing export quality animals. SPS-LMM also helped obtain recognition of Ethiopian SPS systems by new countries, thereby opening new markets and increasing demand.

Figure 7 below shows the composition of exports by destination in 2010/11. Forty-six percent of official livestock exports go to neighboring Sudan, Somalia and Djibouti primarily for re-export to Arab States. The major final destination markets are Saudi Arabia and Egypt, together accounting for 34% of direct exports. Other GCC countries (Bahrain, Kuwait and Oman in particular) and Near East markets (Jordan and Lebanon) are still small (2% and 3% respectively) but growing in share, with significant strides taken in recent years in obtaining import permits and clearance for Ethiopian imports by their veterinary authorities. Exports to these countries are expected to rise in the future.

Figure 7. Share of Ethiopian livestock export volumes by country, 2010/11



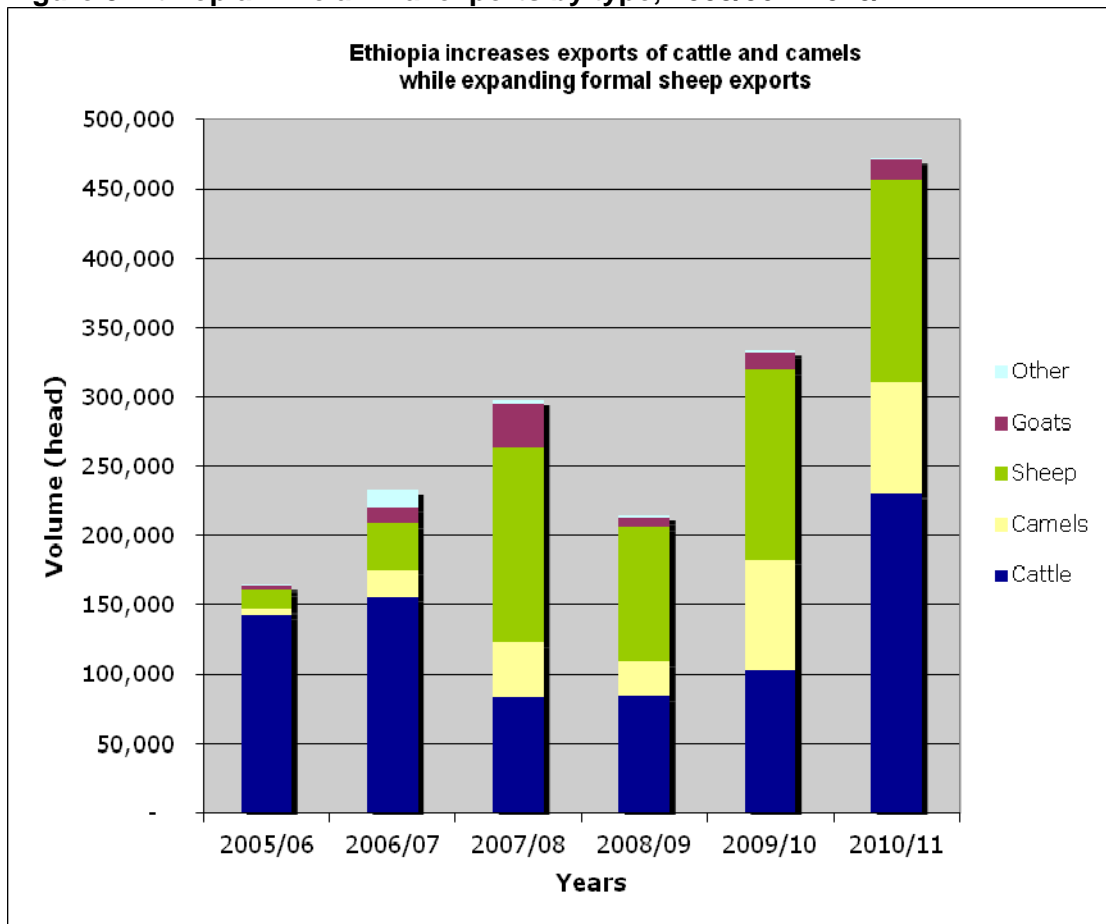
Source: Ethiopian Revenue and Customs Authority*
 (*with information on country of destination provided to ERCA by exporters in some instances)

Increase in sheep and cattle exports. Figure 8 shows that the increase in livestock export volumes comes from a significant increase in sheep exports as well as a large increase in cattle exports in 2010/11. The increase in cattle exports can be tied to improved feedlot operations (which have increased cost-effectiveness as well as stimulating new demand from importers) and new business relationships created through trade missions and participation in the Gulfood Fairs. The increase in sheep exports is a combination of increased total exports as well as the expansion of *formal* sheep exports, which in 2005/06 were virtually non-existent. SPS-LMM contributed to the formalization of sheep exports by helping to attract buyers who did not purchase through the clan-based informal market channels, while higher prices paid by live animal exporters using the formal channels provided an incentive for pastoralists and traders to supply to sell into the

formal channels. An increase in insecurity in Somalia due to al-Shabaab’s activities also contributed to the curtailing of informal exports.

Camel export volumes also saw an impressive increase during the last two years of the program in particular. This increase is likely due to the “pull factor” of sharp increases (70-100%) in camel prices in Sudan in 2009 and 2010 (Aklilu and Catley, 2011), as well as general increases in formalized trade due to stricter government controls and the equalization of exchange rates between the official and black market rates, which reduced incentives for unofficial trade. By the second half of 2010, domestic prices for camels had also increased significantly, leading to a slowdown in the growth of exports (*ibid*).

Figure 8. Ethiopian live animal exports by type, 2005/06 – 2010/11



Source: Ethiopian Revenue and Customs Authority

IV. LESSONS LEARNED

Notable lessons learned during the implementation of the SPS-LMM program include:

The first lesson learned is the interrelatedness of value chain constraints and, consequently, the importance of a systems approach giving comprehensive and coordinated attention to all elements of the value chain. For instance, in 2006 meat exporters reported that their major constraint was a limited supply of animals for slaughter. However, this “lack of supply” was in effect due to the low purchase prices offered by abattoir agents for shoats in the pastoral supply areas. These low purchase prices were a direct reflection of low prices paid by importers, which were low because of the poor quality of Ethiopian meat exports (due to poor hygiene and cold chain management as well as transport constraints) as well as an unfavorable exchange rate. Hence the real challenge faced by abattoirs was not one of supply, but rather one of quality control. During the last two years of the project in particular, new and expanded markets for higher-quality and longer-shelf-life Ethiopian meat exports and the favorable exchange rate have enabled export abattoirs to pay top prices for export quality animals. As a result, supply—at least for the centrally located export abattoirs—is no longer a major constraint. Abattoir capacity utilization over the life of the SPS-LMM program increased from an average of 31% to 62%, despite an increase from 4 to 7 in the number of operating abattoirs and a more than tripling of slaughter capacity.

The second lesson learned concerns stakeholder collaboration and buy-in. The SPS-LMM program found that it is essential that development objectives be agreed and strongly

“Whereas others (for one reason or another) have failed in the past, SPS-LMM has been successful in working collaboratively with the authorities and in providing support for critical policy changes for the betterment of the industry. [...] Its entrustment by the Government to coordinate the two task forces set up to develop a comprehensive plan for supporting the meat export industry indicates the confidence of the Government in the program.”

- Yacob Aklilu, SPS-LMM Midterm Evaluation, 2008 (p. 28)

supported by both public and private stakeholders, and that these stakeholders understand how the objectives will support their own priorities. In other words, development objectives must be shown to address government priorities (in this case foreign exchange earnings through increased meat and formal live animal exports) and bring positive returns for private investors in a relatively short time span. In this instance, because increasing meat and live animal exports was a top GoE priority, key leaders and government officials contributed actively to problem identification and helped implement rapid solutions. The establishment of APHRD and the transformation of NAHRC into NAHDIC—both in the space of eight months in 2007—are clear examples of the government’s commitment and willingness to act decisively when the changes are understood as essential to meeting SPS requirements for increased exports. In the private sector, operators’ willingness to make significant investments in new technologies and improved practices, as recommended by SPS-LMM, increased profits. Feedlot operators’ investments in using “best cost” rations and improving feedlot design and management significantly increased weight gains and improved the quality of finished animals. Abattoir operators’ investments in improving hygiene and cold chain management and complying with international HACCP requirements led to higher prices for meat exports.

V. NEXT STEPS FOR ETHIOPIA'S LIVESTOCK AND MEAT EXPORT SECTOR

Ethiopia's Growth and Transformation Plan aims to increase annual exports to 111,000 MT for meat and over 2 million head of live animals through formal channels by the year 2014/15. Achieving these targets will require the continuation of many SPS-LMM ongoing activities as well as new and additional interventions. Recommendations for priority activities and their expected outcomes are outlined below.

1. SPS related activities

Outcome: Ethiopian animal health services, including establishment of a competent and credible veterinary service in Ethiopia strengthened. Develop legislative framework for SPS compliance

1. Strengthen livestock disease surveillance and reporting systems countrywide
2. Improve national capacity for early detection and rapid response to animal health emergencies
3. Establish livestock identification and traceability systems
4. Improve training of veterinary professionals and paraprofessionals to support export limiting constraints from TADs
5. Establish system to register and license animal health personnel countrywide
6. Establish laboratory QMS for NAHDIC and adapt QMS to requirements of regional labs
7. Build analytical capacity for verifying the purity and safety of export meat and meat products
8. Develop financially sustainable laboratory diagnostic services
9. Standardize diagnostic services, establish quality control and develop functional linkages and collaboration between regional and federal veterinary laboratories
10. Establish LIMS at NAHDIC as model for expansion to NVI and regional labs
11. Expand vaccination for TADs and disease of intensification to meet SPS requirements for exports, control endemic TADs and improve productivity
12. Upgrade export abattoirs' hygiene and sanitation standards to international levels
13. Improve capacity of Ethiopian Competent Authority to ensure credibility of SPS certification of live exports

APHRD will be the primary agency responsible for these activities, as it constitutes the foundation upon which SPS compliance will be established. The majority of the activities below are already ongoing, with completion expected between 2012 and 2014.

Outcome: Improved meat processing hygiene and reduced prevalence of meat-borne diseases among Ethiopian meat consumers.

Develop, introduce and enforce basic hygiene for slaughter and meat processing in municipal abattoirs and butcherries as well as export abattoirs.

Activities are ongoing and are overseen by APHRD and the Ministry of Health, together with regional bureaus and municipal administrators.

Outcome: Livestock subsector safeguarded from consequences from use of inefficient, altered and unsafe veterinary drugs and biologicals. Quality testing and

label verification system established for animal feeds in order to protect the health of livestock and the investments of producers.

Activities for this outcome will be led by APHRD through the development of regulations and guidelines. Initiatives to strengthen APHRD's analytical and technical capacity are expected to be completed in 2013.

Outcome: Export earnings from export of leather and leather products through the improvement of the quality of hides and skins enhanced.

1. Assist plan development and implementation for the control of diseases/parasites which cause pre-slaughter defects on hides and skins
2. Reduce pre-slaughter physical and mechanical damages to hides and skins
3. Reduce peri-slaughter defects

These activities will be led by regional, zonal and woreda bureaus and administrations, development agents and laboratories, including NAHDIC. Treatment protocols are expected to be established in 2012, with trainings, awareness creation and the establishment of a quality incentive market mechanism continuing through 2014.

2. Livestock and meat marketing activities

Outcome: Consistent and profitable demand for Ethiopian meat and live animal exports established.

Establish a public-private or governmental organization with responsibility for promoting meat and live exports and assisting private operators in profitable production of export quality livestock products

Outcome: Effective market intelligence system developed.

Collect key market intelligence information; develop software to update, maintain and support analysis of market supply and demand information

Ongoing activities include NLMIS led by the Ministry of Agriculture and EMDTI, together with regional bureaus and agriculture and marketing agencies.

Outcome: Effective and efficient livestock and meat marketing system established.

1. Develop transparent market system and reduce marketing transaction costs.
2. Implement Ethiopian Livestock Market Information System (NLMIS)
3. Increase capacity for appropriate and cost effective transport of live animals (low stress) and meat (refrigerated containers)

These activities will be supported by a variety of institutions and agencies, including EMDTI, APHRD, QSAE, regional bureaus and marketing agencies, private sector operators, and the Ethiopian Commodity Marketing Authority and Ethiopian Commodity Exchange. Certain activities—such as the implementation of NLMIS—are ongoing.

Outcome: Consistent and price competitive supply of export quality slaughter animals.

1. Provide training and technical assistance in:
 - a) Pastoral herd nutrition, health, husbandry and feed conservation to increase offtake by improving fertility and reducing deaths and drought destocking
 - b) Improved feedlot technical and business management

- c) Dairy beef production
- 2. Develop public and political support and implement policies and procedures to reduce marketing costs
- 3. Develop commercially viable livestock production and meat processing operations which operate on scale and with controls required to provide consistent year-round supplies of export quality products.

EMDTI, regional bureaus of agriculture, private operators and development partners will all contribute to these activities.

Outcome: Public and private actors in meat industry capacitated in beef processing.

Develop managerial and staff capacity at EMDTI and export abattoirs for carcass fabrication, packaging, transport and cold chain maintenance and for general business planning and management

Activities will involve EMDTI and export abattoir operators, with support from the FAO.

Outcome: Well-planned and –implemented investments in the meat and livestock sector which are profitable for investors and improve the contributions of the livestock sector to the national economy and livelihoods of Ethiopian producers and consumers.

Develop capacity for advising lenders, investors and GOE on investment opportunities in livestock/meat sector

EMDTI and the Ministry of Agriculture, regional investment offices and Ethiopian private investment consultants will support this activity.

Outcome: GOE policies and institutional support improve efficiency and profitability along value chain for livestock sector.

- 1. Develop linkages with and obtain support from Ethiopian diplomatic missions in importing countries for meat and livestock exports
- 2. Strengthen livestock and meat sectoral associations and local marketing organizations to represent the interests of members (producers, traders, feedlot and export abattoir operators) with GOE and with importers.
- 3. Strengthen federal institutional support for market–led development of Ethiopian livestock sector
- 4. Develop credit scheme to support investments in livestock sector development

The Ministries of Agriculture and Foreign Affairs, EMDTI, banks and insurance companies, private operators (including UGITSC and others), and sectoral associations (ELTA and EMPEA) will support the achievement of this outcome.

Outcome: Ethiopian livestock exported through informal channels diverted to formal meat and live animal market channels so that their value contributes directly to the national economy.

SPS and LMM priority activities to strengthen demand, comply with international SPS & HACCP requirements, increase offtake of export quality meat and live animals, provide market intelligence, improve marketing efficiency, support enabling policies which help ensure that producers receive fair value

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ANNEX

SPS-LMM Program Team

Name	Position
Hank Fitzhugh, PhD	Chief of Party, Livestock Production & Marketing
SPS Activities	
Wondwosen Asfaw, DVM, MSc	SPS Coordinator, Veterinary Epidemiologist
Nega Tewelde, DVM, MSc	Veterinary Epidemiologist
Laike Mariam Yigezu, DVM, MSc	Veterinary Immunologist
Konrad Eugster, DVM, PhD	Senior Advisor*, Animal Health, Laboratory Diagnostics
LMM Activities	
Belachew Hurrissa, MSc	Deputy CoP, LMM Coordinator, Value Chain Economist
Dugasa Dirbaba, BSc	Livestock Marketing Analyst
Getachew Legesse, MSc	Livestock Marketing Specialist, Value Chain Economist
Adugna Tolera, PhD	Livestock Production Specialist, Ruminant Nutrition
David Hutcheson, PhD	Senior Advisor*, Feedlot Nutrition & Management
Administration and Program Support	
Tigist Gelaye	Program Administrator
Hiwote Derbow	Communications Specialist
Meseret Yirgu Gebreyes	Finance Officer/Accountant
Yeraswork Tadesse	Administrative Assistant
Elsabeth Admassu	Secretary/Receptionist
Henok Arthur	Senior Driver/Liaison
Dereje Abu	Driver/Liaison (2010-11)
Berhanu Aberra	Senior Driver/Liaison (2006-10)
Linda Cleboski, PhD	Senior Program Development Coordinator**
B. Keith Cole, MS	Assistant Director for Administration and Finance**
Francine Rodriguez, MS	International Business Manager**
Dana Lewis, BBA	Business Coordinator**

*Senior advisors spent 4-5 weeks each year in Ethiopia and provided internet-enabled assistance.

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