Cold Chain Assessment: Bolivia, Ecuador and Peru 2014

Funded by the USDA Emerging Markets Programs
## LIST OF ABBREVIATIONS

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3PL</td>
<td>Third-party Logistics Provider</td>
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<tr>
<td>AV</td>
<td>Ad Valorem</td>
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<td>CADEX</td>
<td>Chamber of Exporters of Santa Cruz</td>
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<td>EMP</td>
<td>Emerging Markets Programs</td>
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<td>FDI</td>
<td>Foreign Direct Investment</td>
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<td>FF&amp;V</td>
<td>Fresh Fruits &amp; Vegetables</td>
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<td>GCCA</td>
<td>Global Cold Chain Alliance</td>
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<tr>
<td>GDP</td>
<td>Gross Domestic Product</td>
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<td>GOB</td>
<td>Government of Bolivia</td>
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<td>GOE</td>
<td>Government of Ecuador</td>
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<td>GOP</td>
<td>Government of Peru</td>
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<tr>
<td>Ha</td>
<td>Hectares</td>
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<tr>
<td>HACCP</td>
<td>Hazard Critical Control Point</td>
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<td>MFI</td>
<td>Microfinance Institutions</td>
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<td>MT</td>
<td>Metric tons</td>
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<td>PPP</td>
<td>Purchasing Power Parity</td>
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<td>SENSA</td>
<td>Servicio Nacional de Sanidad Agropecuaria e Inocuidad Alimentaria (Bolivia)</td>
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<td>USDA</td>
<td>United States Department of Agriculture</td>
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<td>UHT</td>
<td>Ultra High Temperature</td>
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<td>WFLO</td>
<td>World Food Logistics Organization</td>
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EXECUTIVE SUMMARY

Activity Description:
The World Food Logistics Organization (WFLO), technical assistance, training and education arm of the Global Cold Chain Alliance (GCCA), was allocated a grant under FAS’s Emerging Markets Program Agreement #2014-05 to conduct an assessment of the food and rural business systems in Bolivia, Ecuador and Peru with particular emphases on the cold chain infrastructure available to receive US perishable imports, as well as facilitate exports and local retail distribution.

Assessment Team:

Paul Forrest led the market assessment team, comprised of both international and regional experts in the food and agribusiness supply chain sector. Mr. Forrest has more than 30 years of experience in Latin America, Africa, the Middle East, the Balkans, Central Asia, Southeast Asia and domestically in all phases of agriculture and agribusiness including: value chain identification, competitiveness analysis, and selection of growth interventions; crop production; out-grower and contract farming for supply chain expansion; supplying agro-inputs; postharvest handling, pre-cooling, cold and frozen storage, packaging and shipping; end-market identification and product development; MFI and commercial bank financing to SME and large-scale farming and agribusiness; agribusiness management; association creation and capacity building; public-private cost-sharing grants management; and, project design, implementation, management and evaluation.

Field work, client visits and data collection in Bolivia was conducted by Richard Tracy, Vice President for International Programs for WFLO, as well as Cecilia Munoz and Carlos Ribera Paz from the Chamber of Exporters of Santa Cruz, Bolivia (CADEX).

In Ecuador Mr. Forrest was very ably assisted by local market assessment specialist, Mr. Santiago Tinajero, who has over 10 years of experience in various kinds of agricultural enterprise management and operations having a focus on finance and profitability.

In Peru, Mr. Forrest was supported by Jose Carranza, General Manager of Agroempaques, a cold and frozen storage service provider, and a member of the Board of Director of the International Association of Refrigerated Warehouses (IARW), a core partner of the Global Cold Chain Alliance (GCCA).

Each of the country assessment teams were supported by WFLO’s office in Latin America based in Guatemala City, in addition to WFLO’s Director of International Programs and grant manager, Nikki Duncan, based in the home office.
Methodology:
The assessment team used WFLO’s and USDA’s network in each country to identify key players in the cold chain industry, particularly those handling perishable products imported from the United States. Meetings were arranged with the following types of companies/organizations to learn more about the challenges experienced in the cold chain in each country, as well as the opportunities for further technical assistance, training and investment to improve the infrastructure and services required to support and expand trade between the US and each of the three target countries:

- Perishable food producers and producer associations
- Processing facilities and packing house operations
- Fast food franchise owners/operators
- 3rd party logistics (3PL) providers and warehouses
- Supermarkets and other food retailers

The team traveled to conduct interviews at company operating sites where possible. Overall, the team met with 49 enterprises and organizations during the assessment (13 were interviewed in Bolivia from 10 – 16 July 2014; 18 companies in Ecuador from 28 July to 5 August 2014; and, 18 companies in Peru, 7 – 15 August 2014. The purposes of the visits were to:

- Examine the extent to which lack of cold chain infrastructure has limited the ability of Bolivia, Ecuador and Peru to receive a larger volume of U.S. perishable exports in poultry, meat and dairy and horticultural products (fruits/vegetables)
- Obtain firsthand accounts of local infrastructure constraints and the effects of these constraints on US import volumes from major logistics companies, supermarkets, restaurants, hotels and retail outlets
- Identified gaps in the cold chain infrastructure that can be addressed through industry training and technical assistance on topics such as:
  - Postharvest loss reduction
  - Food safety
  - Refrigerated transportation
  - Warehouse operations/distribution best practices

The results of this study provide a macro-level view of the level of the development of cold chains in the three countries. Micro-level quantitative information on the volumes and types of US perishable products being handled and distributed by food system operators visited in each country are absent from the report but can be found in various references cited in Appendix A.

Region-Wide Cold Chain Opportunities:
The principal driving influence on the uses, needs and opportunities for cold chain development are directly connected to the sourcing networks and distribution systems whereby the citizens of a country obtain their daily sustenance. Bolivia, Ecuador and Peru all have complex, highly-developed societies undergoing rapid urbanization and witnessing the growing influence of
supermarkets in purveying foodstuffs. Another way to look at the three countries, ergo in ranking investment opportunities, is to look at supermarket penetration rates, for Bolivia it is estimated to be 20% (growing at 10% per year), for Peru it is 30% and for Ecuador it is 50%.

In all three countries similar needs were encountered in the following three areas and in the following ordinal sequence of need:

- There is a huge shortage of good quality refrigerated trailers. Most entrepreneurs said they would like used trailers, stating that even used trailers from the US are superior to new ones from South American manufacturers.
- 3PL firms specializing in cold chain storage, consolidation, transportation and distribution do not exist. But, nearly all importers, exporters, wholesalers and retailers mentioned they would be absolutely delighted to turn over this aspect of their enterprise to such a firm.
- The development of logistics for frozen products is nascent, with abundant opportunity for equipment manufacturers and 3PL experts.

Region-Wide Follow-Up Recommendations:

- Technical training for refrigeration technicians/mechanics was by far the most commonly expressed need across all three countries, subsectors and sizes of enterprises. Currently, technical experts must be brought from Chile, Argentina, Brazil or Colombia. Two types of refrigeration mechanics are needed: one for industrial-size ammonia units, to include ammonia safety training for plant personnel, and the other for smaller freon-based units. Several enterprises recommended the training include an apprenticeship component.
- The second most frequently encountered need was for training in cold storage management and inventory control.
- Provide training to processors, wholesalers, distributors and retailers on how to properly maintain the cold chain for chill and frozen product handling up to and including retail display cases. This should include information on ways to improve distribution and shipping practices that will reduce time and conserve energy. The training should emphasize avoidance of cross-contamination by using separate coolers dedicated to dairy, fresh meat, fresh poultry and frozen products.
COUNTRY ASSESSMENT: BOLIVIA

Economic/Trade Overview:

Bolivia's 2012 gross domestic product (GDP) on a purchasing power parity (PPP) basis totaled $54.36 billion and in the official exchange $27.12 billion. Its standard of living, as measured in GDP in PPP per capita was US $5,100. Economic growth is about 5.2% a year and inflation was 4.5% in 2012. Bolivia experienced a budget surplus of about 1.5% of GDP in 2012. Expenditures were nearly US$12.2 billion while revenues amounted to about US$12.6 billion. The government has had surpluses since 2005.

Since 2001, Bolivia’s leading agricultural export has been soybeans. In addition, cotton, coffee, and sugarcane have been viable exports for Bolivia. For domestic consumption, corn, wheat, and potatoes are the crops of choice for Bolivian farmers.

Annually, manufacturing accounts 14% to 15% of Bolivia’s GDP. The contribution of industry as a whole (including the mining sector) to the GDP increased from 30% in 2000 to 37.3% in 2010. Most industry is small-scale, aimed at regional markets rather than national operations.

Processing of food, beverages and tobacco is the biggest portion of the manufacturing sector (39% in 2001). These sub-sectors occupy a prominent place in a manufacturing sector that is continually growing, both in production and number of businesses and jobs. In 2010, the Manufacturing sector accounted for about 14% of total exports. Soybeans and its derivatives reached very large export markets in recent years. The largest factories processing soybeans, sunflower seeds, cotton and sugar from cane, are mainly situated in Santa Cruz Department, although large edible oil refineries operate in Cochabamba. All major cities have at least one brewery, one or more soft drink bottling plant, and one or more packaging plants for canned food.

Many of the companies visited as part of this assessment are among the largest companies in Bolivia. For example Hipermaxi S.A. is the number one wholesale/retail company, while Pil Andina is the number four manufacturing industry, and Sofia Ltda is the number two company in the category of agriculture, hunting, and forestry.

Bolivia has a population of 10.5 million of habitants. The three biggest cities in Bolivia are La Paz, Cochabamba, and Santa Cruz. La Paz has around 2.8 million of habitants, while Cochabamba has 1.7 million, and Santa Cruz has 2.6 million. From 2008 to 2013 the relative percentages of GDP attributed to the three most economically important departments have had very little variation, with Cochabamba at 14%, La Paz at 25% and Santa Cruz a noteworthy 28%. Consequently, the market assessment team chose to focus its data-gathering activities in La Paz and Santa Cruz.
Santa Cruz Department

In June 2014, among the departments, Santa Cruz had the largest number of companies in Bolivia at 42,988 or 29% of those in Bolivia, registering a growth of 86% of its company base since 2005.

According to the specialized magazine *America Economia*, in 2013, based on surveys of business people in the region, Santa Cruz was among the 50 main cities of Latin America with the greatest potential for doing business and, furthermore, was positioned as the most important city in Bolivia.

The activities contributing the most to the Departmental GDP are agriculture and manufacturing, which represented 26% of the Departmental GDP, the other important sectors being services, including transport and storage (8%), finance (8%) and public administration (7%). 70% percent of the food consumed in Bolivia is produced in Santa Cruz according to the Camara Agropecuaria del Oriente (CAO). Industrial agriculture accounts for 43% of the agricultural production, especially for the sugar and oleaginous sectors. All of the production and exports of oleaginous products in Bolivia come from the Department of Santa Cruz, as well as 86% of the sugar cane production.

Furthermore, due to its strategic geographical location in the center of South America, Santa Cruz is the main route of the bi-oceanic corridor between the Atlantic and Pacific, which favors the foreign trade of its products. Likewise, the International Santa Cruz Trade Fair (EXPOCRUZ) is held in Santa Cruz annually. This fair is the most important multi-sector event in Bolivia and is one of the most important in South America.

According to the CAO report, the Summer Agricultural Campaign in Santa Cruz in 2013 achieved a cultivated area of 1.3 million hectares with a production of 9.4 million tons. Furthermore, according to the National Service for Agricultural Health and Food Inoculation (SENASAG) reports, the department has 3,492,505 head of cattle.

In 2013, exports from the department reached $3,322 million USD, registering an increase of 15% relative to 2012. This increase was greater than the national exports growth, which only registered an increase of 2%. The main products exported were those from the hydrocarbons sector, soy and its by-products and sugar, alcohol and their by-products.

The main foreign markets for exports of Santa Cruz’s products were Brazil, Colombia, Argentina, Peru, The Netherlands, USA, Ecuador, Venezuela, Chile and Spain.

On the other hand, imports from other countries reached $4,197 million USD in 2013 and the main products purchased were heat exchangers for the hydrocarbon sector, iron or steel bars, fuel, tractors and agro-chemicals. Likewise, the markets of origin of the foreign purchases made by the department in 2013 were Brazil, China, the United States of America, Argentina, Japan, Spain, Mexico, Peru, Germany and Chile.
Summary of the Basic Food Systems and the State of the Cold Chain in Bolivia

The two major constraints to the development of cold chains in Bolivia are the lack of refrigerated transportation and the lack of availability of repair parts. This is exacerbated by poor road infrastructure, landslides due to heavy rains, and occasional protesters blocking roads, all of which hinder farm-to-market deliveries. These problems are most acute for exporters, who not only need better roads in Bolivia, but also overland transportation to ports in Paraguay and Uruguay, made even less competitive due to the lack of back-haul cargoes.

With the exceptions of bananas for export and some products from Chile and Peru, such as apples, peaches and kiwi, there is no cold chain infrastructure in place for local fresh fruits and vegetables (FF&V). As is the case in many developing economies, FF&V are moved unrefrigerated from farms to local markets where they are subsequently transported in unrefrigerated trucks to regional wholesale wet markets. Sales begin around 3:00 AM and continue throughout the day in unsanitary condition with no refrigeration. Packaging ranges from nothing at all, to sacks, to woven baskets, to wooden crates. Given the condition of the roads and the lack of refrigeration, losses are estimated to be at least 10% based on information collected from market interviews. They are purchased by consumers, processors and small retailers. It is estimated that most wet products are purchased and consumed within 48 hours of harvest. In addition, consumers are not demanding cold chain supply systems for FF&V.

Challenges with the cold chain for dairy products begin on small farms where there is rarely access to electricity and thus no cooling for raw milk. Milk is usually transported to the processor in insulated but non-refrigerated tank, at times up to eight hours. Because of the lack of a strong distribution cold chain for fluid milk, it is usually processed into Ultra High Temperature (UTH) milk in Tetra Pak bags, boxes and powdered milk.

To ensure the safety and quality of frozen dairy products, processors provide frozen food display equipment to be used at retail points for sales. Nevertheless, the need for refrigerated transport at -25°C is considered a big issue.

Local culture in Bolivia has a long-entrenched preference for “fresh” meat, meaning an animal is slaughtered in the pre-dawn hours and sold “hot” at ambient air temperature in open shops in the morning, with no exposure to cooling or chilling. A majority of local consumers (up to 70%) purchase their meat from the wet market. Organized retail outlets sell meat but today account for only 30% of national sales. To overcome this cultural issue will take time and will need the support of the government.
Changes in the way food is handled is being driven by an expanding middle class that is demanding safe, quality food at affordable prices, prices which they are prepared to pay.

In Bolivia food safety is, for the most part, the responsibility of individual states, where implementation and enforcement are weak. The National Service for Agricultural Health and Food Inoculation (SENASAG) must work more closely with Intendencia (at the State level) because both parties are responsible for the cold chain, SENASAG from the field to the market and Intendecia from market to retail to consumer. At the moment they mostly point fingers at each other. SENASAG and Intendencia Municipal are very tough on the organized sector with monthly, often weekly, inspections, while inspections in the open markets are rare. To compound matters, there is a high turnover at these agencies, with new, untrained staff arriving for inspections, which is disruptive.

**Opportunities for Further Cold Chain Development in Bolivia:**

1. Provide information to private sector decision-makers on cost-benefit analysis for selecting new refrigeration equipment or facilities, including warranties and after-sales service, perhaps by having GCCA members who are specialists in design/build review plans. This will become increasingly important with the demise of R22 in 2015, because it is forcing many inexperienced executives to confront costly changes to ammonia systems.
2. Work with transport companies and retailers to improve best practices. This could include working with Infocal to develop a training of trainers (TOT) program in handling and moving food products through cold chains.
3. Spread information about the GoUSA program, whereby refrigerated transportation equipment would be more affordable to the Bolivian market, including access to high-quality used refrigerated trailers, which cost about $80,000USD. Access to capital is affordable at 3% APR, so the issue is making the best investment possible. This initiative could include lobbying GOB to subsidize the import of cold chain transportation equipment to stimulate expansion of the refrigerated transportation fleet.
4. Improve energy efficiency in cold chain operations. The power grid is relatively stable and the cost of electricity is bearable; however, food processors would like to be more efficient in their use of electricity because they know they save money easily in this area.
5. A business opportunity exists for establishing third party logistics for transporting and/or distributing cold and frozen products.
6. Another business opportunity exists for making available small-, medium- and large-size trucks with multiple chambers for cold and frozen products.
Recommendations for future WFLO/USDA activities in Bolivia:

1. **Offer technical training for refrigeration technicians/mechanics.** This was the most commonly encountered need across all subsectors and sizes of enterprises. Currently, technical experts must be brought to Bolivia from Chile, Argentina, Brazil or Colombia to fix broken refrigeration systems or equipment. Two types of refrigeration mechanics are needed: one for industrial-size ammonia units, to include ammonia safety training for plant personnel, and the other for smaller Freon-based units.

Several enterprises recommended the training include an apprenticeship component. *(Note: As is the case here and with other training recommendations below, it was emphasized that any assistance offered must be in Spanish, be of adequate duration (not fast) and have patience to deal with the local culture. It was further mentioned the importance of tracking training results concerning adoption of improved practices or physical improvements.)*

2. **Provide training to processors, wholesalers, distributors and retailers on how to properly maintain the cold chain for chill and frozen product handling up to and including retail display cases.** This should include information on ways improve distribution and shipping practices that will reduce time and conserve energy. The training should emphasize avoidance of cross-contamination by using separate coolers dedicated to dairy, fresh meat, fresh poultry and frozen products.

3. **Work with the Government of Bolivia (GOB) to implement food safety regulations that will create a system for better quality food and reduce widespread unsanitary practices currently encountered in the market.**

4. **Assist in developing training modules for at-risk populations in food safety through better temperature control at home**

**Commodity- Specific Needs/Opportunities for US businesses and service providers**

**Fresh Fruits & Vegetables:**

1) Work with GOB to enact and then implement food safety regulations that will create a system for better quality food and reduce the use of unsanitary practices currently encountered in traditional open wet markets where a majority of fresh fruits and vegetables are sold to consumers; and

2) Develop tax incentives to stimulate processing of fruits into juice.

**Dairy Products:**

1. Processor/Retailers should require temperature control and monitoring from farm-to-processor-to-market, in an attempt to eliminate the common practice of shutting off refrigeration equipment at night to save costs;

2. Work with transport companies and retailers to adopt best practices to ensure the safety of dairy products; and

3. Provide training on proper maintaining the cold chain for frozen dairy products in retail display cases.
**Beef & Pork Meat and Poultry:**

1. Work with GOB to implement food safety regulations that will create a system for better quality meat and reduce the highly unsanitary practices currently found in local slaughterhouses and open air retail meat shops;
2. Launch a consumer awareness campaign on food safety and the benefits of cold chain for a safer meat supply;
3. Work with transport companies and retailers to adopt best practices to ensure the safety of meat products;
4. Lobby GOB to implement a meat law similar to Argentina, which requires all meat to be chilled for food safety;
5. Recommend the installation of stand-by generators to charge refrigerated containers while they are being filled with meat for long-distance transportation;
6. Provide technical assistance with Halal certification to service the growing Muslim population in Bolivia as well as export to the Middle East; and
7. Provide training on proper maintaining the cold chain for frozen meat products in retail display cases.

**COUNTRY ASSESSMENT: ECUADOR**

**Economic/Trade Overview:**

In the past 15 years, Ecuador has experienced considerable political and economic instability due to weak rule of law, an unpredictable regulatory environment and preferential public investment, leading it to have the lowest foreign direct investment (FDI) level in the region. Public spending and investment are the main drivers of growth and the national economy. In 1999/2000 Gross Domestic Product (GDP) shrank 5.3% accompanied by a significant increase in poverty. To help stabilize the situation, the economy was dollarized, but was also aided by higher oil prices, an increase in non-traditional exports and remittances. Average economic growth from 2002 – 2006 was a healthy 4.3%. However, in 2008 President Correa – who was reelected in 2013 – defaulted on Ecuador’s sovereign debt, amounting to $3.2 billion USD or 30% of the country’s public external debt. Since 2009 Ecuador has terminated over a dozen trade treaties, including one with the US. Having provided $10 billion USD, today China is Ecuador’s largest lender. In response to a trade deficit of $1.1 billion USD in 2013, in December of that year technical trade barriers were erected, causing serious difficulties for importers. In early 2014 Ecuador decriminalized violations of intellectual property rights. GDP growth for 2014 is projected to be 4.2%, slightly above the 4.0% of 2013.

GDP in 2013 was $157.6 billion (USD) on a Purchasing Power Parity (PPP) basis and $91.4 billion USD at the official exchange rate. GDP per capita (PPP) was $10,600 in the same year. A good indicator of the strength of the middle-class is that household consumption accounts for 62% of GDP. With a population of 15.4 million growing at a reasonable 1.4%, the median age is 26.3 years and rising slowly with a declining rate of population increase. Purchasing power
parity is improving for young lower- and middle-class consumers, but it is limited by underemployment of 40% despite an official unemployment rate of 5%.

At 29.4% of GDP, or $25.5 billion USD, exports of goods and services is slightly offset by imports of the same rated at 32.1%. Petroleum exports account for half of Ecuador’s exports and generates about 40% of public sector revenues. The other top exports are bananas, cut flowers, shrimp, cacao, coffee, wood and fish. Export partners are the US (37.3%), Chile (8.1%), Peru (6.5%), Japan and Russia (both at 4.5%), and Colombia (4.0%).

Imports in 2013 were $26.2 billion USD, although none of the top commodities were agricultural products. The main imports were industrial materials, fuels and lubricants, and nondurable consumer goods. It is an interesting anomaly to observe that Ecuador has no refining capacity despite its considerable oil reserves and petroleum exports. The imports originated from the US (28.4%), China (11.3%), Colombia (8.8%) and Peru (4.5%).

**Summary of the Basic Food Systems and the State of the Cold Chain in Ecuador**

Annual domestic imports of fresh fruits and vegetables (FF&V) are about 4,000 refrigerated containers of 24 MT each, or roughly 100,000 MT, representing only 6.7 kg per capita in a population of 15 mm. With ample room for expansion, FF&V imports are expected to double in the next five years. Imported FF&V include apples, grapes, kiwi, oranges and mandarins. Chile supplies 80% - 90% of these imports, the remainder coming from many sources, including Argentina, US, Italy and China. The ad valorem (AV) tariff from the US is 15% for grapes and 25% for all other FF&V.

While cold chain from port to the importers’ wholesale cold chambers is excellent, but in 95% of cases, the distribution system to retail shops is in small non-refrigerated trucks. Supermarket chains directly import their own needs rather than using middlemen.

Bananas are the number two export after crude oil. With about 7,000 producers, comprised of mostly smallholders with plantations averaging 30 Ha, Ecuador produces 40% of global banana production. Prices are set by GOE. This sector is completely focused on exports.

At about 4,500 Ha, all located around Quito, the cut flower industry is almost exclusively export oriented and although it is only 25 years old, it’s a mature industry; many small- and medium-size operations disappeared during the recent recession 2008 - 2010 in Europe and the US. Surviving firms are strong and expertly managed, with some having extended their vertical integration down to R&D for the breeding and propagation of new varieties. Unfortunately, as
is also true of the cut flower industry in the US, none of the production, postharvest handling or cooling equipment used in Ecuador originates in the US. The dominant supplier to the global industry is the Netherlands, followed by Spain and Colombia.

Despite the complete lack of opportunities for US cut-flower or equipment manufacturers, it is well worth noting that the export of cut flowers has led to the establishment of an excellent cold chain inside and near Mariscal Sucre International Airport in Quito which could be favorably employed for the import by air of US products whose cold chain handling and transport requirements are similar to flowers. These include strawberries and cherries and other high-value horticultural crops with high rates of postharvest respiration.

Domestic milk production is estimated at 5.3 mm liters per day (LPD); however, only 1.3 mm LPD is received by processors, the difference being consumed by the population across the country. To stimulate domestic production and increase the quality of milk products, GOE has a program of distributing lacto-freezers (chilling tanks) to groups of small farmers, with capacities of 1,000 – 2,000 liters and each farmer delivering 30 – 50 LPD. Each tank is limited to a maximum of 20 farmers, and none may be located more than 10 Km from the tank. These milk collection and cooling points are also provided basic equipment to measure protein and milk fat content. This is the only GOE intervention in this sub-sector, all else dependent on the private sector.

Most milk is collected warm from small producers in 40 liter cans and is not cooled until it reaches a central collection point where it is pumped into cooling tanks holding 10,00 – 20,000 liters.

Processors find little profit in producing or distributing fluid milk because of cold chain problems and low per capita consumption. Higher profits are found in yogurt and ice cream. Fluid milk destined for retail distribution undergoes UHT processing and is sold in Tetra Paks. Demand for fluid milk is increasing at 2% per year with production increasing at 2.6%, but a large gap still exists.

As is common in much of the world, most animals in Ecuador are slaughtered in simple, unhygienic abattoirs in the pre-dawn hours and sold “hot” in butcher shops beginning with the new day, hanging on hooks in the open air.

Per capita consumption of beef is only 12 kg per year, and the Government of Ecuador (GOE) would like it to increase to 40 kg per year. Between 2012 and 2013 imports of beef declined from 80% of national consumption to 60% as a result of the GOE’s desire to stimulate production by small producers. This desire has been unfulfilled, with production remaining static. Unmet demand is increasing because per capita demand is increasing and the population is growing, particularly the middle class seeking higher quality meat products. Per capita consumption in 2012 was 9.5 kg with a population of 14.5 million, or 137,750 MT, whereas domestic production was 120,000 MT, the shortfall being 17,500 MT. The situation in 2013 was a population of 15.3 mm demanding 11.5 kg per capita, or 175,950 MT, but with production
remaining at 120,000 MT the unmet demand increased to 55,950 MT. At the same time GOE imposed an import quota of 11,000 MT. This is in addition to a 30% ad valorem (AV) import duty imposed on meat products from the USA and Canada. Chile, whose products face no AV, is the dominant source of imported meat. Ecuador is self-sufficient in chicken meat products.

Shrimp and fish, mainly tuna, are caught in boats with on-board freezing capacities ranging from 500 – 1,000 MT. Viscera is removed at sea, with whole fish delivered dockside to waiting refrigerated trucks operated by processors. Like bananas and cut flowers, the seafood sector is exclusively export oriented, with few opportunities for US seafood processors or products. Opportunities do exist, however, for manufacturers of deep frozen equipment. The sector is in the midst of rapid expansion: all four processing / exporting firms interviewed, ranging from medium- to large-size, were in the process of doubling processing capacity as we met. The four will expand daily processing capacity from 220 MT to 440 MT. One firm is preparing to construct a tuna and sardine canning plant for $16mm that will initially handle 80 MT/day, with space to expand to 150 MT/day. The annual catch is not expanding; rather, the industry is undergoing rapid consolidation, with smaller firms closing.

The growing middle class is exhibiting a willingness to increase discretionary spending on high quality food products with faster preparation times. This demand is being met by an increasing network of large- and medium-size supermarkets (which are often located in malls owned by the same firms). While domestic production of these high value food products is increasing, substantial levels of imports will be needed in the near term to meet demand.

The cold chain for frozen products (-40°C to -15°C) is very fragmented, even for some of the largest supermarket chains and food processors, providing opportunities for that type of equipment.

In terms of infrastructure and logistics, the majority of the interviewees agreed that in Ecuador a real concept of a third party logistics (3PL) operator has not been developed, and almost all the infrastructure in terms of cold storage and transportation has been implemented without a logistics service criteria or approach. WFLO could try to develop this concept by gaining members in the country and by offering them training and assessment services. This might also be an opportunity for American companies interested in establishing a logistic operator business in Ecuador.

Another topic that was mentioned several times by the interviewees was the lack of cold chain facilities at airports and ports in general.

While it is understandable that GOE wants to expand domestic agricultural production, their approach is not altogether logical in its application. To wit:
• Duties, tariffs and quotas are manipulated with no advance warning in the short-term, rather than being planned and announced as part of long-term strategies.

• The time required to get import permits for gourmet products can be from several weeks to several months.

• Failure to reduce AV on imported processing equipment makes it burdensome for domestic processors to expand purchases of raw products, introduce new products and/or stimulate exports. GOE policies are, essentially, “production driven” whereas “market pull” incentives have provided more effective economic incentives for producers in many countries trying to expand domestic production. Producers and processors need to be allowed to convert product expiration date verbiage from “Use By” to the slightly more generous “Best Before” as is now done in the US, because the cost of locating and removing from shelves the last remaining units of a lot is prohibitive.

GOE has started a process to update and reinforce food quality and food safety standards. In the long term this initiative is going to benefit food producers and consumers but until this process is finished it is causing delays and discomfort in businesses that have to dedicate extra human and financial resources to be able to comply with all the government’s requirements.

• This might represent an interesting opportunity for WFLO to approach government representatives with an offer to assist in helping to establish standardized procedures and regulations for food quality and safety standards, specifically for products that require cold chain storage or transportation.

A topic that was mentioned continuously by the interviewees, especially by fruit and meat importers is the Government’s import policy in which only certain volumes of these products is allowed into the country. This is a topic that must be delivered by the competent organisms to the proper agencies of the government.

In relation to market conditions, importers mentioned the high import taxes that have been established for products coming from the United States in relation to other countries in the region, for example Chile. This is another topic that should be addressed by government representatives from both countries.

**Opportunities for Further Cold Chain Development in Ecuador:**

• **Increasing demand for additional cold storage space by international franchise companies.** The largest importers are owners of well-known international franchises which, because of those connections, have diversified into supermarket chains and food services to up-scale hotels and restaurants. While they have developed smooth channels for imports of US products, all of them are straining to expand their cold chains, thus
with needs for more equipment. This is particularly acute in the port facilities in Guayaquil, where costly time-sensitive bottlenecks have developed. Customs transit time has increased from less than one day to an average of two to three days unless one pays extra for expedited handling. For its part, GOE is planning to invest about $3 million USD annually over the next few years to address problems in the Customs handling area, but this is unlikely to be adequate to resolve the delays.

- The major importers have offices in Miami, providing good initial points of contact for US exporters.
- The cold chain for cold products (0° to 8° C) is well developed in many cases, but it is still growing, with **opportunities for manufacturers of cold storage equipment and refrigerated transport**.
- Despite an abundance of well-heeled tourism in the Galapagos Islands, it has no cold chain infrastructure.
- The sierra and eastern part of the country has 40% of the population with little or no cold chain infrastructure.
- **Business opportunity**: Many companies decried the lack of good refrigerated trailers. This should be an interesting opportunity for American manufacturers of reefers.
- **Business opportunity**: There is an opportunity to establish a cold chain handling, storage and transport company by an experienced US firm. Many of the firms interviewed, including the largest companies, expressed a need for this service but do not know how to organize such an enterprise. The largest agribusiness firm in the country hopes to attempt this, but they are proceeding cautiously.
- **Potential business opportunity**: Exporters of high-end chocolate are learning that they need a tight frozen cold chain to ensure top quality upon arrival; simultaneously, ice cream importers have learned that periodic breaks in their frozen cold chain have devastating impacts on product quality. We heard on many occasions that the frozen food cold chain is in need of a 3PL providing transport, frozen storage and distribution.

**Recommendations for further WFLO/USDA activities in Ecuador:**

By far the most frequently voiced desire by companies interviewed during this assessment was to have training for refrigeration technicians. The large importers and processors have refrigeration engineers on staff, but medium-size companies, who rely on local refrigeration service providers, would be happy to send staff to training in maintenance of refrigeration equipment and, more generally, in cold storage inventory management.
Commodity-Specific Needs/Opportunities for US businesses and service providers

Fresh Fruits & Vegetables:
- There is an opportunity for US producers to export for FFV to Ecuador, especially grapes and peaches, during Chile’s off-season or when seasonal production in Chile is down.
- US producers also have an opportunity to export more garlic to Ecuador
- There is a large opportunity to sell equipment for cold storage chambers, including compressors, evaporators, insulated panels

Bananas:
- The only opportunity for US exporters uncovered in this assessment is for fertilizers, especially urea (46% nitrogen). With a total area planted of about 200,000 Ha and urea usage averaging 750 kg/Ha, annual consumption is estimated at 150,000 MT

Cut Flowers:
- The new Ministry of Foreign Commerce is preparing to spend $35 mm to expand and upgrade the cargo handling facilities at the airport, including cold storage (but not frozen storage), principally for handling cut flowers. This may be an opportunity for equipment manufacturers. A senior staff member of the Ministry indicated they would be happy to have a GCCA consultant help them determine the needs and capacities of this investment.

Dairy Products:
US producers of the following products may want to research unmet demand in the following products:
- High quality ice cream
- Specialized, high-end cheese
- Equipment for producing yogurt and ice cream
- Seed of improved pasture grass varieties
- Semen or live animals of improved breeds of dairy cows
- Feed concentrate ingredients
- Access to credit by small farmers to improve herd genetics, pastures and cooling
- Technical support to small farmers in herd and pasture management

Meat:
- Investment by the private sector in modern slaughterhouses
- Meat cutting and packaging equipment
- Semen and artificial insemination equipment
- Training in efficient cold storage management
- Live turkey chicks
• Reduction of the 30% AV duty on US beef, pork and turkey imports

**Seafood:**
- Stand-by generators
- Equipment for fish processing
- Equipment for fish canning including cooking, canning, packaging,
- Equipment for frozen storage chambers including generators, compressors, evaporators and insulation panels
Economic/Trade Overview:
The healthy, highly dynamic economy of Peru is driven by domestic demand, foreign trade and private investment, resulting in sustained growth, low inflation, and it’s considered one of the best performing economies in Latin America, which came about as a consequence of privatization and progressive market-oriented reforms. During the past five years, the Peruvian economy has been growing at an average rate of 5.6%, with consumer price inflation of about 2.9% in 2013. Peru is the biggest producer of silver and third in copper in the world. Exports of these metals and minerals account for 60% of total exports, which in recent years have benefited from favorable international prices. When countered by substantial imports of industrial commodities and foodstuffs, the economy can be seen as vulnerable to fluctuations in the prices of its metal and mineral exports. A further impediment to national growth is poor infrastructure beyond the coastal areas, especially roads. Typical large truck delivery times from Lima to cities in the Amazon basin are 20 to 30 days. Lima, a city of about 10 million people with only two pseudo-highways, is highly congested with vehicles.

In 2011, the population was estimated at 30 million, with an official unemployment rate of 3.6%. GDP on a Purchasing Power Parity basis was $344 billion USD in 2013 with GDP per capita (PPP) at $11,100, while GDP at the official exchange rate was $210 billion in the same year. The middle class, the main driver of domestic consumption, has doubled in the last ten years.

Since 2006 Peru has signed bi-lateral free trade deals with 16 nations or blocs of nations, including the US, with more in the pipeline. The US–Peru Trade Promotion Agreement was signed in early 2009, immediately eliminating tariffs on two-thirds of US agricultural products, and stimulating trade between the two countries to double by 2011, reaching $875 million USD. The remaining tariffs on agricultural products will disappear in the next 15 years.

The primary exports form Peru are copper, gold, lead, zinc, tin, iron ore, molybdenum, silver, petroleum products, natural gas, coffee, asparagus, fruit, apparel, textiles, fish and fishmeal, chemicals, machinery and alloys. Its main trading partners in 2012 were China (19.9%), USA (15.7%), Canada (9.5%), Japan (6.6%), Spain (5.2%) and Chile (4.9%).

In addition to a long list of industrial commodities, machinery and telecommunications equipment, the main agricultural imports are wheat, corn, soybean products and cotton. In 2012 the sources of these imports were USA (24.6%), China (14.0%), Brazil (6.4%), Argentina (5.0%), Chile (4.8%), Colombia (4.2%), Ecuador (4.1%) and Mexico (4.0%).
Summary of the Basic Food Systems and the State of the Cold Chain in Peru

Supermarkets in Peru have about a 35% market penetration, while in Chile it is 75%. Pressure from the supermarkets is creating demand for improved/increased cold chain infrastructure in Peru. In 1997, there were only 26 supermarkets in Peru, but in 2014 there are 160. One factor driving the increase is that sales in traditional open markets are typically conducted in cash only. One of the large chains has 43 supermarkets, 23 of which are in the Lima area, but they hope to have a total of 100 by 2016. Unfortunately, many of the supermarkets have poorly planned/organized receiving areas for products that require temperature control. These bottlenecks often cause their drivers to wait 3 – 4 hours to unload into cold chambers rather than simply dropping the cargoes on the sidewalk or loading dock. Distribution to the retail level in Lima is done during daylight hours by trucks ranging in capacity from 20 MT down to 1 MT. Few of these trucks have multiple chambers. Given the density of traffic in Lima it is easy to believe that in the not-too-distant future deliveries will be done during the night.

Fresh fruits and vegetables for supermarkets arrive at distribution centers directly from farmers, from local open markets and from providers who buy in the local markets where they undergo grading, sizing packing. However, these products are never chilled during transport or handling, and are not displayed chilled. Traditional open markets account for 55% of sales of fresh fruits and vegetables.

Peru has virtually no imports of chicken and per capita consumption of beef is very low. In Peru 70% - 78% of chicken is bought live or freshly killed without refrigeration in traditional open markets, only 22% - 30% in supermarkets. It is difficult to compete with the traditional system because slaughterhouses and chilled distribution are expensive. The processed segment is growing but it is dependent on growth of the aggregate economy, especially the middle class. Consumers are very slowly becoming willing to buy frozen chicken, even though chicken not consumed on the day of purchase is placed in a refrigerator or freezer. Chicken is sold by the piece and not the kilo, so small Peruvian chickens have an advantage over large birds from the US. Three-quarters of processed chicken is sold cold (0°C – 4°C) and 25% frozen (-18°C). Wholesale purchasers of these chickens are supermarkets, food services and large-scale caterers.

Large-scale catering to the mining industry is big business, with a national need to feed about 100,000 miners three times a day. A better cold chain distribution system, with more centers, is needed to service the mining sector and related food service operations.

Most enterprises in the food business have no trucks, whether for dry goods or cold chain products, and rely entirely on general transport or 3PL companies to move their products. This applies across the spectrum of large- and medium-scale producers, processors, manufacturers, wholesalers, supermarket chains and retailers. There are 25 – 30 3PL companies in Peru, but few
offer refrigerated trailers. These companies have not formed an association to allow them a strong voice for lobbying the Government of Peru (GOP), especially to streamline heavy paperwork and permitting requirements in trucking. For example, trucks need separate permits for each state where they will be making deliveries for each load! The best solution heard to counter the problem of unreliable third party drivers is to insist on training them and then allowing only trained drivers to carry one’s products.

Export volumes out of Callao/Lima port are growing at the rate of about 5%/year while, at the same time, container truck turn-around times in the Callao/Lima port facilities (APM Terminals and DP World) for loading or unloading are lengthening. Previously, one truck could make 6 – 8 round-trips/day, but now only 2 can be completed. Nevertheless, Callao/Lima Port is in a favorable position to become the North-South and East-West center for regional and South Pacific trade because:

- Long Beach/San Pedro Port, California is too far away and getting slower
- Buenaventura Port, Colombia is not growing and the government is not interested in making investment
- Guayaquil Port, Ecuador is too shallow and the government is not interested in making investment
- Manta Port, Ecuador is too small and is stuck in the 1980s
- Ports in Chile are full up

The major wholesale and retail distribution centers are in the Lima area, but many enterprises have invested in centers in Piura, Trujillo and Chiclayo, all in the north. This is being driven by rapidly expanding agricultural production in that region, especially mango, avocados, citrus, grapes, blueberries, bananas and fish. Most of this increase is export oriented, though there is some increase in domestic consumption. Sea cargoes in Trujillo are handled using lighters because the harbor has silted up, with no plans to dredge it. A bigger port with piers could be constructed but there are no plans to do so. But, basically, there is no port.

In the north, air cargoes leave from Piura because the airport nearest the major production areas, Trujillo, has no cold chain infrastructure and the runway needs to be lengthened to handle for bigger planes. The best marine terminal in the north is at Paita. Despite the extra distance, Paita is gaining cargo volumes because services in Callao/Lima are becoming slower and slower due to lack of investments in infrastructure and the time it takes to drive through Lima.

**The scale of processing plants with cooling and freezing capacities is expanding.** Small facilities have chambers with total capacities of 500 MT, medium are 1,000 MT and large are 10,000 MT. The average new plant in Peru today has a total chamber capacity in the range of 1,000 – 3,000 MT. Another way to look at this is that in the past most facilities had ice-making capacities of 20 – 30 MT/day, but now on average they are 200 MT/day. Screw compressors have completely replaced older piston-types. The savings in energy in new, modern plants is so large that firms are electing to build new plants with new
equipment rather than trying to modernize old facilities. Small units use Freon, but everything else is ammonia.

Although crop production is increasing in the south, there are no cold or frozen handling facilities located in that region.

Among the cold chain processing, distributing and logistics enterprises visited it was common to find facilities with HACCP, BSC and various ISO certifications. These same organizations make regular use of modern temperature monitoring and recording devices.

**Opportunities for Further Cold Chain Development in Peru:**

- Many of the entrepreneurs using 3PL agents said they would be happy to have their cold chain storage and distribution handled by a 3PL specializing in this area, particularly for frozen products, including load consolidation services. Demand for moving frozen products is growing faster than demand for moving cold products.
- Every enterprise visited that sometimes needs to temporarily use additional cold storage space said it is hard to find high quality space, especially frozen storage.
- Refrigerated trailers for cold or frozen products are not easy to find.
- Servicing the refrigeration units on the trucks is a problem in cities and towns, but when these units break down in remote areas there is no help. The best solution would be to hire and retain drivers that have had at least some basic level of training in fixing the units, or provide this training after they are hired.
- To speed container in and out time, the municipality of Callao/Lima or GOP needs to invest in a highway to the port but no one is interested even though APM and DP World have offered to help finance it. Plans for this were drawn in the 1980s. Both organizations are planning to double capacity in the next five years.
- Another improvement to port logistics would be an inland container staging site connected to the port by rail. But, again, no government entities are interested. The government is good at planning but not follow-through.

**Recommendations for future WFLO/USDA activities in Peru:**

- As was learned in Bolivia and Ecuador, need for training refrigeration technicians as well as cold storage inventory managers was frequently voiced. Only the very largest enterprises have full-time staffs of refrigeration engineers and technicians, but most companies have only a few trained technicians and rely on manufacturers’ reps or outside service providers to maintain their refrigeration equipment.
- Among the reasons the logistics services in Peru are weak is because it is not taught at the college or university level. WFLO and GCCA could provide connections between local universities and US universities to encourage development of a curricula and program.
- The cold chain is frequently broken at the retail level after delivery of products, usually by turning off refrigeration units at night. Training in the food safety aspects of the cold chain maintenance at the retail level is needed.
- GOP Customs regulations change capriciously from day-to-day. Customs offices are open from 9:00 AM to 5:00 PM five days a week rather than 24/7/365. The Customs officers
are poorly trained and are in need of capacity building.

**Commodity- Specific Needs/Opportunities for US businesses and service providers**

No sub-sector specific needs were elicited from the interviewees, other than those described in the discussions above.
ANNEX A: Country Reference Materials

**Bolivia:**
National Statistics Institute of Bolivia / Elaborated by IBCE / (p): preliminary data; Fundempresa / Elaborated by IBCE; Subsectors Affiliated to the CAO / Elaborated by CAO Planification; Instituto Nacional de Estadistica.
USDA/FAS GAIN Report: Oilseeds and Products Annual – Bolivia, 3 April 2012
Autonomous Departmental Government of Santa Cruz: Report for C-77 + China Summit
National Statistics Institute of Bolivia / Elaborated by IBCE / (p): preliminary data.
Fundempresa / Elaborated by IBC
Subsectors Affiliated to the CAO / Elaborated by CAO Planification

**Ecuador:**
USDA/FAS GAIN Report: Food Processing Ingredients – Ecuador, 22 March 2014
CIA World Factbook: Ecuador, Updated 22 June 2014

**Peru:**
CIA World Factbook: Peru, Updated 20 June 2014
USDA/FAS GAIN Report: Food Processing Ingredients – Peru, 17 December 2012
USDA/FAS GAIN Report: Food Service – Hotel Restaurant Institutional – Peru, 30 Dec 2013
USDA/FAS GAIN Report: Peru Suspends Brazilian Beef and Beef Products Imports, 29 May 2014
USDA/FAS GAIN Report: Retail Foods – Peru, 30 December 2013
USDA/FAS GAIN Report: The US-Peru TPA – Five Years of Spectacular Growth, 10 February 2014
ANNEX B: Contacts and Meeting Dates

See separate Excel Spreadsheet