MÉXICO
GOBIERNO DE LA REPÚBLICA

SAGARPA
SECRETARÍA DE AGRICULTURA, GANADERÍA, DESARROLLO RURAL, PESCA Y ALIMENTACIÓN

National Agrologistics Program

2 Diagnosis Report

FOOD & BIOBASED RESEARCH
WAGENINGEN UR

MÉXICO

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National Agrologistics Program

Report 2
Diagnosis

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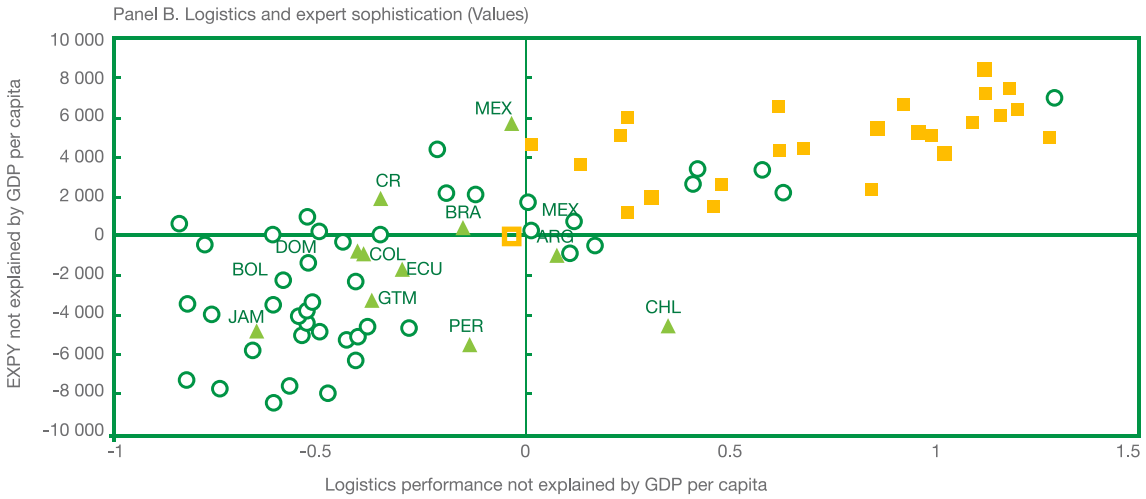
1 Introduction

Logistics is one of the most important factors that drive global competitiveness. According to the World Economic Forum and Baine Consultancy, global GDP (Gross Domestic Product) could increase by almost 5% (USD 2.6 billion) and exports could rise by 14.5%[1]. if every country improved its logistic performance in two of their key supply chain barriers. Furthermore, a survey conducted with CEOs in 2013 shows that physical infrastructure is the sixth-most important factor for driving global manufacturing competitiveness (Deloitte 2013).

In short, better logistics mean more business since it reduces transaction costs, benefiting mostly small businesses that pay the highest logistics costs. According to At Kearney's logistic survey the overall logistic costs for Small Businesses in Mexico represent 13% of total sales[2], while for large companies this percentage is between 6-8%. Another analysis from the Organization for Economic Cooperation and Development (OECD) shows that countries with more infrastructure tend to have a more sophisticated export matrix (controlled by income)[3], due to the increased global market integration (*See Figure 1.1.*).

Logistics is still expensive in Mexico. Some studies show that logistics cost, as a percentage of GDP, is about 20% in Mexico versus 9% in OECD countries[4] In Querétaro, a study of logistic costs of 99 SME's[5] (small and medium-sized enterprises) indicated that the average percentage of total costs was 22%. Thus as in the rest of the region logistics costs seem to double compared to more mature markets (United States and Europe).

Figure 1.1: Relationship between logistics and exports*



* Figures are compared using PPP and relationship controls by economic growth. The logistic performance index of World Bank is described in footnote 3.

Source: OECD Economic Outlook 2014

1 Enabling Trade Valuing Growth Opportunities Online Appendix 2013, Baine, World Economic Forum

2 At Kearney Evolución del desempeño logistica de las cadenas de suministro en México, 2011.

3 Considering the parity of purchasing power, method for balancing differences in exchange rate according to consumption.

4 Barbero, J.A., Freight Logistics in Latin America and the Caribbean: An Agenda to Improve Performance. 2010: p. 68

5 Campos-Garcia et al (2010) in (Rantasila y Ojala 2012)

All the above is due to Mexico's inefficiencies throughout its complete logistics chain. The most recent microeconomic analysis of the sector conducted by the World Bank (Connecting to Compete, 2014) that surveys operators, agents and logistic professionals in 155 countries every two years, shows that Mexico is in the 50th position in the overall index and has fallen 2 places from its previous position in 2012. Among the main indicators dragging down Mexico's performance are the procedures in customs (70th position), inefficient traceability of logistics (55th position) and low quality of infrastructure (50th position). In addition, none of six sub-indexes is above the 46th position.

Furthermore, the Enabling Trade Index of the World Economic Forum (WEF) that analyzes the countries capacity to foster international trade, positions Mexico in the 65th place out of 132 countries (falling one place from 2010 position). The main reasons why Mexico is in this position include: insecurity (126th position), lack of transparency of border administration (70th position), and availability and quality of transport infrastructure (71st position). On the other hand, one of the country's best-positioned indicators is the market access (ranked 18th) with its trade policy with 45 free trade agreements and tariffs being reduced systematically in the past decade for most products, including agri-food products.

For the agroindustrial sector logistics is even more relevant as more than 50% of all fruit that is produced in Latin America is lost before it reaches the consumer because of logistics inefficiencies[6]. The various production areas and perishable conditions of food make logistics more crucial for this sector as food needs to arrive in time with a controlled temperature and be inspected by sanitary authorities.

By agrologistics we refer to the activities of the supply chain process that plans, implements and controls the efficient, effective flow and storage of food from producers (farmers) to final consumers while meeting customer and government requirements. In other words, to get the right agroproduct, in the right place, at the right time, in accordance with the right specifications (including quality and sustainability requirements), and at the lowest cost.

A survey carried out by At Kearney shows that logistics costs are much higher for agricultural products than services as a percentage of total sales in Mexico. The first represents 8% of total sales while the latter represents 2.4%. These costs, just like changes in food demand, require that Mexico rethinks its agrologistic approach.

This is why the Ministry of Agriculture, Livestock, Rural Development, Fisheries and Food (SAGARPA) commissioned Wageningen UR to develop a vision about national agrologistics and a food production system to improve the competitiveness of the food trade, both in the international and the domestic market.

This National Agrologistics Program has three strategic pillars: Infrastructure, Institutions, and Knowledge Development and Transfer, It comprises: a Diagnosis, an Agrologistics Program, and a 2018 Roadmap with its communications strategy. Besides a general analysis of agrologistics, the Program includes an specific analysis of the supply chains of the most important products within the following categories: vegetables, fruits, dairy, meat, grains, fisheries and processed foods. These sectors were selected using a methodology that compares the competitive advantages as well as the production growth (for more details about the methodology see Annex 1).

Finally the products that are analyzed within the Program were: saladette tomato, fresh berries for export, fresh pasteurized milk for the domestic market, pork cuts for the Asian export market, imported yellow corn for feedstock, cultivated shrimp for Mexican retail, fresh-cut and washed vegetables ready-to-cook.

From a demand perspective agricultural products are shifting to processed and ready-to-eat because of growing urbanization (*see Annex 2*) and a larger proportion of working women with less time for shopping and cooking. International trade is also becoming more important every day, especially for fruit and vegetables exports and cereal imports[7].

Urbanization is also driving a rapidly decreasing market share for grocery shops (abarrotes) and economic kitchens (cocinas económicas o loncherias), although this trend varies by region. For example, in the northern part of the country food markets are in retail shops, while in the southern part of the country, the open markets continue to be important (*see Annex 3*).

Furthermore, Mexico's increasing middle class has also led to changes in what is consumed and where it is consumed. For example, while the preference for corn tortillas decreases, the demand for pasteurized cow's milk, beef and prepared food increases (*see Annex 3*). This is particularly relevant in Mexico, due to the fact that households spend more money on food

6 OCDE, Economic Perspectives of Latin America: Logistics and competitiveness for development 2014.

7 PM, G., Harvesting 20 years of doing business: the Mexican market. 2010(competitiveness of states): p. 32

compared to other countries. For example, in Mexico, food expenditure amounts to 25% of per capita annual income, comparable to 10% in European countries. In comparison, India averages almost 80% less and China 50% less than Mexico. In general, households with less income spend a proportionately larger amount of their income on food. Among the main products where the most of this expenditure (80%) is allocated we have: breads and cereals, meat, dairy, mineral water and vegetables. However, there are differences among urban and rural dwellings. For example, in urban areas consumers spend relatively more on meat and less on bread and vegetables (*see Annex 4*).

International trade is also posing new challenges for agrologistics, by focusing on animal products with greater added value. In this sense, by not adopting international standards, staff training and improve cold chains, Mexico will continue to have a limited role in comparison to traders producers from South America, North America, Australia and New Zealand. Making these changes would allow the country to export and at the same time reduce one of its main animal product imports (beef and dairy).

Besides, Mexico has an important potential in several exportation products. One of the opportunities can be found in those products with a fast growth at international level such as: frozen crabs, chicken edible offal (fresh and frozen), bovine edible frozen offal (excluding tongue and liver)[8]. Other area of opportunity is in the high-quality fresh fruits and vegetables that are currently exported by developed countries (*see Annex 5*) due to the lack of efficiency, technology and standards of developing countries. There are opportunities in growing export markets (2008-2012): asparagus (fresh/chilled) with a 121% growth, strawberries (fresh and processed) which had a 64-57% growth, walnuts growing 246% and maize seed, which grew by 830%. Other products with a lower volume and fast growth include cauliflower, broccoli, carrots, and kohlrabi/kale. Finally, another area of opportunity is in those products for which the difference in price[9] is favorable to Mexican importers such as: cauliflower, broccoli, asparagus, peppers, sausages, grapes, lemon, dehydrated limes, and fresh berries.

To be able to serve these markets Mexico needs not only to improve its logistical infrastructure, but also the different processes within the production chain, as well as the institutions involved in such processes. The following sections describe the current situation and challenges of both physical and institutional infrastructure of agrologistics in Mexico.

[8] Imported products that grow the most are: meat, fish and grains (and to a certain extent dairy), yet for the European Community all of these categories are significant except dairy and vegetable products.

[9] Dividing trade value by trade volume, yielding a 'price competitiveness' indicator.

2 Agri-food Supply Chains

The current situation of agrologistics in Mexico can be summarized as follows: Mexico produces products with low added value and distributes these products by truck to serve its domestic markets as well as the North American market. Most of these products move through their road system and its distribution lacks diversification in four aspects: product, market, modality and organization.

Product

Although the changes in demand favors the supply of more products with higher added value, Mexico remains focused on low-value products. For example, the country exports live animals to the US, where value is added. Moreover, adding value must take place near the production areas (e.g. oranges in Veracruz, milk in Chiapas, etc.), to reduce losses and take advantage of economies of scale regarding storage, among others. This way, policies like the National System of Agroparks, will be very useful in attracting additional financial resources such as knowledge and talent to the regions. In this sense, agroparks would improve the competitiveness through achieving greater efficiency in how they use resources, they would improve the phytosanitary and customs inspection processes in just one place and they would reduce the agrologistics costs. In addition, regional specialization will create new opportunities to coordinate production (green ports/agroparks) domestically.

Market

The domestic markets for agricultural products are mainly wholesale markets (Central de Abasto), supermarkets, and specialty or convenience shops. As for export markets, these are practically three: US, EU or Japan. To improve Mexico's advantages over its competitors on food export to the US, the country needs to improve road infrastructure, border crossing and cold chain management. To maximize the export advantages in the Asian and European markets the country needs to increase the visibility of Mexico inside both markets and create high-performance logistics at domestic level to serve as a test before being implemented in such markets.

Modality

Quality and size of infrastructure to export food products to countries in Asia (i.e. Japan) and Europe (i.e. the Netherlands) is inadequate. This is due to trade being limited to just a few seaports and airports, which lack intermodal transport, cold chains and adequate inspection processes. Recently, ports have begun a diversification process to diversify transport routes for food products. For example, in Veracruz the company Maersk and food marketers are preparing a new maritime route to transport food products between North and Central America due to the opportunity for short-distance sea shipping. Another alternative to explore is the use of railways to transport food products that currently is limited due to the lack of connectivity with other modes of transport.

Organization

Improving the agrologistics competitiveness of Mexico requires the cooperation of different public and private institutions, at domestic level. In this sense, a National Agrologistics Program contributes to resolve some of these challenges of coordination of which the main ones are: the lack of coordination of the border inspection services, cold chain integration, standardization of quality and logistic processes, promotion of international standards (GlobalGap, BRC, and IFS) as well as planning new infrastructure like agroparks, among others. In summary, Mexico needs an agrologistics platform for coordinating the participation of private institutions within the public policies and new regulations.

2.1 Selection of Supply Chains

In order to understand Mexico's main agrologistics challenges and opportunities a case study approach is followed. This approach is introduced to determine seven supply chains based on a multi-criterion analysis of the domestic and international markets using selected Product Market Combinations (PMCs). To learn more about the details of this methodology see Annex 1. In the table below the seven selected products are shown as well as a brief explanation of their importance to Mexico.

Table 2.1. Selected Product Market Combinations

Product	Product Market Combination	Explanation
Vegetables	Saladette tomatoes from protected cultivation for export to the US market	The most important (and still growing) agro export product to the most important export country, the United States. Many improvements are possible in export chains to the US.
Fruits	Fresh berries for export to EU markets	Fresh berries are a fast-growing product. The major advantage of this product is that production is year-round in Mexico. Besides, in Europe they are considered as 'healthy food', therefore its demand increases (especially in Germany).
Dairy	Fresh pasteurized milk for Mexican retail markets	The opportunity to substitute import of powdered milk from the US/New Zealand. Challenge is to organize the Mexican sector, which is characterized by fragmentation of the production and concentration of the demand.
Meat	Pork cuts for the Asian export market	The increasing demand of pork meat in Asia creates a new opportunity for relatively new markets in Asia.
Grains	Import of yellow corn for the animal feed industry in Mexico	Animal husbandry industry is growing due to a shift in consumption patterns to more animal protein. To serve this market Mexico needs to import more yellow corn. In this sense, logistics in ports and storage facilities need to be improved.
Fisheries	Cultivated shrimp for Mexican retail markets	Cultivated shrimp is a growing market for Mexican consumers, while wild-caught shrimp is exported to the US. There are two interesting issues to mention here: the increasing imports from Asia and the diseases for cultivated shrimp.
Processing Industry	Fresh-cut and washed vegetables for high-end markets in Mexico	The market share of fresh-cut and washed vegetables is still small. However, based on international experiences, this market is expected to increase considerably in the next decade, given the increase in the consumption of processed foods and ready-to-eat.

2.2 Supply Chain analysis

The main findings, challenges and some recommendations for each selected supply chain are described below.

2.2.1 Export of Saladette tomatoes for US

Main Findings

Tomatoes are one of Mexico's insignia food exports, not only because its origins can be traced on the country but also because their export value is close to USD 1,618 million (2012) and growing. Between 2008-2012 the export value of tomatoes increased with 39% (volume also grew 41%, suggesting this is real demand driven growth). Tomatoes are produced mainly in northwestern and central Mexico (Baja California, Sinaloa, Sonora, and El Bajío). However, Sinaloa and Sonora account for at least 70% of fresh tomato exports and Baja California peninsula for most of the remaining 30%.

Tomatoes are grown mostly in open fields, about two thirds of land is used for this kind of production (2,800 ha). The rest (1,450 ha) is grown in protected areas (greenhouses or mesh cover). However, protected production results in almost 2.5 times higher yields (200/ton ha) than open field production (80 ton/ha).

Challenges

Among the main logistical constraints for Mexican tomato producers' competitiveness we have:

1. The lack of road connectivity between producer states and Northeast and Northwest US consumer markets. This gives US competitors an edge because of shorter distances. It is important to consider that all tomatoes are exported by road and most flow through Nogales.
2. The limited supply of refrigerated transport (only existent in trucks) has increased refrigeration costs by 41% in comparison to US costs. This supply chain is also affected by border inspections that lead to interruptions of the cold chain, which is critical to obtain the 20-day shelf life.
3. Low quality of roads and insecurity is increasing transport costs as the product suffers from losses (harmed or robbed) and also increases insurance costs.
4. The current structure of consolidation points near border crossings is limiting exports when prices drop when warehouses are filled. This is a relatively new phenomenon happening since 2013 when the Suspension Agreement was implemented limiting tomato export when market prices are below a minimum price.
5. The high quality standards (especially in size and color) and critical mass of production required for the export market are making it more difficult for smaller producers to integrate themselves to this market controlled by relatively small group of large, high-yielding producers. This has also resulted in a more integrated chain, where today 20% of sales are done through direct contracts.

Recommendations

To solve some of these challenges it is recommended that:

1. Organize smaller producers in market associations, to the obtain critical mass needed to increase their bargaining power as well as benefitting from economies of scale.
2. Move consolidation points so they are closer to the main markets (New York, Chicago) for which it is required to integrate exporters with large wholesalers.
3. Test different programs to reduce lead times and costs, such as inspection and certification programs at producer level. Other forms to improve efficiency are: improvement of the Single Window at the border-crossing to reduce corruption, paperwork and lead times, as well as evaluating different ways of aggregating value to this supply chain by using technology, product processing or marketing, among others.
4. Improve road infrastructure quality in the Northwestern part of Mexico, build new roads to connect Pacific and Atlantic coast and guarantee security 24/7 in the main export routes.

2.2.2 Export of Berries to the European Union (EU)

Main Findings

Berry production grew at an annual rate of 12% from 2000 to 2012, resulting in a production increase from 207 kton in 2004 to 524 kton in 2012, and in more than doubling the hectares cultivated (from 8,900 to 21,850 in the same period). The main regions where such fruit is grown are the states of Michoacán, Jalisco and Baja California.

The above turned Mexico in the 6th largest berry producer in the world and 2nd largest exporter. Among those fruits, the strawberry stands out by having a growth of 57% from 2011 to 2012, where Mexico is the 5th largest producer and 3rd largest exporter in the world[10]. Although even while the Netherlands has the largest trade hub for fresh berries, some of Mexican varieties (raspberries, blackberries, mulberries, and loganberries) account for less than 10% imports to the European Union. Also, production costs in Mexico are less than in the US which gives them certain advantages over specific deliveries for the US and EU markets.

Challenges

Among the main logistical constraints for Mexican berry producers we have:

1. The low participation of small producers because exports are concentrated in a small group of high scale players. It is worth mentioning that a producer organization has already been set up through the Aneberries organization.
2. The complication to fulfill all export requirements for the European Union: hygiene inspections (according to HACCP), phytosanitary certification and control, residue levels and packing standards. Additionally there are other quality standards that must be met such as: Fairtrade, GlobalGAP, IFS and SQF.
3. Time for border crossing: berries need to cross the border on the same day. There is a need for less red tape and more efficient inspections (preferably one) by different agencies.
4. High losses: berries such as raspberries and strawberries have losses that exceed 40% during the transition from harvest to the consumer's table due to a poor handling after they are harvested (almost 14% is lost from the farmer to the wholesaler, 5% is lost from the wholesaler to the retailer, and 22% is lost between the retailer and consumer).

[10] Berichten Buitenland 5/9/2014: www.freshplaza.com/article/120669/Mexicos-soft-fruit-sector-growing-strongly.

Recommendations

To solve some of the challenges it is recommended that:

1. The integration of smaller producers in export chains through co-operation structures like Aneberries.
2. Training program for producers to fulfill all export requirements for EU markets, and facilitate the implementation of certification schemes.
3. Improve the co-operation between different institutions of the Federal government (customs, SENASICA, security controls, etc.).
4. Establish a regular contact between the government of Mexico and the governments of importing countries to make the export procedures more efficient.
5. To reduce losses, the handling of postharvest berries needs to be improved. The required refrigeration temperature must always be maintained, even during cargo handling. Berries should remain cold and wrapped during each phase of transportation. Therefore, to eliminate heat in the products, shortening transportation times from field to packaging station to 15 minutes is required (grading, sorting and packaging the berries in export boxes at the farms). This becomes more challenging when production areas are situated further away from the infrastructure.

2.2.3 Cultivated shrimp for domestic market

Main Findings

According to the National Commission of Aquaculture and Fishing (CONAPESCA), in 2012 the total shrimp production (cultivated and wild-caught) was 99 kton with a value of USD 363 million. However, after year 2009, the year with the highest production (133 kton), production has been dropping at an average of 5% per year. The Gulf of California and the Pacific region produce 90% of cultivated shrimp, where Sinaloa (with 35 kton) and Sonora (with 44 kton) account for 80% of the national production. The share of such cultivated shrimp relative to the total production was 67% in 2009 of which 85% is consumed in Mexico. Shrimp cultivation is concentrated in the Gulf of California and the Pacific region (mainly in Baja California, Baja California Sur, Nayarit, Sinaloa, and Sonora), although it is also developed in the Gulf of Mexico and the Caribbean region.

With respect to market tendencies, the primary difference between wholesale markets and retail markets is the amount of fresh produce versus frozen produce. For example, fresh shrimp accounts for 75% of the wholesale market shares while frozen shrimp accounts for 85% of retail market shares. In Mexico, 60% of annual shrimp sales take place in only ten weeks out of the year. These weeks include the season of Lent and the holidays in the Christmas and New Year period.

Challenges

Among the main logistical constraints faced by the Mexican shrimp producers' competitiveness we have:

1. The absence of an integrated market. The fragmented processing and production sector makes that the direct sales of processors to retailers becomes complicated and that power concentrates in the intermediaries of the two major markets: Zapopan and La Viga in Mexico City.
2. According to the interviews in this study, in Mexico 47% of the shrimp fishing is done illegally (although IMCO estimates that it is closer to 60%[11]. This leads to overfishing and less control over the cold chain since illegal shrimp needs to be transported without being detected by the authorities.
3. The fact that shrimps are handled through many intermediaries affects the cold chain, which is the key for added value for the fresh product.
4. The lack of security measures on farms as well as the presence of illegal farms raises risk of chemical and microbiological contamination, along with poor use of slightly known antibiotics, which affects the health sector.
5. High processing and cold storage costs. This results in a final cost level at the point of sale of approximately 86% above the producers' prices.

Recommendations

To solve some of the challenges it is recommended that:

1. Integrating the market through producers' organizations that can be able to process, pack and trade their product. Large-scale retailers prefer to buy directly from the producer in order to obtain certain guarantees of the security of product. CONAPESCA is encouraging small producers to work together in different cooperatives to serve the retail markets.
2. Adjusting the production based on the consumption pattern during the seasons of Lent and Christmas/ New Year; this could result in better prices for producers.
3. Long-term budgets and planning (25 years in US) are required to establish a quality cold chain. Public cold storages haven't functioned well due to a lack of continuity in the programs and a clear public policy (according to interviews conducted).

[11] IMCO, La Pesca Ilegal e Irregular en México: Una barrera a la competitividad, IMCO, 2012 learn more at www.imco.org.mx

2.2.4 Export of pork cuts to Japan

Main Findings

The export of Mexican pork meat to Japan mostly consists of high quality pork cuts. This meat is cut, packed, and frozen according to detailed phytosanitary and hygiene specifications requested by the client, which limits the market to only a few players. Thus, only 5 states can export pork to Japan, these are: Sonora, Yucatán, Sinaloa, Chihuahua, and Baja California (in decreasing order of production). In total, only 10 producers (7 of which are located in Sonora), export pork cuts to Japan.

In 2013, 63,675 tons of frozen pork meat and 6,562 tons of fresh pork meat were exported from Mexico to Japan[12]. Most of these exports were transported from the port in Long Beach, California (United States) or the port in Ensenada, Baja California (Mexico).

Before any pork meat can be exported to Japan, the production plant in Mexico must be TIF certified. To obtain this certification, plants must be inspected by the National Service of Agro Alimentary Health, Safety and Quality (SENASICA). Although Japanese customers do not demand additional certification, the Japanese government must approve the plants. Therefore, the plants are subjected to annual audits by Japanese veterinary inspectors.

Challenges

Among the main logistical constraints for the Mexican pork meat exporters to Asia we have:

1. The strict product quality regarding tenderness and health: the strict Japanese veterinary inspections and certifications such as TIF, Supreme Quality and HACCP, require complying with more and better inspections.
2. Breaking the cold chain in control points (in roadways and border-crossings): although storage and refrigerated transport (containers) are available for pork meat, the chain is broken on occasion in these control points. This aspect is of utmost importance because the shelf-life of cold products ranges from 7 to 45 days, and for frozen products, from 3 to 12 months.
3. High feed costs: these costs represent about half of total production costs (improving the logistic costs of these supplies contribute greatly to such exports).

Recommendations

To solve some of the challenges it is recommended that:

1. Align inspections at border crossings. A field visit in Nuevo Laredo showed a new cold storage for SENASICA inspections, but not the required alignment of the different inspections (customs).
2. The shortage of refrigerated containers in ports increases logistical costs. Transportation costs vary from $3,700 to Yokohama and $4,000 for Osaka. However, the refrigerated containers with fruit from South America, which arrived in Manzanillo, could be recycled to reduce costs.
3. Shorten lead-time with the shipping companies. Delivery time on average is 21 days from Hermosillo to Osaka, and 17 days to Yokohama.
4. Integrate SMEs into the export chain, which now is composed of several vertical integrated companies of the Northern states (from production, merchandising, slaughter houses, to processing and packaging).

2.2.5 Fresh pasteurized milk for domestic retail in Mexico

Main Findings

Although milk production has grown at an annual rate of 0.5% over the last years (2008-2012) reaching almost 11,000 million liters (2012), the country still has a 30% dairy deficit. In Mexico, the production is concentrated in very few states (mainly Jalisco, followed by Chiapas and Durango) and in few dairy processing companies (90% of processed milk is produced by five companies). Especially with respect to liquid milk (pasteurized and ultra-high-temperature processed milk), the chain is strongly integrated as Grupo Industrial Lala and Ganaderos Productores de Leche Pura (Alpura) control nearly 70% of Mexico's retail market. These large milk processors operate as integrated companies, providing the entire distribution chain from milk production to distribution and delivery to the final customers.

The major outlets for fresh milk in Mexico are supermarkets and hypermarkets (over 60% of sales) while the convenience stores account for 20% with a higher percentage of sales per capita in the Northern part of the country (the Southern part consumes more powdered milk). It is worth to mention that these sales suffer a significant drop during school holidays.

[12] Wageningen UR, Processed Data Transport Sector Mexico. 2014.

Challenges

Among the main logistical constraints that are hindering Mexican milk producers competitiveness are:

1. The high logistical costs due to the distance between the milk processing units (in the North and in the South) and the major markets (Mexico City)
2. The limits to truck size, producing higher cost from having to do further outsourcing.
3. Interruptions of the cold chain, key to this product which requires temperatures below 3°C. There are expectations for governmental support so the producers can construct cooling tanks.
4. Despite this highly centralized milk industry system, according to the Cámara Nacional de Industriales de la Leche (CANILAC) the milk sector in Mexico still has too many intermediaries.

Recommendations

To solve some of these challenges it is recommended that:

1. Support for milk cooperatives with the aim to reduce costs in the purchase of raw material, transportation, cooling facilities, among others.
2. Evaluate the milk collection centers program (Centro de Servicios Ganaderos) established in 2012 where small dairy farms (with 15-20 cows) can deliver their raw milk for central cooling.
3. Diversify the dairy products and milk substitutes production to add value to the production.
4. Improve the road infrastructure that connects producing areas and milk processing units.

2.2.6 Import of yellow corn from US

Main Findings

Mexico is the largest importer of corn in the world (close to 8 million tons)[13] despite being the 6th largest producer. This is the result of corn by far being Mexico's most important agricultural commodity in terms of both production and consumption. The type of corn that Mexico is importing is the yellow corn, which comes almost entirely from the United States (99%) and it is used for animal feed. The transport mode for this product is mainly by train through Nuevo Laredo and Ciudad Juarez and by Veracruz, when it is imported seaway. Volume imported varies by season, arriving from January to March and declining from June onward. Thus, storage is very important. Mexico's storage capacity for yellow corn is approximately 2,952 million metric tons.

Challenges

Among the main logistical constraints to trade yellow corn are:

1. Red tape and authority regulations, this is one of the main complaints from the private sector.
2. Failure to take advantage of railway containers. Trains go back empty to US. This is an opportunity for export agricultural products as return cargo by train (requiring products that doesn't need refrigeration to take advantages of the containers).
3. Alignment of inspection procedures at the border to decrease lead times.

Recommendations

To solve some of these challenges it is recommended that:

1. Support the diversification of the purchase of corn and cover the further risk of shortages through financial instruments, consuming different types of corn (competitive price) and importing corn from other markets such as Brazil and South Africa.
2. Pilot a project to take advantage of containers that go empty back to US.

2.2.7 Fresh-cut and washed vegetables for high-end markets in Mexico (salads and vegetables ready-to-eat)

Main Findings

Although there are no statistics on the production and sales of fresh washed and cut vegetables in Mexico, the analysis shows that this market is limited to a small number of processors. The majority of which are located in the central part of the country (Guanajuato, Estado de México, and Puebla) and in the North (Nuevo León), in order to be closer to the main urban markets.

This sector is organized in three ways: completely integrated chains (production, processing, and distribution), processing plants that buy vegetables of independent companies, and a mix of both. However, the majority of processors have their own system of distribution since fresh vegetables can't be stored for more than 3 or 4 days and the cold chain needs to be maintained in an environment close to 4°C which is important for quality control. Additionally, these types of goods are subject to inspections by the HACCP and GMP, depending on the type of vegetable used.

[13] INEGI 2011.

Challenges

Among the main logistical constraints for the Mexican fresh and cut vegetables producers we have:

1. High logistical costs.
2. Low quality and safety standards of the domestic highway network. It's essential to improve the security in shipments of products (particularly Michoacán, Zacatecas and Tamaulipas).
3. The lack of export chains to the US and other countries.
4. Inadequate regulation: there are at least 3 laws related with food inspection. For this reason, there is a need for a national program on Food Safety to protect the name and brand of the country.

Recommendations

To solve some of the challenges it is recommended that:

1. Expand and improve the road infrastructure and guarantee security 24/7 along the main trading routes.
2. Introduce of a new Food Law such as the General Food Law in EU in order to simplify compliance.
3. Make a business case for an export chain of fresh cut and washed vegetables for the US market, followed by a pilot program.

3 Physical infrastructure in Mexico

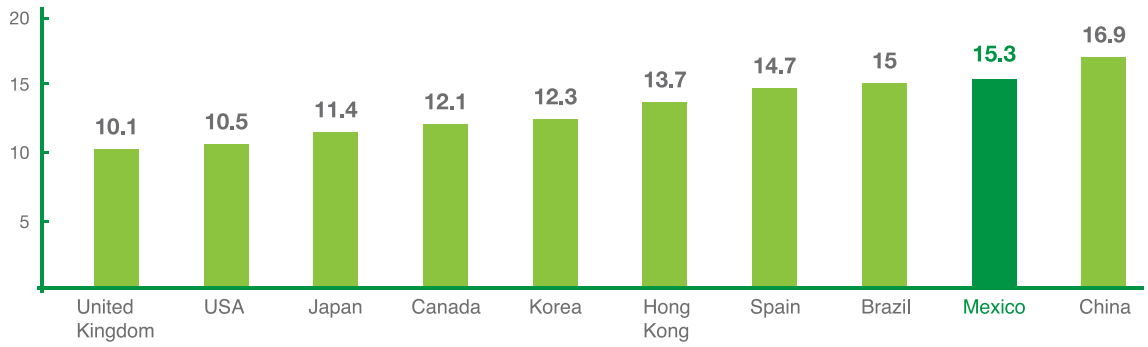
Mexico's logistic cost is more expensive than most of its trade partners (*see Figure 3.1.*) because of its high transport costs (mostly concentrated around trucks), lack of storage (especially cold storage), poor connectivity between rails and ports and long lead times at ports, among others.

Although comparative cost analysis for agrologistics doesn't exist, many studies[14] suggest that the difference between Mexico and its trading partners and competitors could be a major disadvantage for Mexico. This is due to the fact that agricultural products require a greater control of temperature during transportation, special packaging and a better infrastructure, which the country is currently lacking. Among the factors that drive up the agrologistics cost in Mexico are:

1. High tariffs for agricultural products. Today some agro-products have very high tariffs, such as 45% for wheat and 20% for pork and beef meat, while the tariffs for the majority of other products don't even reach the double digits[15].

2. Dependency on roads. In Mexico close to 80% of its food is transported via roads (except grains), very little is transported by sea to international markets and almost nothing is transported by plane. Although some modes of transportation have increased its share of the market, this doesn't seem to be changing. (*See Figure 3.2.*)

Figure 3.1. Total logistics costs as a percentage of GDP*



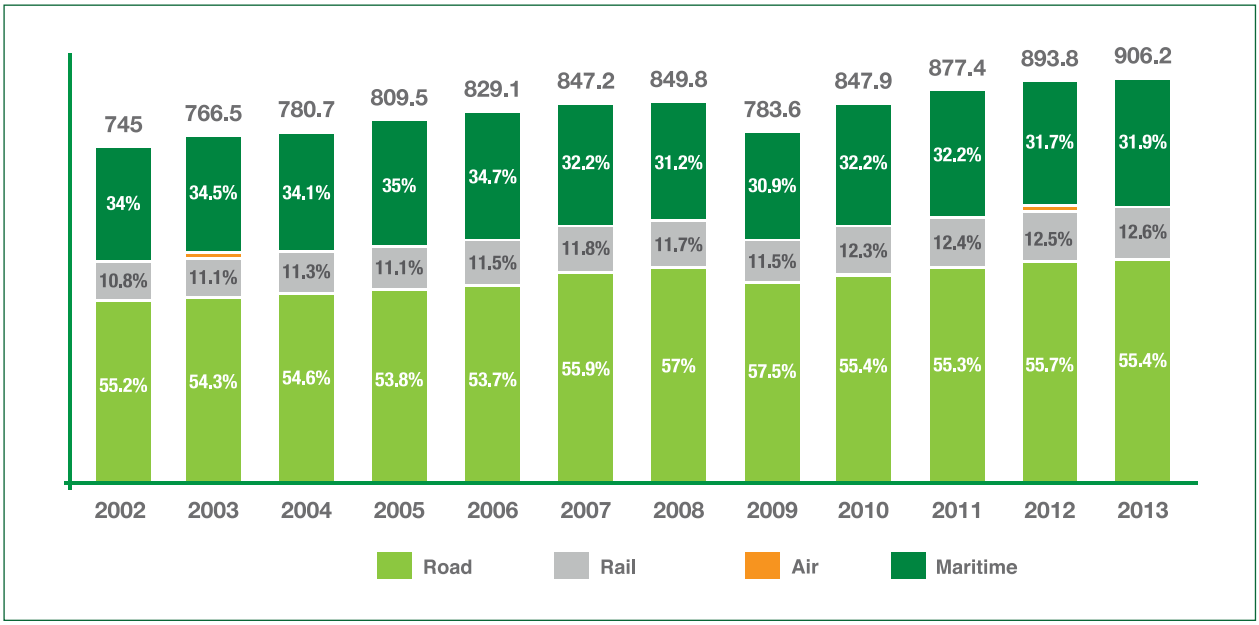
*Includes storage, administration, communications and air, sea, and land transport (considering passengers within cities)

Source: World Bank, 21st Century Logistics, Bowesox DJ 2012

[14] World Economic Forum, The Global Enabling Trade Report 2010 - http://www3.weforum.org/docs/GETR/2010/GlobalEnablingTrade_Report.pdf

[15] UNCTAD, Mexico's agricultural development: Perspectives and Outlook, 2013, Ministry of Economy, http://www.siicex-caaarem.org.mx

Figure 3.2. Total cargo volume transported by different means (million tons per year).



Source: IMCO with data from Ministry of Transport 2013

3. Road transportation is expensive. Road transportation in Mexico is not only expensive for long distances (over 500 km), but it is also more expensive in Mexico than in other countries. For example, some estimation shows that the road transport is 50% more expensive than in the US due to tolls, risk management, and inefficiencies in border-crossings.

4. Slow border-crossing. According to interviews conducted in this study, Mexican trucks take in average 134 hours to cross the border. In many cases trucks have to unload on one side of the border and load on the other side. Nevertheless, according to the WEF, border-crossing times in Mexico are better than the ones in China and Thailand[16] but slower than the ones in the OECD countries. This is explained by the bureaucracy in the Customs office, and the lack of coordination between the authorities responsible for the different inspections (customs forms, phytosanitary control and the review of the FTA in relation to the packaging, among others). Also, in some cases this gets interrupted during the weekends. There is also a capacity issue of some agencies in dealing with the growing demand.

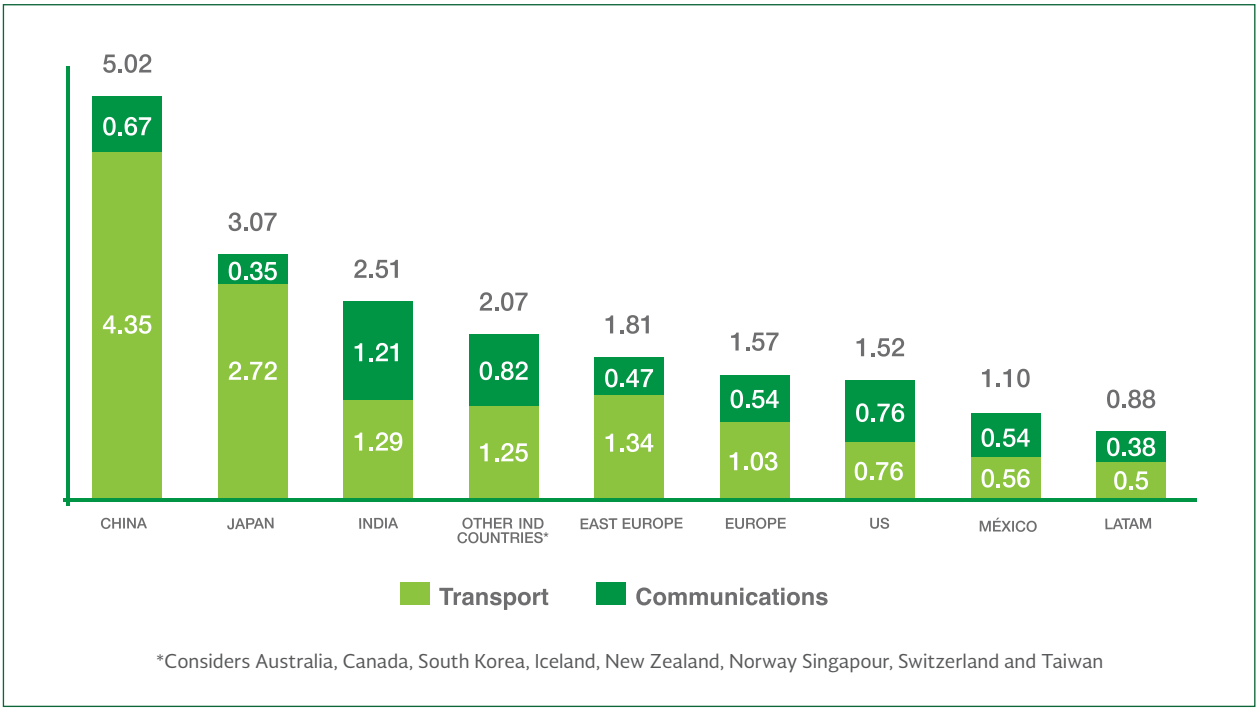
5. Lack of connectivity between roads in different states. In some regions like Sinaloa, Durango, the coastal areas of Jalisco, Michoacán, Guerrero and Oaxaca road transportation becomes more expensive due to the lack of connectivity among roads.

6. Additional costs for bad road quality. One of the more recent problems is the additional cost created by lack of security in the roads. This not only translates into insurance premiums but also into the necessity to use alternative routes, which are much longer, in order to avoid dangerous roadways in states like Michoacán, Zacatecas and Tamaulipas. Moreover, mechanical losses are reported due to the road quality, only 36% of the roads are paved, affecting the most vulnerable products like fruits and vegetables. Mexico has also underinvested in transport and communications. From 1992 to 2011 the country invested an average of 1.1% of GDP in transport and communications infrastructure, which is lower than most of its trading partners. (*See Figure 3.3.*).

7. Lack of port infrastructure. On the one hand, ports lack of connectivity with railway systems, but also they don't have enough installed cold storage to store food products. Due to this, only 5 seaports carry the required capacity to manage agri-food business: Manzanillo, Lázaro Cárdenas, Veracruz, Altamira and Ensenada.

[16] According to the WEF Export and import times in Mexican ports was 11 days in 2014, more than all of OECD countries but less than China and Thailand. However, site visits showed that in Veracruz and Manzanillo these times were down to 8 and 7.

Figure 3.3. Investment on Infrastructure in different countries as percentage of GDP



Source: Official Gazette Tuesday April 29th 2014 (National Infrastructure Plan 2014) taken from the OECD International Transportation Forum, document from IHS Global Insight and McKinsey & Company.

8. Low railway connectivity. Besides low port connectivity, this also happens at national level with the road system through multimodal centers. There are also challenges related to its low speed and limited cold storage capacity. According to a study by Gomes (2010)[17] shifting from a unique transport system to bi-modal transport systems (railway and road) can reduce logistics costs up to 57%, and reduce externalities by 27% (pollutant emissions), thus resulting in 42% cost reduction.

9. Lack of quality and cold storage. Not only there is a shortage of storage near important logistic hubs like ports, but also the facilities of such centers are of low quality. Therefore, by means of the Financial Reform of 2013, greater competition will be allowed to invest in general storage facilities and there will be a possibility to improve their services.

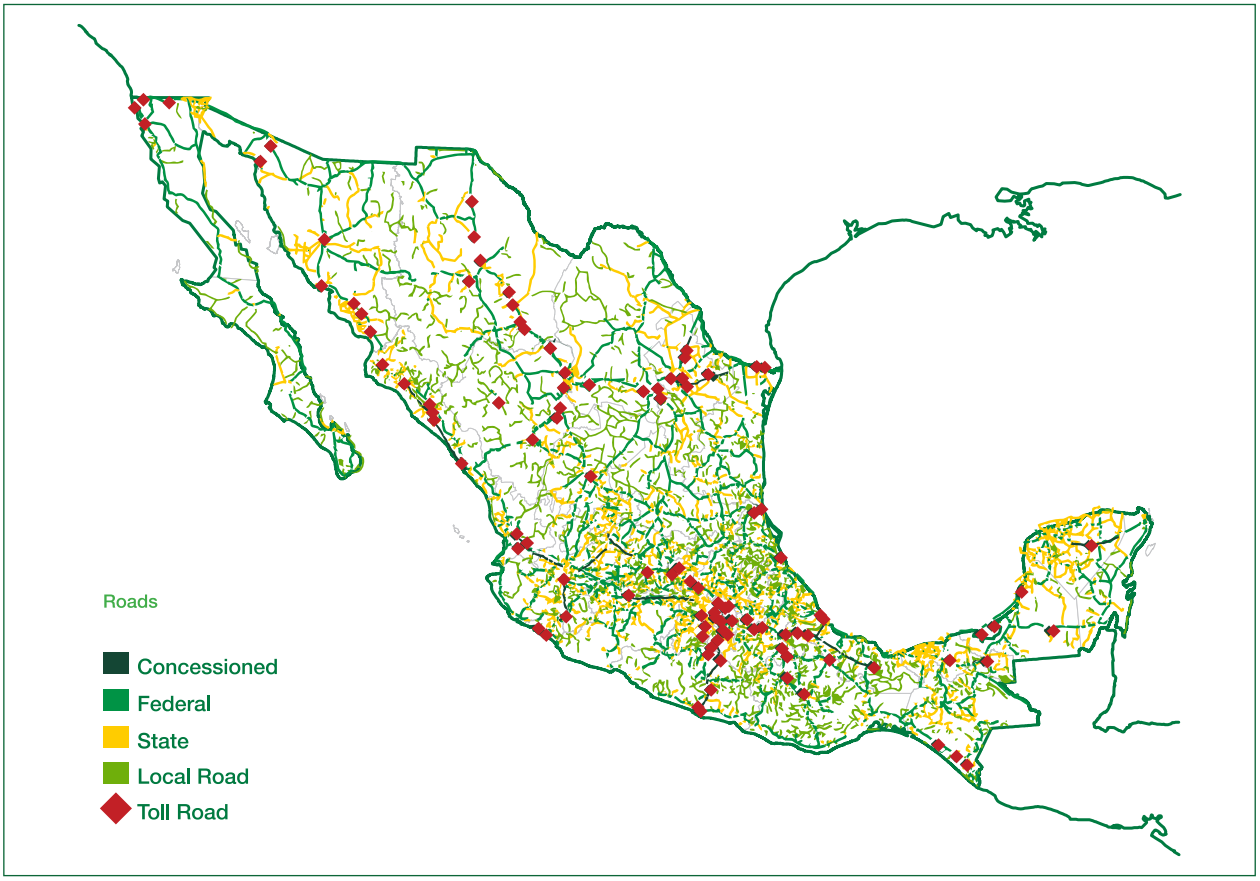
Below, the status of each of these challenges is described in further detail.

[17] OCDE, Economic Perspectives of Latin America: Logistics and competitiveness for development 2014.

3.1 Roadways in Mexico

The road network in Mexico is developed mostly around its historical center, Mexico City. As a consequence, some regions lack of road infrastructure, which increases logistic costs. For example, in the central part of the country the road network grew in a radial structure instead of an interconnection structure east-west and north-south. In essence, the infrastructure connects different cities with Mexico City and surrounding cities, but provides limited connections between cities outside this region. A radial pattern, yet more scattered, seems to have influenced the rest of the network around the main cities (for example, in Monterrey). See the map below.

Figure 3.4. National Road System, Mexico (2014)



Source: Own elaboration based on the Geostadistical Framework and the 2010 Census of Housing and Population, INEGI.

In fact, this road arrangement favors the creation of national wholesale markets, such as is the case for Central de Abasto in Mexico City, one of the biggest markets in the world, that limits in great measure national agrologistics since a great amount of trading operations are concentrated far from the centers of demand and inside a city. In more developed countries these types of markets (on a smaller scale) are only for transactions between wholesalers and are located outside of the cities.

Among de effects of these road arrangements is the increase in prices between wholesale markets and consumer areas, as can be seen in an exercise that compares price differential of wholesale markets in Mexico City and wholesale markets in the main producing areas of berries and tomatoes in the country (see Annex 6). Also, other factors that increase the transportation costs by road are: tolls, gasoline cost, and mechanical damage to products like fruits and vegetables due to the quality of the infrastructure. It is estimated that the cost for truck transport from the U.S.-Mexican border to Mexico City is between $1,950 and $2,100 per container. However, the distance may vary between 1,000 and 1,500 km[18] depending on the use of toll roads.

[18] According to the information provided by Kuhne & Nagel where the prices fall between $1.77 and $1.90/km, while according to information provided by USDA Agricultural Refrigerated Truck Quarterly, in the US they average $0.35/km per trailer 2013: p. 31.

3.2 Seaports in Mexico

The Mexican National Port System has 123 ports: 60 in the Pacific Coast Line and 63 ports in the Gulf of Mexico and the Caribbean. However, only about 20 ports[19] have the necessary infrastructure for importing and exporting activities, and only 13 ports have the capacity for the international trade of agricultural bulk, except for the ports at Salinas Cruz and Puerto Chiapas, which are used solely for food transport at national level (i.e., cabotaje or domestic coastal). Figure 3.5 shows the locations of these 13 agroports and their trading activities.

Containers move most agroproducts (20 and 40 foot dry containers and 40-foot reefer containers), except for cereals (corn, wheat and sorghum) and other commodities[20] that are shipped as agricultural bulk. However, only 5 ports (Manzanillo, Lázaro Cárdenas, Veracruz, Ensenada and Progreso) have a specialized terminal for loading and unloading containers. The rest have semi-specialized and conventional handling terminals. In 2012, the majority of agricultural bulk passed through the ports of Veracruz (55%), Progreso (11.2%), Manzanillo (10.7%), and Coatzacoalcos (7.6%), whereas the majority of exports passed through Guaymas (38.8%), Topolobambo (36%), and Ensenada (11.6%). This explains why some ports (such as Veracruz) are reaching their point of saturation. In general, 10 ports represent 77% of all cargo and 4 ports represent 94% of all cargo[21] in terms of containers.

Even though quality and quantity of ports has been improving for the last five years (rising 32 places in the WEF Global Competitiveness Report) Mexican ports rank in 52nd place worldwide (2013) in this same report. This is due to the existence of major challenges such as:

Figure 3.5. The 13 Mexican Seaports.

Source: Made by WageningenUR Food & Biobased Research, 2014

[19] From these 20 ports, 16 are managed by the Ministry of Communications and Transport (SCT) through the APIS (Integral Port Administration), while the others are managed by the private sector.

[20] Such as Sorghum, rice, canola seeds, corn gluten, wheat bran, cookie dough and sugar.

[21] Each of these 10 ports trade more than 10 million tons: Cayo Arcas (Campeche), Dos Bocas (Tabasco), Coatzacoalcos (Veracruz), Veracruz (Veracruz), Tuxpan (Veracruz), Altamira (Tamaulipas), Salina Cruz (Oaxaca), Lázaro Cárdenas (Michoacán), Manzanillo (Colima) and Isla de Cedros (Baja California).

1. The low connectivity of ports with the railway and road networks. In this regard, some measures are being taken such as: the investment of the "Tunnel" project in Manzanillo to increase the connection between railways and increase road investment and the expansion of the Lázaro Cárdenas port (an investment of more than USD 860 million), despite the fact that the business has shrunk in recent times due to lack of security[22].

2. Poor linkage of Mexican ports with other markets. No Mexican port serves as link between Asia and Europe[23], while other countries like Dominican Republic are building multi modal ports (Centro Logístico Cuacedo) to join both markets, taking advantage of the expansion of the Panama's Canal. Furthermore, Nicaragua is hoping to start working on the construction of a second canal this year (with the collaboration of the Chinese firm HK Nicaragua Canal Development) to connect Pacific with the Atlantic by building 2 ports that will serve for rail and boat crossings.

3. Addressing the under development in cold storage. Manzanillo, the main commercial seaport for containers has 4% of the cold storage capacity of Portland port (See Annex 7). For this reason, in the port of Veracruz the first cold storage facility (2500 m2) is being built[24]. Also, some major trading firms like Maersk are starting an Intra-America service for agri-food products, as well as a new shipping route between Veracruz and Philadelphia for limes, lemons, avocados, berries, and papaya[25].

[22] http://www.colliers.com/-/media/Files/MarketResearch/UnitedStates/2013-NA-Highlight-Reports/Q4-2013/Colliers_NA_Port_20132H_FINAL?campaign=port-2H

[23] According OCDE Economic Perspectives for the region.

[24] Grupo Inversor Veracruzano (GRIVER) and Grupo Romeu de España .

[25] http://articles.philly.com/2014-05-31/business/50214037_1_gulf-veracruz-philadelphia-wholesale-produce-market

3.3 Railways in Mexico

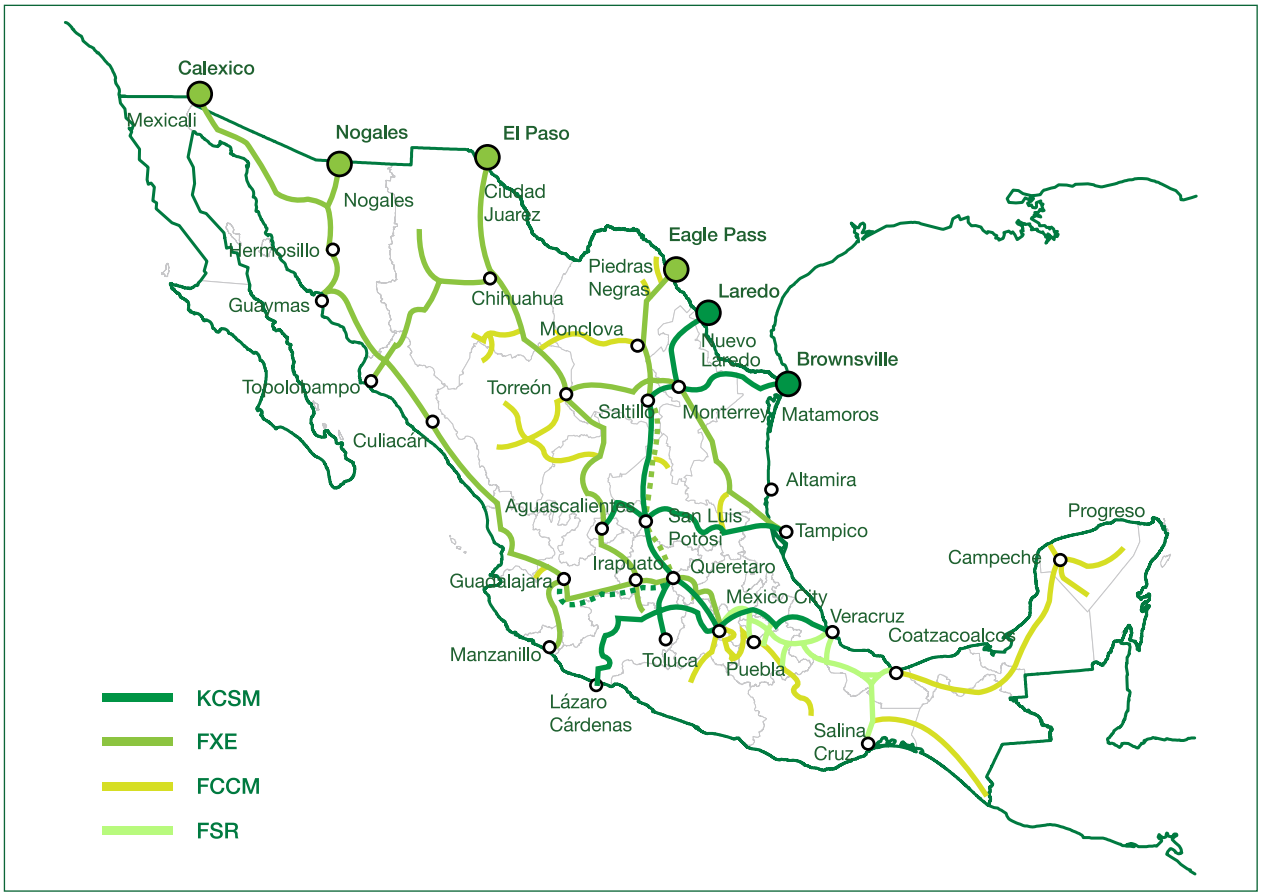
Mexico's railway system has 26,727 km of rail lines operated by four main companies: Ferrocarril Mexicano (Ferromex,), Kansas City Southern de México (KCSM), Ferrosur (FSR), and the Compañía de Ferrocarriles Chiapas-Mayab (FCCM).

The main agricultural product transported by rail is cereal (corn, wheat and soy bean) representing 24% of total rail cargo, second only to industrial products (47% of cargo). Although some fresh vegetables are transported by rail, this cargo is limited as the rails service does not offer reefer railcars in general. Those containers are mostly used to import products from the US to warehouses in Mexico City, for products that can pay a higher price. For example, frozen French fries of consortia like McDonald's can be delivered by rail directly to Mexican buyers, but meat products cannot be transported by this mean, as they have to be inspected at the border and there is no rail-based meat inspection facility. Interviews with some of the main rail operators show that demand for refrigerated cargo is growing and they are studying the possibility of leasing or buying refrigerated railcars.

In general terms, Mexico's railways cargo has been growing in the last 15 years (90%) and now carries as much cargo as Brazil and much more freight than any railway system in the European Union apart from Germany[26]. Rails have become the backbone for the development of efficient supply chains for the industrial sector and grain. This has helped tariffs converge with the US market, although the average tariff of both operators (Kansas City Southern and Ferromex) remains higher than comparable US rates, but lower to the ones in Latin America, at around 3.0 to 3.8 US cents/ton/km.

[26] OECD (2014), "Peer Review of Railway Freight Development in Mexico. Report of the International Transport Forum", February, 2014. Report of the International Transport Forum", OECD, February, 2014. Last accessed from: http://www.internationaltransportforum.org/jtrc/peer-review/mexico-freight-rail.pdf

Figure 3.6. Mexico's current rail system.



Source: Rail Statistical Yearbook, General Direction of Railway and Multimodal Transport, SCT (Mexico 2012)

Other challenge that prevails in Mexico's railway system is the low quality of its infrastructure (according to WEF indicators and field visit) due to the limited intermodal hubs (see Annex 8) especially in the south of the country, as well as the lack of alternative lines for wagons shift and a slower average speed. Although having the capacity of an average speed of 50 km per hour its average speed is close to 30 km per hour due to urban area crossings and outdated regulations that limits speed. This had led to an increase in accidents in the system of 83% since 2007. Attending this challenge could reduce the maximum trip time between Mexico-US-Canada from 40 to 30 days.

3.4 Airports in Mexico

Mexico has a total of 85 airports, but only 64 can handle cargo and 34 have customs and phytosanitary services for international trade of agri-food products. However, air cargo only represents 0.02% of the total cargo in the country. Nevertheless, this volume represents 16% of air cargo in Latin America, behind Brazil (with 33%) and Colombia (18%)[27].

In 2013, Mexico's air cargo was 617,000 tons mostly for international markets (57%) and mainly moved through Mexico City (52% imports, 30% exports), followed by Guadalajara (13% imports, 18% exports), Monterrey (7% imports, 11% exports), Toluca (5.2% imports), and Merida (2.7% imports). The main destination of Mexican exports by air was the US (54%) followed by Central and South America with 9% (mainly Guatemala and Bogota) and 8% to Europe (mainly Amsterdam, Paris, and Madrid).

Among the main challenges for air transport in Mexico are: the saturation levels of the main airports, especially Mexico City airport, and the deteriorating quality of the overall infrastructure (falling 8 positions in WEF's ranking from 2008-2013). Thus, one of the main infrastructure endeavors is the construction of a new airport that works as a regional hub outside Mexico City, as well as improving interconnection between regional airports.

3.5 Warehousing and cold chains: one of Mexico's pending agendas

Mexico faces several challenges in terms of cold storage. In the first place, its storage capacity is low compared to other countries because of the difficulty in obtaining a permit to create a general storage house (Almacén General de Depósito). In the second place, the quality of storage is very poor (no registry of inventories quality exists as of today), as historically financial authorities have regulated the warehouses in Mexico. Also, from a financial perspective warehouses in Mexico are not competitive, as they have no clear deposit system or credibility on their security deposits is limited given their lack of standards and certification. According to the Association of Ministers of Agriculture at State Level[28], while in the US it is possible to buy up to 30% of a corn from storage facilities with differed payments with a letter of credit at a LIBOR rate, in Mexico 100% of the purchase has to be paid in cash.

"2013 Financial Reform" can change this situation. For the first time, warehouses will be able to store, keep, preserve, control, distribute and even pack, and add value to agri-food products (in some specific cases). In addition, SAGARPA will be in charge of supervising and inspecting warehouses and determine products to be stored as well as create a new database on agri-food inventories. This will probably result in more competition in the market, as well as more services, lower prices.

This will help cold chains in particular, where Mexico not only has a low capacity (4 million m3) compared to Brazil's (5.7 million m3), Japan's (34 million m3) and China's (61 million m3)[29], but also is 41% more expensive than the one in US, at least in the case of refrigerated transport for tomato.

[27] Tomas Serebrisky et al, 2011.

[28] This affirmation was brought in 2 interviews carried out by IMCO 5 years ago with Octavio Jurado president of AMSDA in those days and reflects the Mexican chamber of industrialized cornflower position as well.

[29] Global Cold Storage Capacity Report, 2010, by Victoria Salin, Texas A&M University, for the International Association of Refrigerated Warehouses.

The consequences of these limitations are substantial. The Ministry of Economy estimates that the lack of cold storage and transport in Mexico has limited the expansion of the fresh milk market and has resulted that almost 50% of Mexico's perishable food products are being transported without refrigeration. This is in contrast with the expected growth figures for refrigerated transport of more than double for 2017 (going from USD 75 to 157 billion from 2011 to 2017)[30]. Although in the past 5 years more storage capacity has been installed, this has not resulted in a larger share of refrigerated products being transported. In other words, refrigerated capacity is growing as the market grows. For example, refrigerated truck cargo has maintained between 6.8 to 7.8%[31] of the total cargo transported by road in the past 10 years.

Another challenge of refrigerated transport and storage is its high concentration both geographically and in small business units. For example, the majority of the refrigerated storage is found in Sinaloa, Distrito Federal, Baja California and Nuevo León (see Figure 3.7.), while 63% of providers of refrigerated transport have only one transport unit and only 2.5% have more than 11 refrigerated transport units, making the service to become more expensive as it is limited and there are fewer profits from economies of scale (i.e. repairs and energy savings, among others).

[30] Global Cold Chain News, 24 de marzo de 2014, disponible en: http://www.iifir.org/clientBookline/recherche/NoticesDetailleesasp?INSTANCE=exploitation&iNotice=5&Idebut=&chkckbox23=off& chk0=off&chk1=off&chk2=off&chk3=off&chk4=off&chk5=on&chk6=off&chk7=off&chk8=off&chk9=off&chk10=off&chk11=off&chk12=off&chk13=off&chk14=off&DISPLAYMENU=&IDTEZO=&IDTEZOBASE=&IDTEZOFORM=

[31] SCT 2013.

Figure 3.7. Refrigerated Warehouses in Mexico*.

*The States with no refrigerated Warehouses (shown in green) are: Baja California Sur, Chiapas, Querétaro, San Luis Potosí, Tabasco, Tamaulipas, Tlaxcala and Zacatecas

Source: IMCO with information form INEGI 2014.

3.6 Clusters: a new model

Clusters have been a useful tool to improve agrologistic coordination and integration in specific places. This is why Mexico's National Development Plan (Plan Nacional de Desarrollo) is looking to create agri-food clusters. One advantage to pursuing such clustering in Mexico is that the agricultural sector has organized itself since 2002 in specific Committees around the production and commercialization of one product (Comités de Sistema Producto, CSP). This has made producers and authorities think of ways to add value to products and improve logistics. Today more than 460 committees exist across the country.

The problem with cluster policies created from the public sector is that they may not necessarily be created to serve markets. A recent study carried out by Food and Agriculture Organization of the United Nations (FAO) compares 7 agri-food clusters in Mexico and shows how the clusters that were created to serve market needs show better results than the ones driven by policies of some authority. This happens because sometimes the latter tends to have goals that are not necessarily aligned, such as eradicating poverty on one hand, and on the other increasing efficiency of supply chains and marketing.

According to the study, the clusters' success depends on investment in public goods such as rural infrastructure, sanitary standards and food safety controls. At the same time, to create these assets, it needs to invest in: research, technical capacity building, negotiation skills for small producers, as well as mechanisms for coordination and cooperation to reduce transaction costs. Another interesting aspect of the study is that it shows that the clusters that create market information and build social capital through facilitators, achieve better results.

4 Soft Infrastructure in Mexico

The problems with bottlenecks at borders have more to do with restrictions on service infrastructure than with restrictions on physical infrastructure. The main challenges of infrastructure of agrologistics services in Mexico are described below.

The lack of an agrologistics policy. Historically Mexico has had no public policy or agrologistics program resulting in the lack of coordination in the sector, both from the policy perspective and budget and goals. Currently the only program designed to boost the logistic of the agricultural sector in Mexico is "PROLOGYCA" from the Ministry of Economy (SE). This program aims at promoting logistics and supply in the agri-food sector. Therefore, the current administration is looking to create a National Agrologistics Program to serve as the first model to meet and develop this sector and also generate a baseline to measure its development.

To do this, the government has already included some agrologistics aspects in the main planning instrument, the "Plan Nacional de Desarrollo", as well as other sectorial programs (see Annex 10). However, to implement a program of this nature it needs to coordinate different institutions. For this, some lessons can be derived from the experience of the Special Concurrent Program for Sustainable Rural Development of Mexico, who has worked in coordination with more than six Ministries. Also, we can learn of other logistics plans such as the Colombia, Costa Rica or Panama National Logistics Plan. One of the lessons learned of such plans is that limiting the political interference of local governments in the construction of infrastructure generates higher returns on investment. Other important aspect is, that for the plan to work it needs to have the participation of the private sector. Currently the "PROLOGYCA" program is considered a success by the participation of the private sector in the creation of support projects for the logistics companies.

The regulatory framework in agrologistic is disperse, complex and uncoordinated. After studying federal and secondary laws (standards and federal and state programs that impact logistics), see Annex 11, it is found that there is no law, regulation or administrative ruling that aims to regulate agrologistics and therefore the framework is unbundled for each of its components. For example, storage regulations have no relation to transport laws. On the other hand, the processing of products and sanitary rules are regulated by very specific and technical laws. Thus, there is no legal instrument that facilitates coordination between these rules, which makes it difficult for stakeholders to comply with the law, as well as for authorities to ensure implementation and coordination between them. In general, federal laws have almost no prohibitions affecting agrologistics performance, thus obstacles arise in the secondary regulations. For example, laws give port authorities and shipping companies the possibility to establish different rules per port, although simple issues as different hours of operation at each port will result in delays. Although it has already started with some changes regarding this, especially through the customs and financial reform (*see Annex 12*), there still is a need for major changes.

Other legal complexities to change: long periods to set standards and outdated regulation. The lack of updates in the legal framework not only refers to general or federal laws, but the backlog extends to all secondary regulation. Part of this outdated regulation hasn´t allowed the private sector to play a role in crafting logistics regulation as it occurs in other countries such as the Netherlands, where private sector shaped part of the policy according to its needs[32]. Furthermore, long periods elapse for creating new standards (NOM), over a year and a half, resulting in the fact that some of those become irrelevant. Besides, there are other problems in the process of creating standards, such as the fact that only half of the standards for the sector have a cost-benefit analysis. Therefore, many firms prefer to bypass the requirements of such standards by issuing other kind of regulation. This does not help agrologistics as it disperses regulation even more and reduces capacity of inspection procedures for such standards.

Insecurity. According to the OECD, Mexico spends between 15 and 20% extra of its logistical costs on security. The institutional weaknesses and insecurity today represent one of the greatest challenges to agrologistics, according to all the interviewees (including customs government officials). According to the WEF, Mexico is one of the world's most violent countries and among the top 10 countries in the world with the higher level in violence and crime. Thus, new actions are needed for the major trade routes to guarantee the security of civilian and goods, 24 hours a day, all year round.

[32] Accessed on May 10, 2014 on the website of SAGARPA, via: http://www.SAGARPA.gob.mx/agronegocios/Documents/PROD_AGROALIM.pdf

Lack of human capital for logistics. According to the interviews with experts and agrologistics companies, the offer in courses and training for employees in the sector are limited and do not satisfy the demand. Furthermore, a recent study carried out by the Mexican Institute for Competitiveness (IMCO) found that only 38 universities in the country have some kind of program related to logistics but no career. This reflects a problem of talent supply to integrate logistics policies that requires certain capabilities to ensure that government resources are used efficiently and effectively.

Lack of coordination in border crossings. According to some studies, the average time to cross the Mexican border from the US is approximately 134 hours[33]. The problem is not customs, its pre-notification and processing of electronic documents exchange can be accomplished in less than two hours. However, the slow inspection processes, interrupted during weekends and holidays and after 16:00 hr every day, as well as a non-existing coordination among agencies, cause long lines on the roads. Thus, instead of having one inspector that asks for one document in one inspection point per crossing, companies have to deal with 6 different interrupted inspections and plenty of paperwork. In addition, there is no outsourcing of this process as some countries have done. For example, in the Netherlands private companies can perform inspections when they have proven systematically that they comply with all standards required by authorities, even with the ones of other countries. This way, goods doesn't have to be inspected at the border. For example, China allows imported milk from the Netherlands to enter without port supervision as producing companies have complied with Chinese standards at the plant.

An inertial public expenditure. In recent years (2000-2010) SAGARPA's resources grew by an average annual rate of 12.3%. However the structure of expenditure has practically remained unchanged for the past two decades where nearly 80% of the budget is intended to producers' supports and less than 1% is intended to investments (*see Annex 13*). This explains in part why public assets have not been created (technology generation and transfer, soil conservation, etc.) as most of it is intended to private assets. Therefore, when analyzing the expenditure there was no wonder why growth has not been translated into increased production. And even worse, public expenditure has been declined. According to the National Survey "ENIGH 2008", 10% of federal resources for rural development are received by households that concentrate the highest level of income in the country. Part of the problem lies in the budget planning by Program Components instead of using an overall comprehensive strategy, resulting in inefficient expenditure shortly aligned, without specific goals and uncoordinated.

Expensive customs. Besides inspections, border crossing also faces challenges in terms of customs procedures, although customs performs well in terms of lead times and red tape, according to the Logistics Performance Index (2014) of the World Bank. According to this report the numbers of days needed to export by air or sea is 2 while by land it is 3 (*see Annex 15*). Also, the WEF Enabling Trade Index ranks Mexico in 5th place in terms of the fewer number of documents for imports and in 29th place in terms of documents for exports. However, the problem is rather in the high cost of Mexican customs procedures, ranked 101 in terms of import costs and 92 in terms of export costs, out of 132 countries. Other problems, such as corruption, credited that in general terms customs are ranked in 70th place out of 160 countries, according to the World Bank, and in 58th place out of 132 according to the WEF. Among the institutional challenges, is to lower the costs of additional services such as customs agents to facilitate trading or the entry barrier that involves joining the list of importers and exporters. The recent amendments to the Customs Law are aimed at improving both processes by allowing companies and individuals to conduct their own import and export process.

[33] Dr. Barry E. Prentice, D.R.M., Refrigerated transport of Canadian Agri-food products to Mexico: Benchmark and best practices. 2007.

5 Recommendations

To be able to become successful in this agrologistics agenda the government has to seek three immediate objectives: standardize the sector, generate world class infrastructure (both physical and institutional) and create human and social capital (operators trained to efficiently take advantage of available resources). For this to materialize, the first step is to be able to work with many different institutions. For example streamlining customs and inspections services needs of more than 6 agencies working together. But also in terms of planning new infrastructure investments, location of agroparks and multimodal hubs. In summary, Mexico needs an agrologistics platform for coordinating the public and private institutions in order to create the new regulatory framework for the sector.

The effort is worthwhile. According to some estimates, improving the Logistics Performance Indicator of the World Bank by one point (on a scale of 1-5) will increase labor productivity by 35%. Some others estimate that for each dollar spent on infrastructure yields an additional 60 cents in economic activity.

The current administration's wide-ranging infrastructure program involves the development of an enhanced national network of highways and roads, in addition to several other transportation and telecommunication projects, set to turn Mexico into a world-class logistics platform. Most of this investment is expected to come from public-private partnerships (PPPs), worth in excess of USD 100 billion for the next 5 years. Projects include 60 new roads (16 toll roads, 29 freeways, and 16 rural roads); three passenger railroads; seven sea ports and seven airports[34]. According to government officials at SCT the roads budget will be 36% higher during the six years of the administration, than under the previous government. The expenses must not only be used to build infrastructure but also to maintain quality, especially on the major agrologistics routes of the country, or at least on these roads that carry higher value products.

Improving railway competitiveness requires several developments, the most relevant being: multimodal investment on all lines; improve urban intersections that have exponentially grown and improve signage (both are responsibilities of the local authorities) as the number of accidents is growing. Furthermore, regulation changes are needed so that the speed limits are not a barrier for operators and to have greater certainty for investors in terms of crossings, investments in railways, and duration of concessions, among others. Finally, the increasing amount of train robberies by organized crime should be attended to.

Another key aspect is to improve logistic connectivity, which fortunately has already begun. Starting in 2010 Wageningen UR has contributed in the development of agroparks in Aguascalientes, Nayarit and Chiapas. Among others this has led to a National System for Agroparks (El Sistema Nacional de Agroparques).

The National System for Agroparks, announced in the Official Gazette in December 2013[35], is a component of the Productivity and Food Competitiveness Program, which mission is to promote the development of facilities such as warehouses, packing plants and agri-food processing units.

In 2012, the Interamerican Development Bank together with the Ministry of Communications and Transport (SCT) and the Ministry of Economy (SE) created a National Logistic Platform System[36] that identified 85 logistical centers and proposes the location of 3 new logistic food centers (CAL) and 6 agroparks.

Despite launching its most ambitious infrastructure plan in recent history, Mexico clearly needs a lot more roads, ports and airports to improve their sector. In fact, perhaps the most urgent need is the necessity to change regulatory and institutional aspects. Therefore among the institutional issues to pursue it is suggested that:

- Addressing the legal framework of logistics through a general articulating law and simplify it. For this, it is necessary to reduce administrative regulation and to simplify rules and programs for the agrologistics sector.
- Coordinate customs inspection procedures by implementing a one-document process, one reviewer and only one revision point per crossing. Also, it should allow inspections by certified private companies in production or packing zones. For each additional day that goods spend at the border, trade decreases by approximately 4% [37].

[34] National Plan on Infrastructure 2014-2018.
[35] National Gazette: 18/12/2013 - Reglas de Operación del Programa de Productividad y Competitividad Agroalimentaria.
[36] Sistema Nacional de Plataformas Logísticas, 2012, BID, SCT, SE.
[37] Korinek y Sourdin 2011.

- Implementing the use of ICT (Information and Communication Technologies) in logistics. For example, develop mobile platforms to increase access to information regarding transport prices, and security services for agriculture (The World Bank 2012).
- Improving coordination between the various organizations that are involved in logistics, particularly for port inspections.
- Encouraging competition within the transport sector and improving logistics education.
- Designing and operating a system of indicators and information that provides decision-makers with information on agrologistics.
- Enhancing research partnerships with universities to delve into agrologistics topics.
- Improving government expenditures in the agricultural sector so that instead of a focus on the creation of private goods (that are actually regressive), focus lies on the creation of public goods.
- Improving the regulatory process, establishing maximum times to create standards and streamlining its verification process. Additionally, the Official Mexican Standard (NOM) could establish the same inspection system for all of their agricultural products and include, as a part of the verification process, mechanisms based on risks. One way of beginning to make these adjustments is through the already established group "Comité Nacional de Normalización para la Competitividad Empresarial" between the public and private sector.
- Streamlining standards according to our main business partners so that the inspections are made simpler and ultimately redundant after they sign a mutual agreement to follow those standards.

In summary, the 10 main recommendations are:

1. Coordinate the integration of the National Agrologistics Program (Programa Nacional de Agrologística) at the federal, state, and regional level, with the help of the public and private sector.
2. Create market access programs: through stimulation of shared markets, cooperatives, cooperation in chains and added value (i.e. Agroparks).
3. Invest in creating a continuous cold chain: through cold storage programs and refrigerated rooms for border inspections.
4. Introduce refrigerated containers (reefer).
5. Improve connectivity between multimodal transport systems to decrease logistical costs, i.e. uninterrupted seaport-railway-roadway connections and maritime shipping for short distances.
6. Align customs and inspection process in seaports by improving the Single Window and condensing it to one review process and one inspection.
7. Incorporate risk based inspections and a certification system so that a third-party can perform the inspections at production zones so commercial goods can pass through the border without further review.
8. Create a program that incorporates information and communication technology, and standardization for the traceability of goods.
9. Combat insecurity in transport through a specific agenda against robbing and illegal selling of stolen goods in roads and railways.
10. Propose an education and training agenda to create new talent in agrologistics.

Appendices

Appendices

Annex 1: Methodology

The methodology used to build this Diagnosis was based on four steps. The first was an extensive literature review from different disciplines to understand both infrastructure cost and efficiency (roads, railways etc.) and soft infrastructure relevance (customs costs and efficiency, legal loopholes, etc.). The second consisted of analyzing case studies to understand the particular conditions of the agriculture sector. The third was based on conducting a series of interviews with experts (see list below) using a World Bank format to be able to obtain the most cost components. The fourth was to carry out a workshop between experts, authorities and main stakeholders. Finally, a set of indicators (see below) to monitor the Program's performance throughout time were also identified. The only factors that were not analyzed as they were beyond this scope were company's internal factors as marketing, production, and internal logistics.

The diagnosis includes a general perspective and a specific one of seven key supply chains each representing one food sector: vegetables, fruits, dairy, meat, grains, fisheries and processed foods. The methodology used to decide on the seven products was based on a study of Product Market Combinations (PMC) as well as price differentials with competing countries

Table A1.1. List of interviewed people:

Commodity	Product	Profile
Other Stakeholders		Carrier Company Carrier Company Carrier Company Retailer Cargo Customs Agent Logistics Solutions for the Cold Chain Customs Agent Logistics Service Provider
Fisheries	Cultivated Shrimps	Shrimp Growers Association
Dairy	Fresh Pasteurized Milk	Milk Agro-entrepreneurs Council Producer/Processor Producer/Processor
Fruits	Berries	Producer/Exporter Producer/Exporter Producer
Meat	Pork cuts	National Pork Producers Association Producer
Processing	Fresh, cut and washed vegetables	National Association Producer/Processor Producer/Processor
Vegetables	Saladette Tomato	Producer/Exporter Producer/Exporter Producer/Exporter Producer/Exporter
Grains	Import of Yellow Corn for Animal Feed	National Association Livestock Feed Companies Meat Producer

After both desk analysis and interviews, the following are the most important indicators:

Table A1.2. List of potential indicators

List of Potential Indicators	
1	Reliability[38]
2	Flexibility[39]
3	Quality[26]
4	Response time[26, 40]
5	Cost[26, 41, 27]
6	Cold Chain performance[42]
7	Computerization, including electronic information (traceability) and financial flows[29, 27, 43]
8	Standardization of load carriers, crates, barcoding, etc. (Van der Vorst & Snels, 2014)
9	Inventory costs[28]
10	Distance[27]
11	Losses[44]
12	Revealed Comparative Advantage (RCA)[45]
13	Logistic costs as a percentage of GDP
14	Localization and accessibility of both markets and logistics hubs
15	Connectivity of production areas
16	Logistics services for the agricultural industry
17	Logistics costs of services
18	Logistics Performance Index (LPI)
19	Availability and quality of logistics infrastructure
20	Infrastructure for modal transfer
21	Opportunities for expanding and connecting hinterlands
22	Trading across borders, including documents needed for import/export, time to import/export, and cost to import/export (in USD per container)
23	Customs procedures, time, cargo security, and corruption
24	Logistics services for the agricultural industry
25	Cost and lead time of phytosanitary control (at the border and within the country)
26	Digitalization of documents
27	Logistics quality and competence[46]

The widely used Logistics Performance Index (LPI, based on a scale from 1-5), published by the World Bank Group, measures the current logistics environment in six areas: customs, infrastructure, international shipments, logistics quality and competence, tracking and tracing, and timelines. The survey-based LPI is based on expert assessments of logistics professionals. There is a relationship between a country's LPI ranking and its level of logistics costs, such that countries with a low LPI score tend to have high costs, and vice versa (Rantasila and Ojala 2012). Thus, agrologistics competiveness can be measured by measuring agrologistics costs.

[38] INEGI, Boletin de informacion oportuna del sector alimentario, Num. 336. 2013, November: p. 106

[39] INEGI, Boletín de informacion oportuna del sector alimentario, Num. 336. 2013, November: p. 106

[40] INEGI, El sector alimentario en Mexico 2011. 2011: p. 307

[41] INEGI, http://www.inegi.org.mx/est/contenidos/Proyectos/encuestas/hogares/regulares/enigh/. 2012

[42] INEGI, El sector alimentario en Mexico 2013. 2013: p. 307

[43] Conacca, I., Centro de Logística Alimentaria (CELA) "MODELO A". 2011 ?(statewise production map for fruit and vegetables, urban areas, possible logistic hubs): p. 100

[44] Mundi, I., http://www.indexmundi.com/g/g.aspx?v=21&c=mx&l=en. 2012

[45] PM, G., Harvesting 20 years of doing business: the Mexican market. 2010(competitiveness of states): p. 32

[46] Jean-François Arvis, M.A.M., Lauri Ojala, Ben Shepherd, Daniel Saslavsky, Connecting to Compete; Trade Logistics in the Global Economy: The Logistics Performance Index and Its Indicators. 2012: p. 68

Annex 2: Trends in urbanization in Mexico

Mexico's population of 120 million people is expected to increase to 150 million by 2050[47] and shall likely mainly concentrate in urban areas. Considering population changes on district level, larger urban areas are expected to grow more.

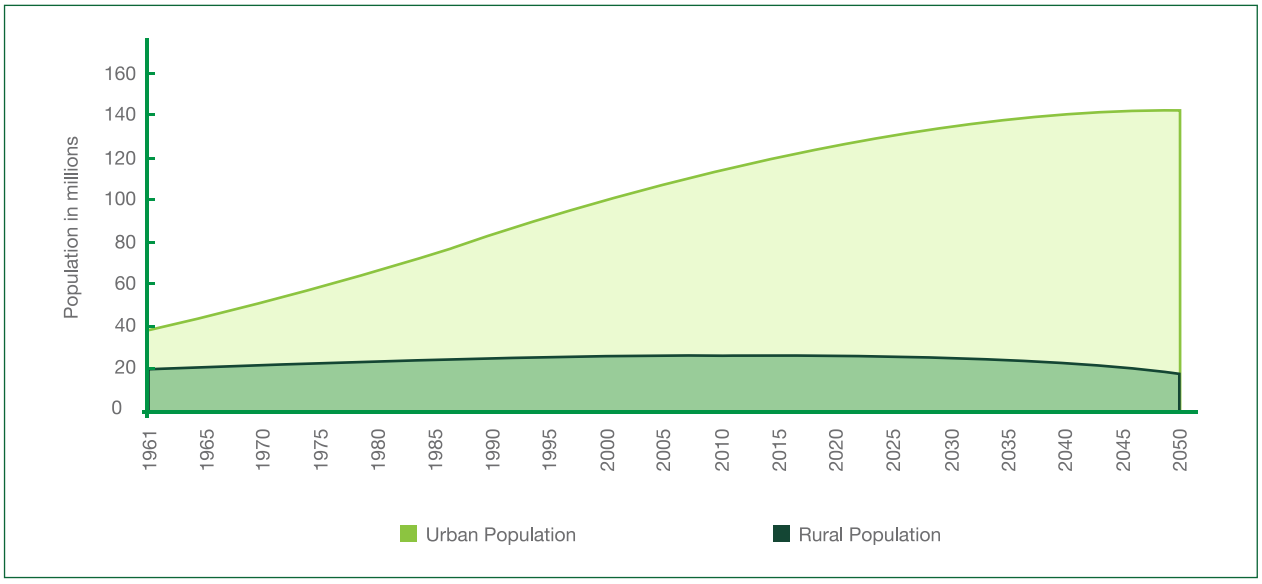
Urban population has grown considerably since 1961, whereas the rural population has remained relatively constant (and is predicted to decrease slightly by 2050).

Table A2.1 Overview of urbanization in Mexico based on three lower boundaries (population thresholds) used to define 'urban' regions

Defined urban if > 15 thousand inhabitants	1995	2000	2005	2010	2015	2020	2025	2030	Average annual growth % 1995-2013
15,000	91%	91%	92%	93%	93%	93%	94%	93%	0.1%
25,000	84%	85%	86%	87%	87%	88%	88%	89%	0.2%
50,000	71%	72%	75%	76%	77%	78%	79%	80%	0.3%

Source: INEGI

Figure A2.2. Population projection to 2050, divided in urban and rural population



Source: FENIX Web Data Server, FAO

[47] Conapo, http://www.conapo.gob.mx/es/CONAPO/Proyecciones_Datos.2014.

Annex 3: Main market channels in Mexico to buy food

Table A3.1. Expenditure in peso/capita/year in Mexico (INEGI, ENIGH)

	ENIGH code	Product name	2006	2008	2010	2012	2006	2008	2010	2012
1	A244	Inexpensive mid-day meal	668	738	877	820	100	110	131	123
2	A004	Corn Tortilla	361	471	525	580	100	130	145	161
3	A243	Breakfast	320	335	376	426	100	105	117	133
4	A220	Refreshment: cola and flavors	298	340	337	380	100	114	113	128
5	A075	Pasteurized cow milk	314	385	345	365	100	123	110	116
6	A093	Hen egg white and red	142	221	225	299	100	155	158	210
7	A202	Others prepared foods: jam, flutes, stews, hot dogs, soups, tacos	205	250	293	293	100	122	143	143
8	A245	Dinner	200	214	223	238	100	107	111	119
9	A025	Beef steak	202	230	250	238	100	114	124	118
10	A059	Whole chicken or parts except, leg, thigh and breast	155	190	231	198	100	122	149	128
11	A137	Beans in grain (Frijol en grano)	99	141	144	183	100	142	145	184
12	A013	Sweet bread into pieces	125	165	170	164	100	132	135	131
13	A124	Tomato	157	136	174	157	100	87	111	100
14	A057	Leg, thigh or chicken breast with bone	99	103	151	153	100	104	153	155
15	A215	Bottled water	89	108	113	120	100	121	127	135
16	A200	Roasted chicken	98	129	120	117	100	132	123	119
17	A095	Vegetable oils: canola, safflower, sunflower, corn, etc.	58	109	91	115	100	188	158	199
18	A246	Light dish	208	114	92	114	100	55	44	55
19	A034	Ground beef	69	84	88	87	100	123	127	126
20	A012	White bread: roll, loaf, baguette, etc.	56	125	100	86	100	225	180	155

Source: INEGI, ENIGH

Table A3.2 Biannual market share by expenditure per outlet type from 2006 through 2012

Market channel	2006	2008	2010	2012
Shops grocery	27.2%	28.9%	25.2%	24.9%
Shops specific branch	19.6%	20.8%	22.2%	22.3%
Supermarkets	12.3%	13.1%	12.4%	13.7%
Open market	9.3%	10.1%	11.9%	9.2%
Loncherías, kitchens economic	9.1%	7.6%	6.3%	7.2%
Street vendors	7.5%	7.4%	6.2%	6.0%
Restaurants	5.8%	4.8%	6.0%	5.8%
Open market including groceries	3.1%	3.2%	3.2%	3.7%
Private person	0.0%	0.0%	3.1%	3.0%
Convenience Stores	0.5%	0.8%	0.7%	1.2%
Cafeteria	0.9%	0.6%	0.9%	0.9%
Diconsa	3.2%	2.0%	1.1%	0.8%
Stores with membership	0.7%	0.5%	0.5%	0.7%
Abroad	0.1%	0.1%	0.1%	0.2%
Departmental Stores	0.1%	0.1%	0.1%	0.1%
Bars	0.0%	0.0%	0.0%	0.0%
Dairy Liconsa	0.6%	0.0%	0.0%	0.0%
Internet	0.0%	0.0%	0.0%	0.0%

Source: Wageningen UR Food & Biobased Research, based on Ref.[48]

[48] Van der Vorst, J.G.A.J., Snels, J. , Developments and Needs for Sustainable Agrologistics in Developing Countrie, Multi–Donor Trust Fund for Sustainable Logistics (MDTF–SL). Position Note on Agrologistics, WorldBank, 2014

Table A3.3. Market share for the four most important channels based on food expenditure in 2012

Market share for 4 most important channels based on food expenditure in 2012					
Region	Open market	Grocery Stores	Specific Brands Stores	Supermarkets	Subtotal
Central North	5.8%	32.5%	25.9%	8.1%	72.3%
Central South	14.4%	18.8%	21.0%	10.9%	65.1%
North East	0.8%	26.6%	20.1%	26.5%	74.1%
North West	2.9%	29.4%	16.3%	27.4%	76.0%
West	7.1%	31.2%	25.6%	6.2%	70.0%
East	12.1%	26.1%	26.7%	6.4%	71.4%
South East	9.1%	25.4%	24.9%	12.5%	71.8%
South West	18.0%	28.1%	21.0%	3.5%	70.6%
Total Mexico	**9.2%**	**24.9%**	**22.3%**	**13.7%**	**70.1%**

Source: Wageningen UR Food & Biobased Research, based on Ref.[34]

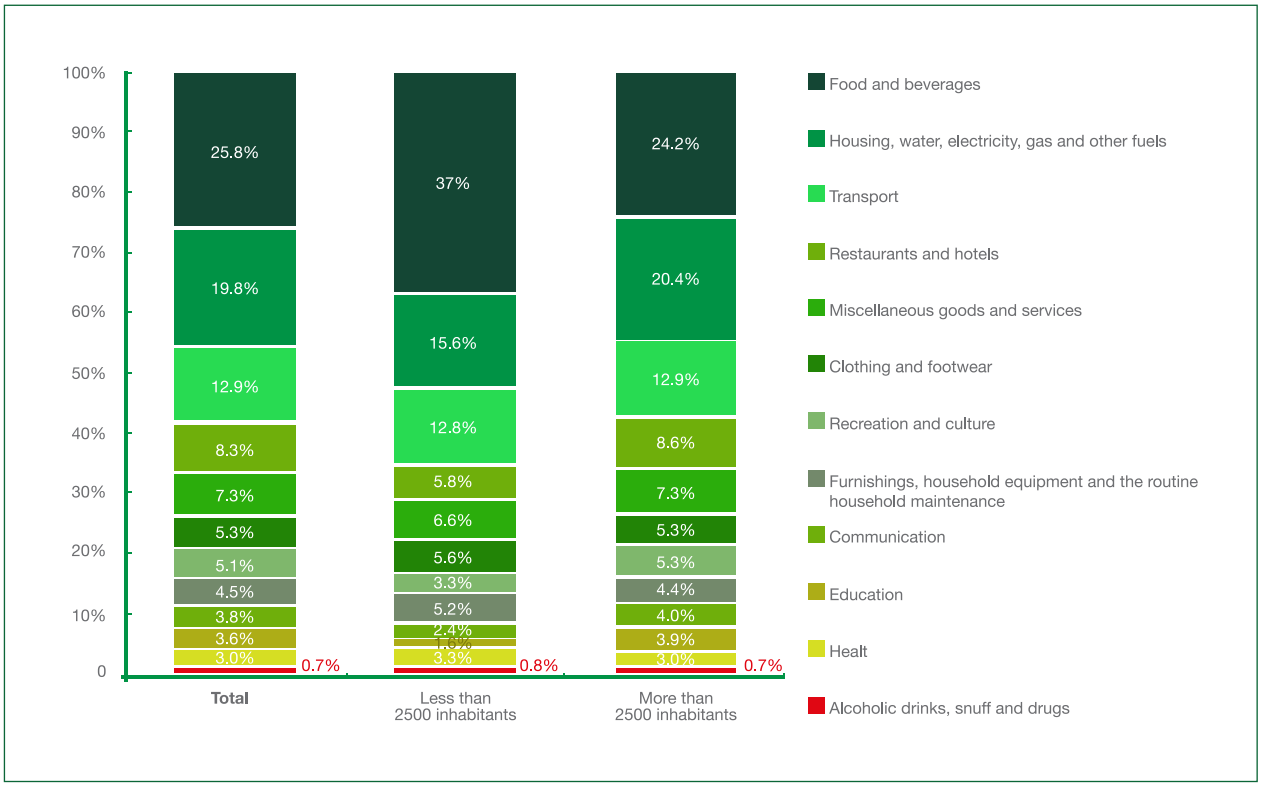
Table A3.4. Purchase channel identification for the major products for the average Mexican consumer

Purchase Channel identification for the major products for the average Mexican consumer	
Grains:	Grocery Stores (without processing), stores that specialize in grains (without processing), and supermarkets (processed grain products)
Meat:	Meat specialized stores, open markets, and supermarkets
Fish:	Supermarket, fish specialized stores, and in smaller scale but still significant, grocery stores and open markets
Dairy products:	Totally dominated by supermarkets and grocery stores
Oils:	Supermarkets and grocery stores
Vegetables:	Nearly equal divided among five channels: open markets, tianguis, grocery stores, fruits & vegetables specialized stores, and supermarkets
Fruits:	Dominated by supermarkets and open markets and to a lesser extent by tianguis and fruits & vegetables specialized stores
Other processed food:	Supermarkets, grocery stores, and stores that specialize in a particular branch (for example, sugar, coffee, chocolate, pizza, etc.)

Source: Wageningen UR Food & Biobased Research, based on the performed diagnosis

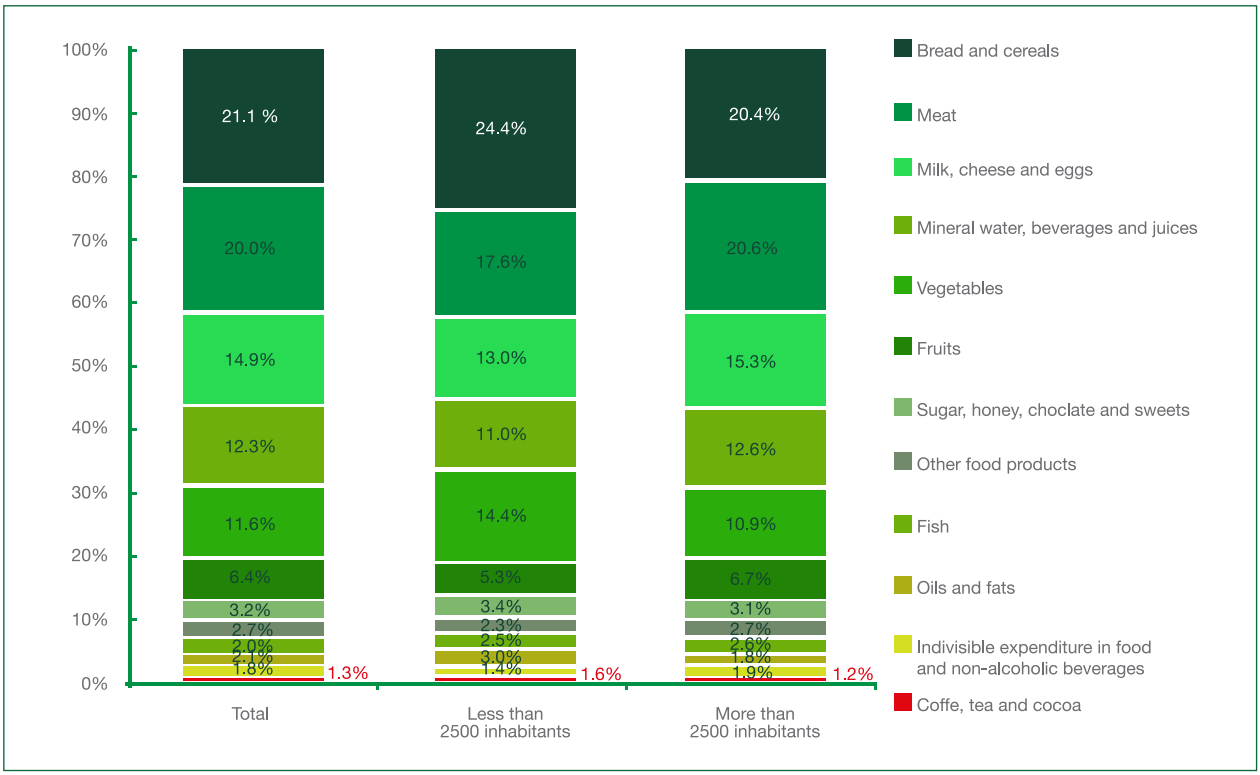
Annex 4: Food expenditure by household in Mexico

Figure A4.1. Distribution of total consumption expenditure by category for localities with <2500 inhabitants and >2500 inhabitants.



Source: INEGI: Encuesta Nacional de gastos de los Hogares. Resultados del ano de levantamiento 2012. ENGASTOS

Figure A4.2. Composition of total consumption expenditure on food and non-alcoholic beverages by locality size.



Source: INEGI: Encuesta Nacional de gastos de los hogares. Resultados del año de levantamiento 2012. ENGASTOS

Annex 5: Main international trends in food to and from Mexico

Table A5.1 Import flows of agricultural products in excess of 100 million USD into Mexico in 2012

Category	Product	Millon US$	% Import value in category	Mainly from
Cereals/Grains	Maize	2976	59%	USA
Meat Products	Meat of bovine animals, fresh/chilled, boneless	784	21%	USA, Canada
Cereals/Grains	Wheat / Meslin	742	15%	USA, Canada
Dairy	Milk and cream-In Powder, of a fat content, by weight, not exceeded	732	45%	USA
Meat Products	Meat of swine, fresh/chilled, hams, shoulders and cuts thereof	686	18%	USA
Meat Products	Fowls of the species Gallus domesticus, cuts/offal, fresh/chilled	460	14%	USA
Cereals/Grains	Grain/Sorghum	403	8%	USA, Argentina
Fruits	Apples	291	32%	USA
Vegetables	Kidney beans, incl. white pea beans	281	54%	USA, Canada, China
Cereals/Grains	Rice in the husk	273	5%	USA
Dairy	Cheese and curd	272	17%	USA, Uruguay, China, Netherlands
Meat Products	Fowls of the species Gallus domesticus, cuts/offal, frozen	250	7%	USA, Chile
Meat Products	Turkeys, cuts/offal/fresh/chilled	229	7%	USA
Cereals/Grains	Malt not roasted	184	4%	USA
Fruits	Grapes, fresh	126	14%	USA, Chile
Dairy	Butter and other fats and oils derived from milk; dairy spreads	104	7%	New Zeland

Source: UNCOMTRADE

Table A5.2 Main export flows of agricultural products in USD from Mexico in 2012

Category	Product	2012		
		Million US$	% Export Value in Category	Mainly to
Vegetables	Tomatoes, fresh/chilled	1681	36%	USA
Fruits	Avocados	878	19%	USA, Japan
Vegetables	Fruits of the genus Capsicum or of the genus Pimenta	773	17%	USA
Vegetables	Cucumbers and gherkins, fresh/chilled	360	8%	USA
Meat Products	Meat of bovine animals, fresh or chilled-Boneless	331	26%	USA
Meat Products	Meat of swine (excl. carcasses/half)	321	25%	Japan
Vegetables	Onions and shallots	308	7%	USA, Guatemala
Fruits	Watermelons	271	9%	USA
Fruits	Lemons and limes	270	9%	USA, Netherlands
Fruits	Guavas, mangoes and mangosteens	254	8%	USA, Canada
Vegetables	Chickpeas	251	5%	USA
Meat Products	Meat of bovine animals, frozen, boneless	247	19%	Russian Federation, Japan, USA
Fruits	Strawberries	224	7%	USA
Processed F & V	Orange juice, frozen, unfermented & not containing added spirit, whether/ not containing added	180	19%	USA, Netherlands, Japan
Cereals/Grains	Maize (corn)	180	34%	Venezuela, USA
Meat Products	Meat of bovine animals, fresh or chilled-Other cuts with bone in	160	12%	USA
Processed F & V	Vegetables, fruit, nuts & other edible parts of plants	149	16%	USA
Cereals/Grains	Durum wheat	141	27%	Algeria, Italy, Turkey
Fish	Crustaceans-frozen-other shrimps and prawns	101	21	USA

Source: UNCOMTRADE

Table A5.3 the top five import products in terms of value in China, Japan, South Korea, and EU-27

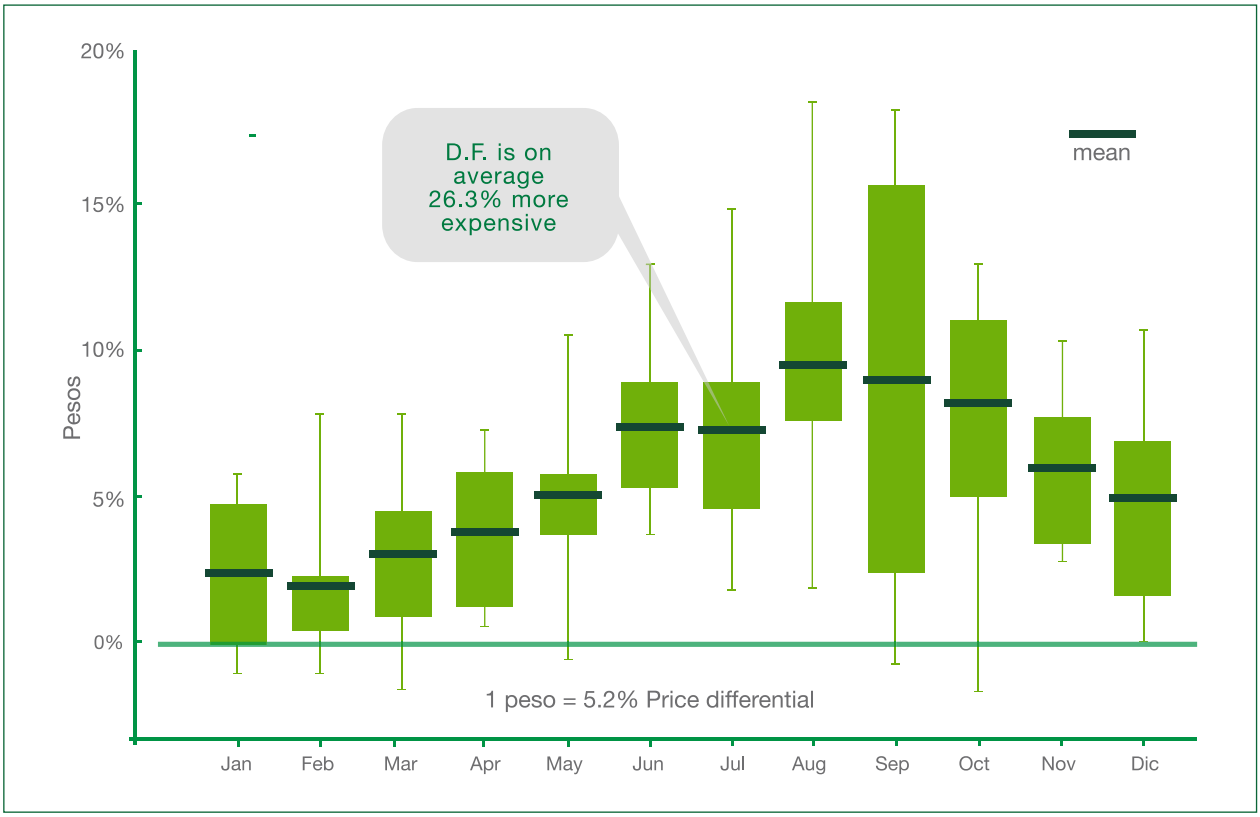
China	Japan	South Korea	UE 27
Maize	Maize	Maize	Bananas, including fresh/ dried bananas
Pork edible offal (excluding liver), frozen	Pork meat (excluding carcasses/half-carcasses/ hams/shoulders & cuts), frozen	Wheat/Meslin	Shrimps & prawns, with/ without shell, frozen (2011, 2012 n/a)
Milk in powder /granules /other solid form, unsweetened, fat content by weight >1.5%	Wheat/Meslin	Pork meat (excluding carcasses/half-carcasses/ hams/shoulders & cuts), frozen	Salmon, fresh/chilled, livers/roes From the Pacific/Atlantic/ Danube
Manioc (cassava)	Shrimps & prawns, with/ without shell, frozen (2011, 2012 n/a)	Bovine cuts boneless, frozen	Maize
Rice	Pork meat (excluding (half-carcasses/ hams/ shoulders & cuts), frozen	Shrimps & prawns, with/ without shell, frozen (2011, 2012 n/a)	Wheat/Meslin

Source: UNCOMTRADE

Annex 6: Price differentials in wholesale markets for tomatoes and berries in Mexico

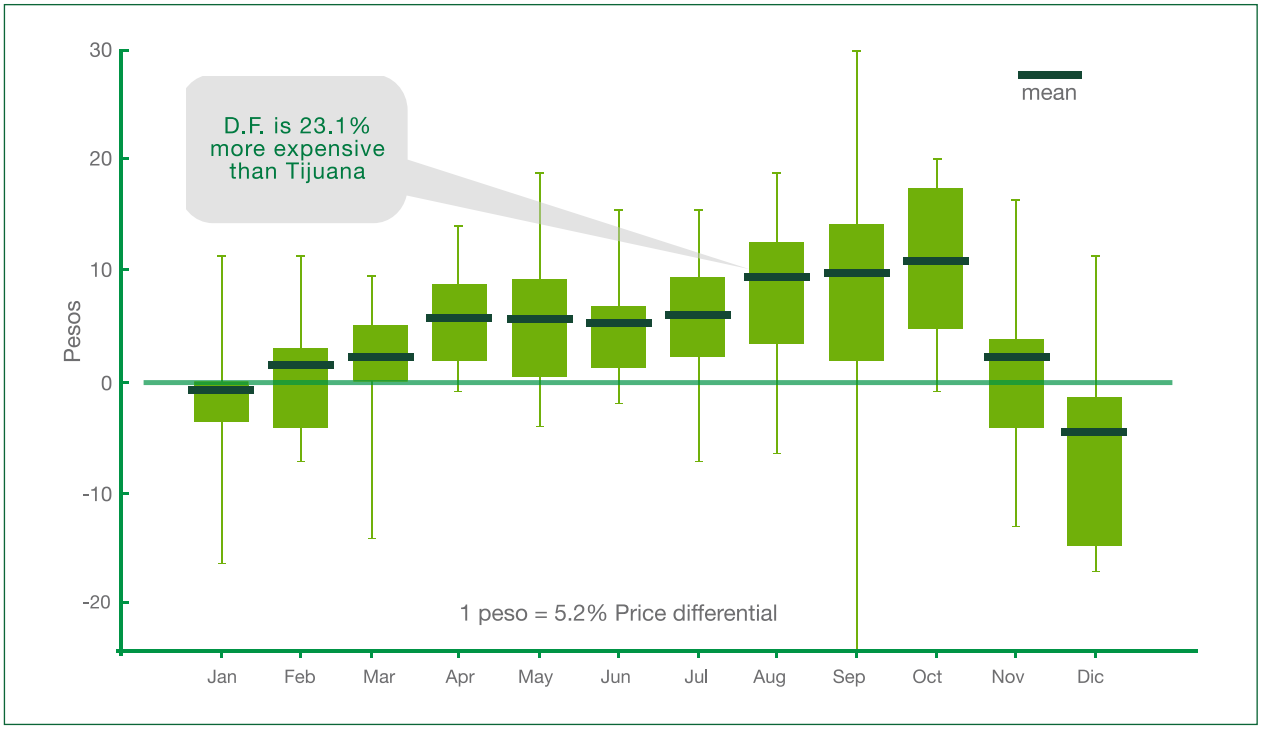
When analyzing the strawberries wholesale market (Central de Abasto) price differentials it is found that prices in Mexico City (D.F.) are consistently higher than in 2 main production areas (Michoacán and Baja California) having an average price differential of 26% and 23% respectively (*see figure below*).

Figure A6.1. Monthly wholesale price differentials for strawberry between D.F. and Morelia 1998-2013 (prices per kilo)



Source: IMCO with Information from SNIIM 2014

Figure A6.2. Monthly wholesale price differentials for strawberry between D.F. and Tijuana 1998-2013 (prices per kilo)

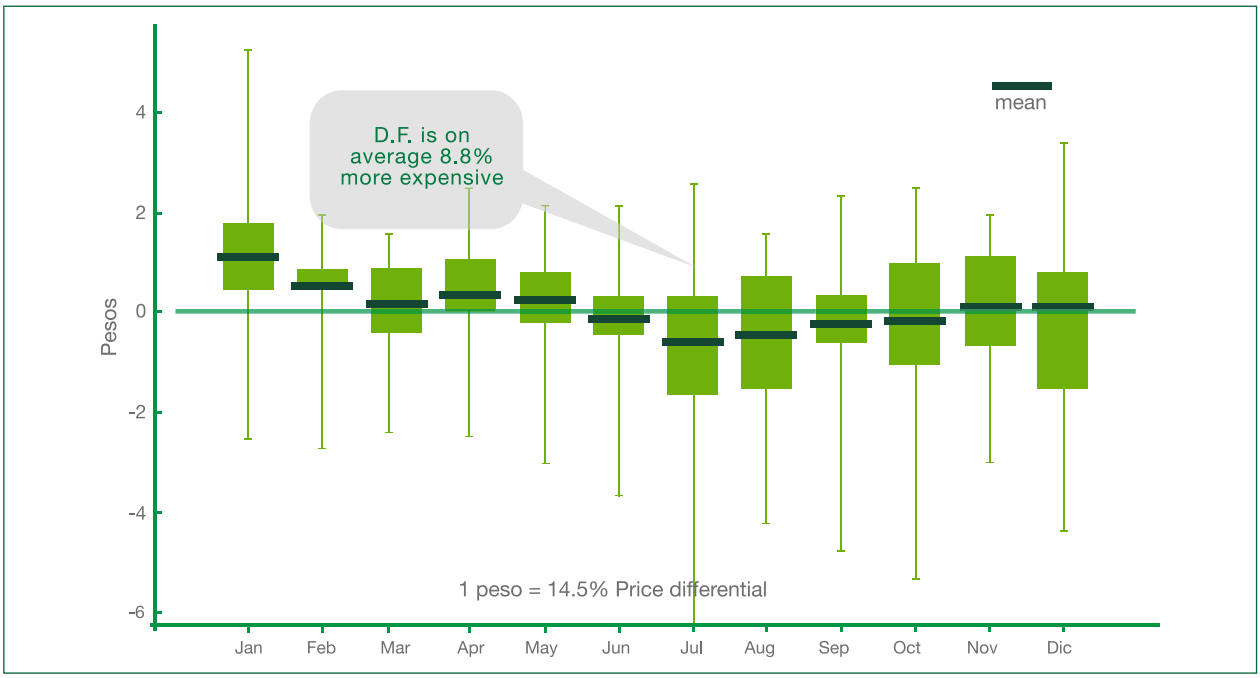


Source: IMCO with Information from SNIIM 2014

As shown in the figures above, the greatest price differentials are between Mexico City and Michoacán, which are the closest cities (90% closer) that were studied. This can likely be explained due to the majority of the strawberry production in Baja California is exported or by possible problems in the supply chain from Michoacán to D.F. or for extra costs deriving from insecurity or lack of competition.

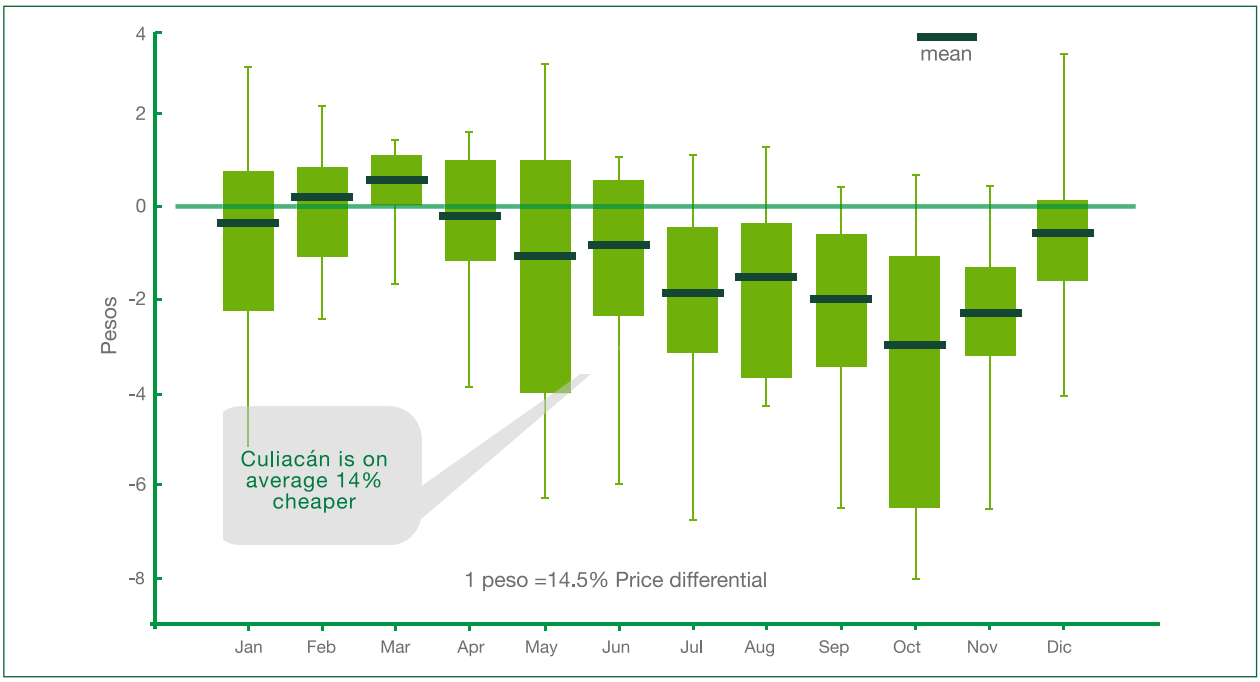
In the other hand, for tomatoes the price differentials between D.F. and main production areas such as Jalisco and Sinaloa are much lower, 9 and 14% on average respectively. As can be seen from the figure below tomatoes are consistently cheaper in Culiacan than in D.F. and with lower price than strawberries. These comparisons suggest that logistics for tomatoes are probably more integrated and efficient than logistics for strawberries.

Figure A6.3. Monthly Wholesale Price differentials for tomato between D.F. and Guadalajara 1998-2013 (prices per kilo)



Source: IMCO with Information from SNIIM 2014

Figure A6.4. Monthly Wholesale Price differentials for tomato between D.F. and Culiacán 1998-2013 (prices per kilo)



Source: IMCO with Information from SNIIM 2014

Annex 7: Ports infrastructure

Table A7.1. Infrastructure data for main agricultural ports in Mexico

Infrastructure	Lázaro Cárdenas	Veracruz	Altamira	Manzanillo
Yard capacity (m^2)	1,564,537	579,239	39,000	566,448
Warehouse capacity (m^2)	17,924	18,595	1,500	26,547
Cold storage (tons)	-	0	-	3,000

Source: Mexico's ports website

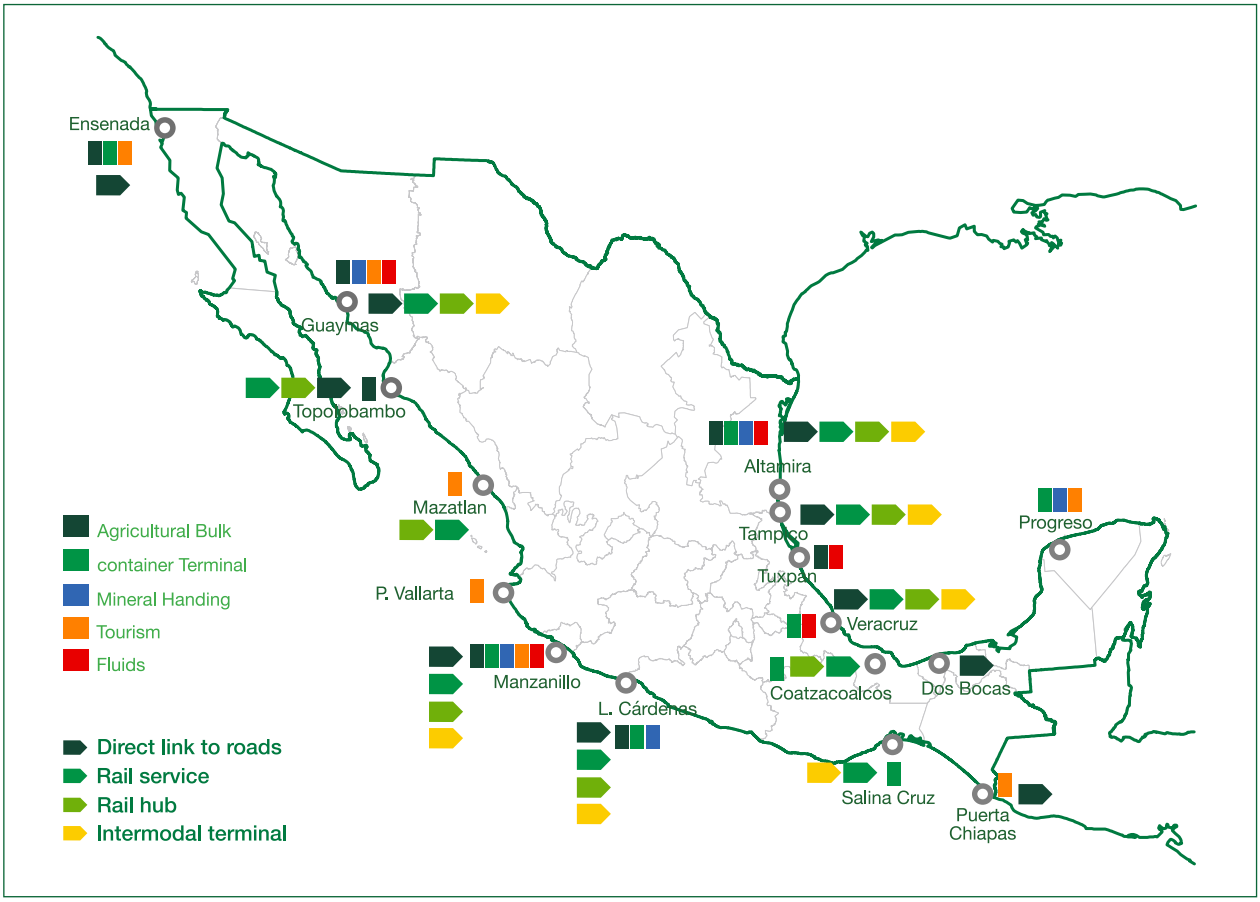
Table A7.2. US-West Coast ports infrastructure

Cold storage	m^2	tons
Los Angeles	78,126	
New Orleans	26,663	38,102
Portland	71,535	

Source: Global Cold Storage Capacity Report, by Victoria Salin, Texas A&M University, for the international Association of Refrigerated Warehouses, 2010

Annex 8: Intermodal hubs in Mexico

Figure A8.1. Intermodal hubs



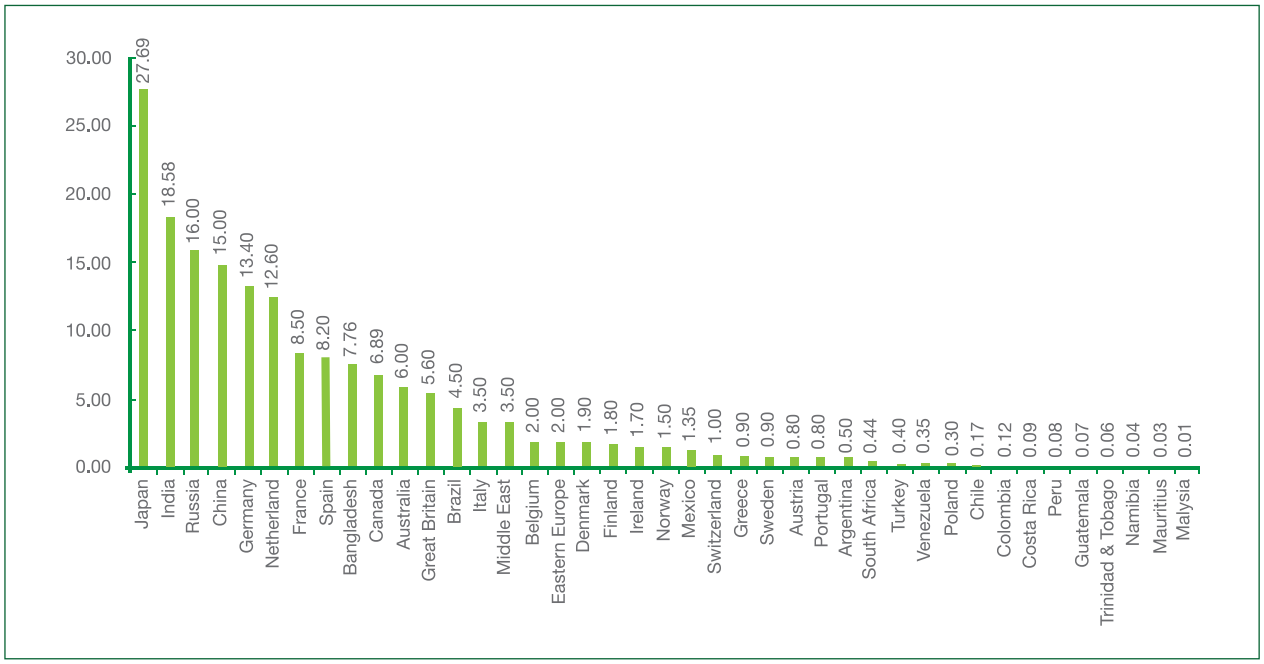
Source: SCT, 2013 "El sistema portuario hacia el futuro")

Table 8.2. Overview of amount of intermodal hubs per state

State	Hubs	State	Hubs
Nuevo León	18	Coahuila	3
México	10	Durango	2
San Luis Potosí	7	Puebla	2
Jalisco	7	Sonora	2
Distrito Federal	7	Aguascalientes	2
Querétaro	5	Chihuahua	2
Hidalgo	5	Michoacán	2
Veracruz	5	Baja California	1
Tamaulipas	3	Guanajuato	1

Annex 9: Refrigerated capacity in Mexico

Figure A9.1: Capacity of refrigerated warehouses (PRW) worldwide (million cubic meters).



Source: International Association of Refrigerated Warehouses

Annex 10: Elements of agrologistics in planning policies

Table A10.1. Elements of Public Policies identified in the 2013-2018 National Development Plan

Worr axes of the National Agrologistics Program	Themes	4th Goal: Prosperous Mexico (number of times mentioned)
1. Development of logistical infrastructure and intelligence	• Investment in cold chains	--
	• Information systems (logistics)	1
	• Infrastructure for cold storage	--
	• Development of competitive clusters	3
	• Middlemen, agents and marketing formats	3
	• Postharvest losses	1
	• Safety (food)	2
	• Transportation (logistics)	3
2. Institutional development	• Aligning the various government agencies/entities (logistics)	1
	• Financing (logistics)	2
	• Chain standardization (logistics)	1
	• Filings and services at ports and customs	1
	• Efficiency of the import/export processes	1
	• Associativity of (agri-food) producers	1
	• Stability (and transparency) of food chain prices	--
	• Environment (and its relationship with the agri-food sector)	1
3. Knowledge development and transfer	• Training for logistical chains management	2
	Total identified references	**23**

Source: Own elaboration using data from the National Development Plan 2013-2018

These general elements are reflected in federal programs for the sector. Those that affect agrologistics are:

1. Promotion and Encouragement Program for Mexican Agri-food and Fisheries Products Exportation
2. Comprehensive Program for Rural Development
3. Program for Agri-food Productivity and Competitiveness
4. Program for Marketing and Market Development
5. Program for Innovation, Research, Technological Development and Education
6. Special Program for Food Safety
7. Special Concurring Program for Sustainable Rural Development

Annex 11: Logistics legal framework

To understand regulations affecting agrologistics we analyzed laws, such as standards, regarding agrologistics, economics and public interest. After analyzing 283 federal laws[49], 255 standards, 32 state programs and over 80 federal programs in the end the logistics legal framework resulted in: 24 federal laws, 21 federal programs and 106 standards as explained below:

Table A11.1. 24 Federal laws affecting agrologistics

	Laws	Related Topics	Relevance for Agrologistics
1	Mexican Constitution	Storage Transportation Sanitation / Processing Trading / Export and Import / Customs	Establishes the basis for the development of natural resources of the country; determines the principles for building infrastructure, regulates agriculture, among others.
2	Code of Commerce	Storage Transportation Trading / Export and Import / Customs	Establishes all the regulation of commercial transactions.
3	Tax Code	Trading / Export and Import / Customs	Establishes contributions in Mexican territory in accordance with the requirements of international treaties. Also presents the general rules for paying taxes.
4	Customs Act	Trading / Export and Import / Customs	Regulates the entrance and parting of goods in Mexican territory and the way they are transported. It also regulates customs.
5	Public Private Partnerships Act (Infrastructure)	Storage Transportation Trading / Export and Import / Customs	Regulates the development of projects that have public and private finance through partnerships under long term contracts. This act promotes services to the public sector or end user, with the objective of increasing social welfare and maintain investment.
6	Biosecurity Act of Genetically Modified Organisms	Sanitation / Processing Trading / Export and Import / Customs	This act regulates activities related with genetically modified organisms as restrained release, commercial release, marketing, import and export in order to prevent, reduce or avoid possible risks that could cause these activities to human health, the environment and biodiversity.
7	Roads, Bridges and Federal Transport Act	Transportation	Regulates the construction, operation, use, care and maintenance of roads and bridges that constitutes the general communication means; as well as rules for federal transport services, and subsidiary service transit.
8	Foreign Trade Act	Trading / Export and Import / Customs	This act serves the purpose of regulating and promoting foreign trade, and competitiveness. It also aims to defend national industry against anti-competitive practices.
9	Import and Export General Tax Act	Trading / Export and Import / Customs	Determine the general taxes for import and export.
10	Navigation and Maritime Commerce Act	Trading / Export and Import / Customs	This law regulates the general means of water communication, navigation, protection and services related. The law establishes the rules for the merchant marine, and regulations related to maritime trade.
11	Livestock Organization Act	Storage Sanitation / Processing Trading / Export and Import / Customs	This law establishes the basic procedures for the construction, organization and operation of livestock organizations in the country. It also incorporates the criteria that support development and improvement of production and marketing processes of livestock products.

[49] However according to the General Legal Affairs Unit of the Ministry of the Interior (SEGOB) there are 546 regulations.

Laws		Related Topics	Relevance for Agrologistics
12	Organic Products Act	Storage Transportation Sanitation / Processing Trading / Export and Import / Customs	Its purpose is to encourage and regulate the requirements for conversion, production, processing, distribution, verification and certification, among others, of organic products.
13	Port Act	Trading / Export and Import / Customs	It rules the terminal ports operation, navy and port facilities, as well as its service provisions.
14	General Communications Act	Transportation	It engages general transport operation under federal regulation.
15	Production, Trade and Seed Certification Federal Act	Sanitation / Processing Trading / Export and Import / Customs	Rules the planning and organizational activities related to the agricultural production, its processing and marketing.
16	Federal Animal Health Act	Sanitation / Processing	It standardizes the analysis, prevention, control and elimination of diseases and pests affecting animals in the country. It regulates livestock good practices, which are applied to the primary production of the establishments engaged in the processing of animal supplies for human consumption; regulates the establishments, products and the development of animal health activities and services.
17	Federal Plants Health Act	Sanitation / Processing	Regulates and promotes health of plants, as well as the implementation, verification and certification of the risk reduction systems of physical, chemical and microbial pollution in primary vegetable production.
18	Sea Federal Act	Trading / Export and Import / Customs	It regulates the maritime national zones; and determines the activities that can be realized in those areas.
19	Metrology and Standardization Federal Act	Transportation Trading / Export and Import / Customs	This law determines the general system of measurement units, metrology concepts, and requirements for processing, importing, repairing, selling, verifying and use of measurement instruments. It also establishes the national calibration system, besides other metrology issues. It provides the basis on standards, certification, accreditation and verification.
20	Auxiliary Credit Organizations General Act	Storage Trading / Export and Import / Customs	It regulates the organization and operation of auxiliary credit corporations.
21	Limited Companies General Act	Trading / Export and Import / Customs	It determines the organization and operation system for limited companies.
22	Securities and General Loans Act	Trading / Export and Import / Customs	The act regulates, endorsements, guarantees, acceptance and all other debt securities transactions; as well as trade activities.
23	Rail Service Regulatory Act	Transportation	Its purpose is to regulate the construction, operation, profit and railway maintenance when used as a general communication mean; as well as the public rail transport service.
24	Agricultural Chambers Act	Transportation Sanitation / Processing Trading / Export and Import / Customs	Settles the basis for the organization and functioning of the agricultural chambers. The purpose is to promote the development of national agricultural activities.

Source: IMCO, 2014

Federal and state programs affecting agrologistics in Mexico

Federal general programs:

1. Simplifying administrative processes to lower administrative and logistic costs and improve control schemes.
2. Creation of Pro Mexico trust fund to promote foreign trade and foreign investment for food processing and food industry.
3. Financial support through credit and guarantees in Crediexporta from Bancomext to increase Mexican exports and import substitution.
4. International Promotion of SMEs of food and beverages industries among others.
5. The National Export Orientation System provides advice for exporters and SMEs in 32 states to diversify export markets for goods and services.
6. Incorporating companies into the Foreign Trade Enterprises Program (ECEX) for international trade.
7. Program to simplify red tape on High Export Companies.

Federal specific programs:

1. Promoting SMEs equipment to streamline the authorization of such products issued by its commercial partners in North America, boosting productivity of the livestock sector by facilitating the transfer of agricultural products into the country, amongst others.
2. Modernization of PROSEC schemes (Sectorial Promotion Program) for the establishment of new support programs for the national food industry, with an impact on the sugar industry, dairy, meat, fish, oil, flowers, fruits and vegetables, cereals and beverages.
3. Activities and rural extension. Promotion of producers' development of abilities, technological innovation, information access, and modern technology. Including producers' relationship with strategic partners.
4. Replace of marine engines in small boats (this works both for production and transport to markets).
5. Marine diesel program and gasoline energetic quota program for fishing and agriculture producers targeted for those properly registered.
6. Study of Mexican Fishing Sector Logistics for implementation of strategies and actions, which affect competitiveness on distribution channels of fishery products.

Treaties and agreements with the rest of the world:

1. Restart the negotiations for the Strategic Economic Complementation Agreement between Mexico and Korea.
2. Negotiate the Free Trade Agreement between Mexico-Colombia to facilitate the exchange of industrial and agricultural goods.
3. Negotiation of a protocol to facilitate Mexican exports of pork to China.
4. Strengthening and consolidating the Comprehensive Program for SMEs Mexico-European Union.
5. Reduction of tariffs on imports of wheat, soybean, bamboo plywood, and conifers, as well as inputs for the manufacture of toys, photographic paper and video projectors.
6. Tariff reductions in the sugar industry.
7. Reduction of tariffs on inputs and capital goods that caused a reduction in imports of wheat, which has a positive impact on the baking industry.
8. New tariffs on dairy, meat, fish, oil, flowers, fruits and vegetables, cereals and beverages.

Regulations of federal programs analyzed:

1. Commercialization and Market Development Program. This program seeks to encourage agricultural and fishing producers to sell their products in legal markets by providing marketing incentives as well as trade promotion and export development to producers.
2. Agricultural Development Program. This program objective is to increase agricultural productivity through incentives for integration of productive chains, development of agri-food clusters, investment in physical, human and technological capital, post harvest management, etc.
3. Food Safety and Health Program. The purpose of this program is to strengthen safety through the preservation and improvement of health conditions of agricultural regions, to reduce risks of contamination in farming units. The program is tailored to areas or regions where pests and diseases exist and production units as well as processing units. The program includes safety measures, inspection and creation of slaughterhouse inspecting establishments.
4. Directed subsidy to rural women through the Microfinance Funds Program (FOMMUR). To incorporate new intermediary agencies to increase access to financing as well as develop intermediary agencies accredited, to stabilize its permanence and foster the offer microfinance services. Nationwide, encouraging the expansion of the integral services of microfinance to those areas of the territory where there are rural women without access to commercial banking.

5. Competitiveness in Logistics and in Supply Centers (PROLOGYCA Program). The objective of this program is to promote the development of logistics by converting slaughterhouses to modern and efficient agri-food logistics centers, as well as to condition and equip establishments to facilitate the logistical efficiency of enterprises. The project is directed to firms that are related to logistics and supply in the agri-food sectors and it consists of monetary support (up to 40%) of total project costs, subject to evaluation.
6. Productivity support program for young and future rural enterprises. The purpose of this program is to develop organizational abilities to work in group; as well as technological, productive and business skills, to implement it in "Agribusiness". The project consists of giving direct support and liquid guarantees to rural inhabitants of 18-39 years who are interested in "Agribusiness" that meet the criteria of being marginalized but with productive potential.
7. Competitiveness program for sectors (PROIND). The purpose of this program is to improve integration of agroindustry production chains at a national level through capacity building, improving commercialization as well as improving investment and financial support.
8. Program of trusted producer. This program wishes to recognize those producers in the livestock industry that are not using clembuterol (tailored for breeders) and focusing on preventive actions and verification of production units as well as animal slaughterhouses.
9. Promoting financial and economic integration to access credit by Financiera Rural. The programs purpose is to finance rural productive chains either in production or commercialization through granting funds for capacity building, consulting and credit hiring in order to be able to improve credit penetration and constitute liquid guarantees either for producers or marketers.

State programs:
Nuevo León

1. COMPEX (Coordination Mixta para la Promoción de Exportaciones). Promotes exports through simplifying all paperwork and technical obstacles for exporting state products.
2. Business Link Center (Centro de Vinculación Empresarial). Supports providers of foreign companies in Mexico, promotes domestic industries in foreign markets through conventions, training etc.
3. FIDENORTE Nuevo León. Part of the programs works on improving technologies for slaughter animals and keeping them, as well as packing end products, as well as building agroindustrial plants.

Estado de México

1. Aid Program to Farmers SEDAGRONEGOCIOS. Bringing together buyers with farmers to reduce intermediaries.

The list shows that few states address agrologistics and most federal programs for the sector are mainly related to reducing tariffs, promoting exports and credit and reducing red tape.

Annex 12: Recent changes in regulation

In recent years there have been some legal reforms that will impact agrologistics in the coming years. The following changes are amongst the most relevant:

Table A12.1. Recent reforms impacting logistics

	Law	Date	Purpose of the Reform	Commentaries
1	Foreign Trade Act	2006	Establishes compensatory quotas to trigger trade.	It doesn´t have a high impact on agrologistics, yet quotas need to be revised constantly.
2	Import and Export General Tax Act	2007-2013	Tariffs have been mostly reduced in different sectors since 2007	The update of tariffs and fosters international trade.
3	Federal Plants Health Act	2007	Incorporates detailed definitions for the sector and promotes plant health, as well as implementation, verification and certification systems of contamination systems in vegetables production.	Needs to be harmonized with other regulations. This law regulates health of population. However, it lacks implementation mechanisms and coordination with different authorities that can help to meet the standard. The regulation of health care is an example of the complexity of the regulatory framework of logistics. It is necessary to harmonize and coordinate authorities to avoid duplication in health reviews.
4	Agricultural Chambers or Associations Act	2010	More faculties for chambers are settled. They can propose measures that they deem appropriate for the protection and defines them for its members. In addition, encourages the participation of women in productive chains and the production of agri-food products.	The reform creates a new type of local agricultural association that integrates specialized producers. It also establishes the National Confederation of Agricultural Producers. Agricultural associations are essential as they represent interests of members, encourage investment and promote the creation of mills, warehouses, refrigerating plants, packaging, etc.
5	Code of Commerce	2011	A new figure for oral trials.	Although this is a minor change in agrologistics it promotes efficiencies in related trials.
6	Federal Animal Health Act	2012	Introduces detailed definitions for the sector and attributions for the 3 levels of government. This reform sets the basis for the diagnosis, prevention, control and eradication of diseases and pests that affect animals.	It promotes clarity and necessary steps to be undertaken in agrologistics. However, as the Federal Plants Health Act, such regulation needs to be harmonized and coordinated with other authorities to avoid duplication in health reviews.
7	Public Private Partnerships Act	2012	Formalizes the partnership in long-term contracts and allows for more private sectors participation.	This reform should trigger more logistics infrastructure in the country within government plans or can propose them even when such plans are not contemplated by the private sector.

	Law	Date	Purpose of the Reform	Commentaries
8	Roads, Bridges and Federal Transport Act	2013	Necessary insurance is introduced for all vehicles circulating on federal roads.	Increases cost of agrologistics in the short term yet probably reduces it in the medium and long term. Through specific programs, government can reduce transportation costs and improve the competitive position of the country. To achieve the proposed benefits, it is required a flexible and diversified regulation.
9	Customs Act	2013	Different articles are being reformed to reduce paperwork and the traditional figure of a customs agent among others.	Improves rule of law and transparency as well as efficiency in customs. This reform is relevant for the agrologistics because today, customs agents and auxiliaries often imply additional costs. The reform allows importers or exporters to do the formalities in customs by themselves.
10	Mexican Constitution	2013	Allows Congress to homogenize the organization and functioning of all public registries of land property .	Improves transparency in authorization of infrastructure within municipal governments. Most of the procedures to build infrastructure are municipal procedures (issuance of an official number, incorporation into the land registry, licensing of operating and environmental impacts, among others), which use public property records information. Standardizing these records gives legal certainty to investors and improves agrologistics.
11	Financial Reform	2014	Changes in dispositions of general warehouses and more competition for storage in the agricultural sector.	Improves storage conditions by promoting competition and a new information system as well as allowing SAGARPA to have an active role in creating useful information of inventories. This reform includes the possibility to add value in agri-food products in the warehouses.
12	Navigation and Maritime Commerce Act	2014	The reform incorporates the service of pilotage or practice service and empowers the Ministry of Communication and Transportation (SCT) to issue certificates of skills.	The reform may increase time and costs for agrologistics if the SCT does not take responsibility of these particular regulations for each port. This reform can result in higher times for maneuvering in ports, as well as generate paperwork. However, if it is regulated properly, there will be a professional service and a minimum of quality assured through certificates of skills.

Source: IMCO with information from the mentioned acts.

Public Private Partnerships Reform 2012

The novelty of this Reform is that it allows the State to celebrate long term contracts to receive services form the private sector, as well as creating a single instrument to invest in infrastructure. Among the most important aspects of its 12 chapters is the possibility that the private sector proposes projects that the public sector has not requested; the possibility to finance; and the inclusion of indicators to evaluate their success, among others. To give more security to investors, if projects are suspended by the government before completion, the investors could receive compensation for all expenditures. In brief, the act allows sharing more risks with the private sector, by deferring public spending as the private sector undertakes all initial investment, limiting the public debt and allowing a better planning on the long term of local governments.

Financial Reform 2013

In the context of logistics this reform's main purpose is to modernize credit within General Warehouses. Such institutions are now responsible for the existence, quality and quantity of all merchandise that is received as deposit as well as the certificates of deposit issued. The Reform creates a new kind of General Warehouses for agri-food products and establishes a minimum capital for its establishment and operation. In case merchandise is abandoned the new process facilitates the process of clearing such merchandise within the market.

Also the new law allows certain processes that can be conducted in the General Warehouses to increase aggregate value of merchandise without changing the nature of the product. For all this to happen a new information system in charge of SAGARPA needs to be created to be able to keep up with inventories and take care of its quality (this responsibility must start a year after the Reform is approved). Among the new attributions proposed by the law to reduce uncertainty about certificates in warehouses, a public registry of certificates will be created which will be in charge of the Ministry of Economy (SE) and will give more legal certainty to participants through deposits and "bonos de prenda".

Customs Reform 2013

In general terms this Reform eliminates redundant procedures within international trade in order to promote flexibility and speed up the customs process. The downside is that the new regulation to accompany this new act has no specific date of publication. Among the most important changes this Reform promotes are:

- Open the possibility to use technology broadly in all commercial activities, such as electronic systems to verify regulations and reduce paperwork with authorities. In this way using IT will contribute to coordinate federal, state and municipal authorities within customs process.
- Foster greater transparency in customs.
- The possibility of exporters and importers to conduct their own transactions without the need of the customs agent (agente aduanal), one of the most important figures of the customs process today. SHCP has until December 2014 to publish the rules for individuals to import and export.
- The elimination of the second customs recognition.

Annex 13: SAGARPA's Expenditure

Table a13.1. SAGARPA's 2012-2013 Expenditure item (Million Pesos)

Item	2012 Expenditure		2013 Original *	
	Amount	% of Total	Amount	% of Total
1000 Personnel Services	7,095.50	10.34	6,965.50	9.24
2000 Materials and Supplies	886.80	1.29	992.00	1.32
3000 General Services	4,149.90	6.05	4,605.10	6.11
4000 Transfers, Allotments, Subsidies and Other Aids	55,878.90	81.42	62,449.90	82.82
5000 Movable, Immovable and Intangible Assets	384.80	0.56	0.00	0.00
6000 Public Investment	232.50	0.34	390.0	0.52
TOTAL	**68,628.40**	**100.00**	**75,402.50**	**100.00**

Source: SAGARPA, 2013

* Preliminary figures

Table A13.2. SAGARPA's 2013 budget allotted to the Programs (Million Pesos)

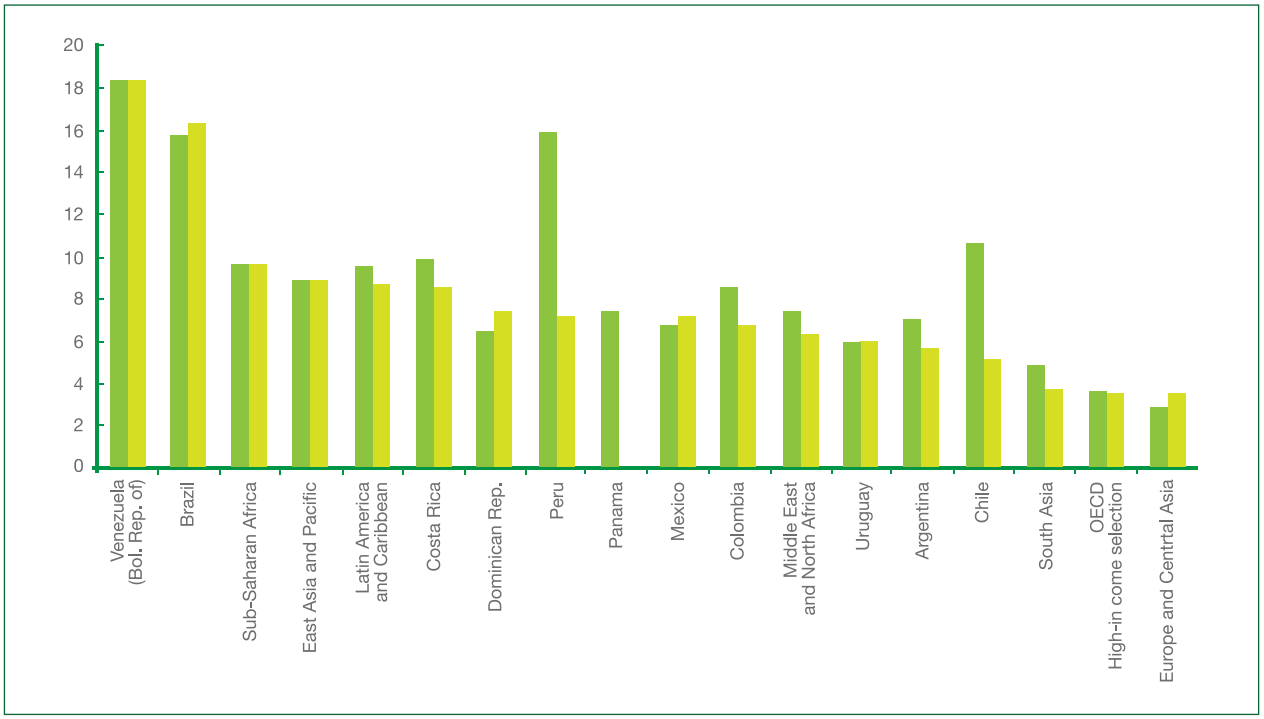
Programs	Original Budget	% of Total
Actions of concurrence with the States in investment, sustainability and development of capacities	3,755.00	4.98
Support for investment in equipment and infrastructure	9,795.00	12.99
Support of agricultural income	18,250.00	24.20
Risk prevention and management	18,250.00	24.20
Development of capacities, technological innovation and rural extension	4,570.00	6.06
Sustainability of natural resources	8,395.60	11.13
Development of agricultural and fisheries markets and information	710.00	0.94
Education and research	5,321.30	7.06
Administrative support	6,121.90	8.12
TOTAL	**75,402.50**	**100.00**

Source: SAGARPA, 2013

* Preliminary figures

Annex 14: Comparison of days needed to clear customs

Figure A14.1. Number of days needed for exports to clear customs



Source: The World Bank, 2014

Annex 15: Tariffs for specific agricultural sectors in Mexico

Table A15.1. Mexican imports of selected agri-food products

Product	Imports from the world				Share US imports of total imports		Tariff
	Average Volume 08-10 1'000 ton	Change from 1991-93 to 08-10	Average Value 08-10 %	Change from 1991-93 to 08-10	Value 91-93 %	Value 08-10 %	
Maize	8179.6	670.3	1854.6	947.7	99.0	99.3	0-20%
Sugar	4556.5	1031.5	649.7	413.1	43.5	73.9	10%
Wheat	3323.2	191.7	1006.8	484.0	58.9	76.1	45%
Sorghum	2101.0	-44.4	411.3	-3.9	99.4	100.0	No tariff
Rice	820.7	173.7	345.5	390.8	72.3	99.5	0 -5%
Poultry**	642.6	390.2	757.9	506.4	98.5	90.7	No tariff
Pork	478.4	664.1	843.3	791.5	78.3	90.5	20%
Beef	318.9	70.2	1152.7	198.6	81.1	84.6	20%
Milk	309.5	22.4	654.4	91.8	34.9	75.5	10-60%
Beans	129.1	852.6	126.1	1330.0	92.4	90.8	0-5%
Barley*	104.4	-1.1	43.3	214.7	68.9	57.8	60%
Tuna	33.9	1121.5	71.2	1451.3	81.1	4.6	No tariff
Egg	9.9	-10.6	33.2	159.8	82.0	99.9	No tariff
Coffee	8.0	218.8	54.8	912.3	45.2	54.6	20-60%
Shrimp	6.1	39.6	33.0	62.2	98.9	3.4	19%
Sugar Cane	2.1	-98.3	0.6	-98.1	25.2	84.6	No tariff

Source: UNCTAD, Desarrollo Agrícola de México: Perspectivas y Situación 2013, SE. http://www.siicex-caaarem.org.mx/

* Tariffs are applicable from January 2014 and are completely eliminated by January 2017,

** No tariffs since November 24, 2012

MÉXICO

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