



## REVISITING THE AGRIBUSINESS INDUSTRY IN MEXICO

Área de investigación: Entorno de las organizaciones

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### Abstract

Mexico has a competitive advantage as a result of its available fertile land, where the possibility, of cultivation of diverse types of crops, in a large scale, exists. Nowadays, Mexico is already one of the main producers and leading exporters of various fruits and vegetables. For example, avocado, tomato, guava, mango, papaya, melon, watermelon, asparagus and frozen orange juice. But weaknesses and threats limit the effective functioning of the Agribusiness sector.

The purpose of this research is to two-fold. From the theoretical side, this research aims to identify main factors that limit the efficient operation of the Agribusiness sector in Mexico. From the practical side, this research aims to suggest alternative solutions to reduce the risk of volatility of future food production, in the country. After reviewing secondary sources and conducting an exploratory industry analysis of the Agribusiness sector, authors identify strengths, weaknesses, opportunities and threats (SWOT) affecting growth in this industry. Key theoretical factors comprise climate change, obsolete technology, limited foreign direct investment (FDI), as well as, inefficient infrastructure and excess in bureaucracy. Practical recommendations focus on the following. First, we suggest to bring more and better foreign direct investment in the Agribusiness industry in México. This should finance more research and development (R&D) of genetically modified organisms (GMO). One way to do so is through joint ventures. Second, the use of a decentralized system for the public bidding in Mexico. Authors recommend to revise the one, currently working in the United States and make the necessary adaptations for the Mexican context.

**Keywords:** Agribusiness, Industry analysis, Mexico.

### Introduction

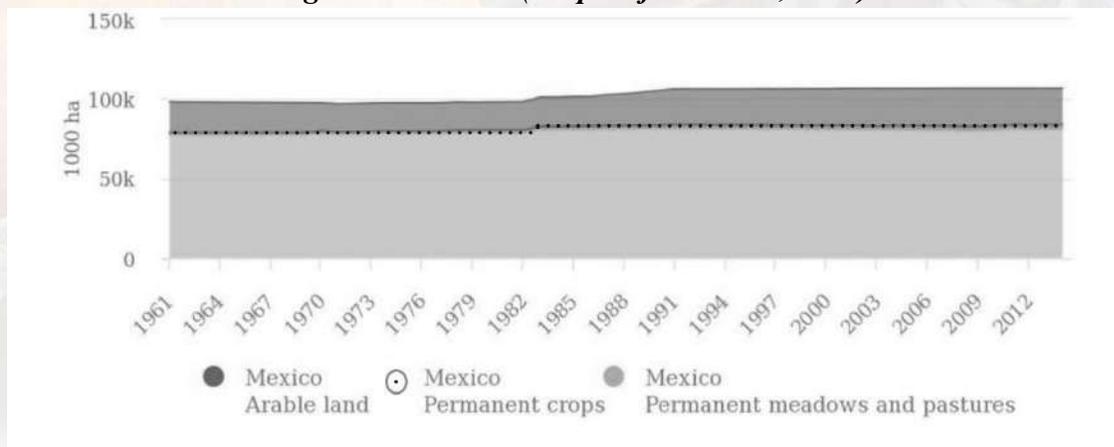
Mexico has a competitive advantage as a result of its available fertile land, where the possibility, of cultivation of diverse types of crops, in a large scale, exists. Nowadays, Mexico is already one of the main producers and leading exporters of various fruits and vegetables. For example, avocado, tomato, guava, mango, papaya, melon, watermelon, asparagus and frozen orange juice. But weaknesses and threats limit the effective functioning of the Agribusiness sector.

According to The Food and Agriculture Organization of the United Nations (FAO, 2015), Mexico increased its arable land since more than 25 years ago. It started in the decade of 1990's (See Figure 1). Nowadays, the country has an



area of over 25,500 hectares dedicated to organic produce, with a total organic production of 104,400 tones (FAO, 2015).

**Figure 1**  
**México's agricultural area (adapted from FAO, 2015)**



However, in spite of its advantages -large land to cultivate and a range of climates that help agribusiness, through out many regions in the country– In 2016, this sector only represented 4.9% of the GDP, this is 50,591.2 USDmn (FAO, 2015).

At the end of the decade of the 1970's Mexico started changing its industrialization model of Import-substitution for an Open-market one (Torres and Rojas, 2015). The Import-sustitution model of industrialization by the time had affected some sectors more than others. In particular, the Agriculture and Livestock had felt behind, resulting in trade disparities. (Guillén Romo, 2001).

Open-market policies have not being able to eradicate the enormous variance within the Agribusiness sector. After NAFTA, producers of tomatoes, avocados, live cattle, fresh fruits and vegetables have been able to benefit from trade (Williams, 2004). While Mexican producers of corn, beans and sorghum, who face strong American competition, have struggled. American producers are subsidized from their government and enjoy larger land holdings (Alvarado, 2008). Situation that cause serious difficulties for Mexican ones. Large demand for corn in Mexico caused an increment in imports when producers where not ready to compete.

Since Mexico changed to favor open market policies, especially in the last 25 years of NAFTA, policy makers also have privileged other industrial sectors. For example, manufacturing. These decisions are understandable and have been productive for the country at large. Since NAFTA, the Mexican government has diversified national production and has prevented too much dependence on commodities, which are more volatile and negatively affected by natural hazards.





But, not paying enough attention to the Agribusiness sector, for a long time, surely has negative consequences too. Current Mexican private and public resources in the sector are limited. At the same time, international competition is forceful. On top of that, foreign direct investment in this sector, in Mexico, has been decreasing in the last years. In 2017, the agribusiness industry received only 0.3% of the total foreign direct investment (FDI) in Mexico (i.e. 90.7 USDmn) (Secretaría de Economía, 2017). From the 7.896 billion dollars of FDI, that Mexico received during the first trimester of 2017, just 0.2% (i.e. 13.9 million dollars), went to the Agribusiness sector. The resources came from 5 main countries: Netherlands, Switzerland, USA, Japan and Luxemburg (González, 2016). Clearly, if Mexico wants to be competitive, internationally in this sector, there is a need to revisit the Agribusiness Industry in Mexico and propose solutions to improve.

The purpose of this research is to two-fold. From the theoretical side, this research aims to identify main factors that limit the efficient operation of the Agribusiness sector in Mexico. From the practical side, this research aims to suggest alternative solutions to reduce the risk of volatility of future food production, in the country. After reviewing secondary sources and conducting an exploratory industry analysis of the Agribusiness sector, authors identify strengths, weaknesses, opportunities and threats (SWOT) affecting growth in this industry.

### Industry Analysis of the Agribusiness in Mexico

In 2013, Mexico exported 24 million dollars of agri-food products. Becoming this way, the leading exporter of various fruits and vegetables (ProMexico, 2016). According to the Global Competitiveness Report 2016 (GCI) (Sala-i-Martin, Crotti, Baller, Di Battista, Drzeniek-Hanouz, Geiger, Gómez Gaviria, Marti, 2016), Mexico is in the 51<sup>st</sup> place of 138 countries in Global Competitiveness. But it is in the 11<sup>th</sup> place (the closest the position to one the better), within the market size indicator, with a score of 5.64, in a scale of 1 to 7. In spite of its long way to go on competitiveness at the global scale, the last indicator is aligned with the conclusion that Mexico is the largest market and most competitive in Latin America and the Caribbean. This report included in its measure, domestic and foreign markets, with the purpose of acknowledging export-driven economies, and geographic areas that are divided into many countries, but have a single common market (Sala-i-Martin et.al., 2016).

On the other hand, in the Global Innovation Index 2016 (GII) (Cornell, INSEAD and WIPO, 2016). Mexico ranks in the position 61<sup>st</sup> out of 128 countries. But, in the market scale, it is in the 24<sup>th</sup> place (the closest the position to one the better), with a score of 73.0. This is a strength that should be capitalized by Mexico. But, in the category of market sophistication, Mexico has a score of 45.7 out of 100, placing it in a 51<sup>st</sup> place. Also, in business sophistication, Mexico got a score of 29.8 and a place of 77<sup>th</sup>. Looking at these



last indicators, and considering the current limited public and private resources in the sector, one might theorize, that venture capital could help Mexican producers to overcome these particular weaknesses.

The indexes, previously stated, show the potential of the Mexican market. Potential because it can be open to improvements, in order to attract FDI, and increase its business and market sophistication. Mexico is one of the main producers of various agro-foods, but it needs more investment. If investment does not come from domestic investors or government funding, it should be reached by attracting more FDI to the sector.



According to BMI (2016b), by 2020, 60,721 USDmn (only 4.2%) of the GDP would be agribusiness related. This is not a favorable forecast for the agricultural sector. If the middle-upper class in Mexico continues growing, by 2020 domestic demand will continue growing too, and the industry should be able to supply (BMI, 2016c). In addition, Mexico is already an exporting leader of fruits and vegetables. Therefore, Mexican production should be more efficient to be able to keep exporting. Also, forecasts announce that demand for the Livestock sector can increase. Economic growth and rising per capita incomes will boost domestic demand further, along with investments made by fast-food companies (BMI, 2017). Mexico then, needs to find a ways to improve the Agribusiness industry in order to satisfy upcoming demands.



The negotiation for a bilateral trade agreement, with the European Union (EU), related to organic produce, could push the agribusiness in Mexico to higher efficiency, in order to meet the rising domestic demand, as well as, the new foreign demand.



Currently, it is relatively ease of get credit in Mexico, as stated in the GII (Cornell, INSEAD and WIPO (2016). This ranking gives to Mexico, the 5<sup>th</sup> position in this classification. This information is reaffirmed by the increase of the agribusiness' financing, through banking and non-banking institutions. The financial support to the producers would have a positive impact for the development of this sector. This can also have higher yields, as long as more capital is used to increase productivity.

Another key influential factor for productivity is climate change. There are numerous negative effects that climate change would have on human life, one of them is the disruption in the food production and water scarcity that would lead to a strain due to lower food supply. (BMI, 2016a).



As stated before, there should be an expansion in food production in order to satisfy a new and increasing demand. In the short and mid-term food supply can met requirements, using current available land for crops, but in the long-term, food security could remain precarious is the Mexican Agricultural sector does not improve. Continuous growth in domestic demand, in the long run, could not be met also if in danger because of natural hazards. This can eventually limit

yield and arable land growth in Mexico (BMI, 2016a). When supply is scarce, prices increase and this will bring other types of problems to the country too (i.e. economic, social, political).

Mexican government does have actual climate friendly solutions for the agriculture to promote renewable energy and their use. Some of them are focused in an efficient consumption of energy, sustainable management of waste and conversion of biomass to a source of energy. “The project, implemented by the Shared-Risk Trust Fund (FIRCO) as part of SAGARPA, and with the support of the World Bank, has been demonstrating tangible results since 2010” (World Bank, 2016). The implementation of the proposal in small agricultural producers was a challenge addressed by a simplification of the process in 2015 with an online platform.

Actions like this one, plausible and accessible, would help diminish the effects of climate change in agriculture, but there is still the need for long term solutions that would tackle the possible future food supply disruption.

Biotechnology is a trend that has shown fast and strong progress for the past 7 years and it is expected for its value to continue increasing with an annual growth rate of 2.2% (see Figure 2)

**Figure 2**  
**Biotechnology value progress (adapted from ProMexico, 2016)**

Year	Value (USDmn)	Annual Var. (%)
2010	275.8	1.2%
2011	268.6	-2.6%
2012	285.8	6.4%
2013	302.6	5.9%
2014	298.9	-1.2%
2015	306.8	2.7%
2016	336.4	9.7%
2017	343.4	2.1%
2018	351.7	2.4%
2019	358.5	1.9%
2020	365.9	2.1%

The research and development of this technology is distributed differently at a global scale, Figure 3 represents the establishments focused on the development of biotechnology and its application by region:



**Figure 3**  
**Distribution of establishments specialized**  
**in biotechnology (adapted from ProMexico, 2016)**



Compared to all the other mentioned regions, South America and Central America are considerably behind. USA is the biggest investor in this area with 11,367 companies working with biotechnology, followed by Spain with 2,831, France with 1,950 and Korea with 939.

Biotechnology in Mexico in relation to research, development and commercialization is in the phase of expansion and diversification (ProMexico, 2016). There are cost related factors and skilled labor availability that make Mexico an attractive nation for the development of biotechnology. According to the same analysis, there are about 260 universities that offer an approximate of 190 degrees directly and indirectly related to biotechnology. In 2015, approximately 2,400 alumni graduated from biotechnology related degrees. In Mexico, there are around 9,500 researchers in areas related directly to biotechnology. (ProMexico, 2016). The GII classified Mexico in the 17<sup>th</sup> place with a score of 26.9, a strength in the graduates in science & engineering (Cornell, INSEAD and WIPO (2016); while the GCI ranked Mexico in the 55<sup>th</sup> place with a score of 4.1 out of 7 in availability of scientists and engineers ((Sala-i-Martín et.al., 2016). Both give the country a respectable place in their respective rankings that support ProMexico's statement.

Although, there is skilled labor, the indexes do not show a favorable context in Mexico for the reception of technology. The GCI placed Mexico 73<sup>th</sup> of 138 economies with a score of 4.0 out of 7 in technological readiness, company spending on R&D an 76<sup>th</sup> rank with a 3.2 score, government's procurement of advanced technological products place 88<sup>th</sup> with a 3.0 points ((Sala-i-Martín et.al., 2016). The GII gave a low of score of 0.5 out of 100 and rank 59<sup>th</sup> in the gross expenditure on R&D and an overall score of 26.4 and 41 place in the R&D pillar (Cornell, INSEAD and WIPO (2016). The results of both reports show a



lacking investment in the R&D, key area for the development of biotechnology in Mexico.

Currently, there are 75 companies working with genetically modified organisms for agricultural purposes in, the country (Secretaria de Economía, 2015). A small quantity when compared to European and North American nations. BMI (2016d) states that with an international context of lower land resources and environmental degradation, there is a need of efficiency through the use of technology in agriculture. The growing pressure in economies will lead them to invest in technologies that will assess the food security issue. This should also drive Mexico to invest more in the development of genetically modified organisms in its agribusiness, in order to reduce the strain in the food supply caused by climate change.



In Mexico, it is The National Service Seed Inspection and Certification (SNICS) of SAGARPA, who regulates and promotes seed, plant varieties and generic resources matters. Here is where the Plant Variety Law is ruled (SNICS, 2017). The main idea of this law is to provide national and international producers with judicial certainty and equitable retribution. Registration of Plant Variety represents a State recognition, given to whom makes the registration, of the specific improvement in the vegetable species (SNICS, 2117).



Another key challenge for this sector in Mexico is its obsolete infrastructure. According to GCI, efficient infrastructure is essential for ensuring the effective functioning of the economy. Effective modes of transport, including high-quality roads, railroads, ports, and air transport, enable entrepreneurs to get their goods and services to market in a secure and timely manner and facilitate the movement of workers to the most suitable jobs (Sala-i-Martín et.al., 2016). This index measures the infrastructure with the quality of roads, railroad, ports, air transport, electricity supply, and telephone lines. Here, Mexico a score with 4.3 out of 7, ranking in the 57<sup>th</sup> place.



The GII also has infrastructure as pillar, in this report the infrastructure is considered because it facilitates the production and exchange of ideas, services, and goods and feed into the innovation system, through increased productivity and efficiency, lower transaction costs, better access to markets, and sustainable growth (Cornell, INSEAD and WIPO (2016). Both analysis talk about the efficiency in production and its relation to infrastructure, but the GII gave Mexico 42.8 points out of 100 and is ranked 67 of 128 nations.



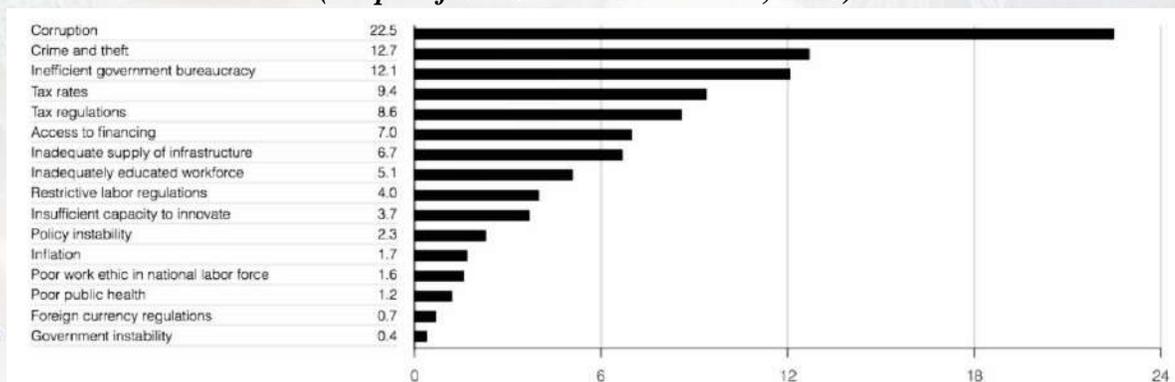
The poor Mexican infrastructure shown in the past data demonstrate the limiting the production growth that have a divided sector of small farms that have low yields along with low competitiveness, a weakness and opportunity area of Mexico. These reports and its respective ranking regarding infrastructure also show a positive tendency because of the better results, in comparison with past years, this means that the governmental actions for fixing and creating new roads, financing support and the climate friendly solution implemented since

2010 are giving positive results, and more efforts like this are needed.

The GCI (Sala-i-Martín et al., 2016) includes a survey about the business environment. This survey asks executives about the most important factors that facilitate entrepreneurship. It also asks about skills gap, and the incidence of corruption. Mexico has the third largest sample with 304 valid surveys. There were out 141 economies surveyed. The results show the most problematic factors for executives when doing business in Mexico (see Figure 4).



**Figure 4**  
**Most problematic factors when doing business in Mexico**  
(adapted from Sala-i-Martín et al., 2016)



From the figure, one can notice that the top three problems are: corruption, crime & theft, and inefficient government bureaucracy. Other weaknesses that were mentioned previously were the lack of infrastructure and the access to financing. In the agribusiness sector the first problem is a persisting one, while the latter is being solved by the increase in the banking and non-banking institutions' agribusiness portfolio. The inefficient government bureaucracy is a weakness to which this paper proposes a solution, specifically in the public bidding process. An extensive process to participate in the public agricultural biddings disincentive potential participants, therefore damaging local competitiveness.

Lack of transparency when granting contracts to potential providers, is other factor that decreases the efficiency of public biddings. According to Santillán (2017), from 2011 to 2016, two out of three contracts were given in a direct way (without contesting). Even though the quantity of directly awarded contracts surpass the public bidding ones, the capital represented by the public biddings was 1,558 million and 637 thousand MXN pesos in comparison to the 698 million and 178 thousand pesos of the adjudicated ones. This happens because the Mexican regulatory framework allows for direct awards, when the amount of the contracts is low (Santillán, 2017). Therefore, most of the small contracts were given by this method. This harms the Mexican state, as it reduces its chances of obtaining better price and quality related conditions, as well as, the possible expansion of production driven by effectiveness.

See Figure 5 for a summary of our findings on the SWOT analysis for the Agribusiness industry.

**Figure 5**  
**SWOT analysis for the Agribusiness Industry**

Strengths	Weaknesses
<ul style="list-style-type: none"> <li>• Available fertile land and a range of climates for large and diverse crops</li> <li>• Leading exporter of various fruits and vegetables (e.g. , avocado, tomato, guava, mango, papaya, melon, watermelon, asparagus and frozen orange juice)</li> <li>• Largest market in Latin America (Mexico has place 11<sup>th</sup> in Market size in GCI)</li> <li>• Experience with climate friendly solutions (e.g. SAGARPA &amp; World Bank projects)</li> <li>• 190 university programs in Mexico related to biotechnology</li> <li>• Low costs and skilled professionals available for biotechnology development</li> </ul>	<ul style="list-style-type: none"> <li>• Inefficient infrastructure</li> <li>• High incidence of corruption</li> <li>• Excessive bureaucracy in the public bidding process</li> <li>• Low investment in biotechnology</li> <li>• Only few companies working on genetically modified organisms</li> <li>• Low business and market sophistication (places 77<sup>th</sup> &amp; 51<sup>st</sup> correspondingly for Mexico in GII)</li> <li>• Lack of investment in R&amp;D (place 59<sup>th</sup> for Mexico in GII)</li> <li>• Country-level low global competitiveness (place 51<sup>st</sup> for Mexico in GCI)</li> <li>• Country-level low global innovation (place 61<sup>st</sup> for Mexico in GII)</li> <li>• Country-level low score on technological readiness (place 73<sup>th</sup> for Mexico in GCI)</li> </ul>
Opportunities	Threats
<ul style="list-style-type: none"> <li>• Favorable negotiations for a bilateral trade agreement with the EU and other regions (diversification)</li> <li>• Agribusiness finance by banking and non-banking institutions.</li> <li>• Easiness for credit adquisition (place 5<sup>th</sup> for Mexico in GII)</li> <li>• Gubernamental support for the use of renewable energy in agriculture</li> <li>• Creation of more research centers</li> </ul>	<ul style="list-style-type: none"> <li>• Fast-growing domestic demand, with limited capacity to satisfy it, risk of high dependency on imported products</li> <li>• Effects of climate change in agriculture (e.g. water scarcity)</li> <li>• Volatile prices</li> <li>• Strong International competition</li> <li>• Organized crime</li> </ul>



## Conclusions and Recommendations

The purpose of this research was to two-fold:

From the theoretical side, this research aimed to identify main factors that limit the efficient operation of the Agribusiness sector in Mexico. After doing the revision, the key theoretical factors, that we found, comprise the following: inefficient infrastructure, corruption and bureaucracy, as well as, low R&D, constrained innovation, obsolete technology, limited foreign direct investment (FDI) and climate change risks.



We also found that this sector is not homogeneous. Some subsectors, for example producers of tomatoes, avocados, live cattle, fresh fruits and vegetables, are more competitive than producers of corn, beans and sorghum, who face strong American competition.

From the practical side, this research aimed to suggest alternative solutions to reduce the risk of volatility of future food production, in the country. After doing the revision, we make the following practical recommendations. First, we suggest to bring more and better foreign direct investment in the Agribusiness industry in México. This should finance more research and development (R&D) of genetically modified organisms (GMOs). One way to do so is through joint ventures. Second, the use of a decentralized system for the public bidding in Mexico. Authors recommend to revise the one, currently working in the United States and make the necessary adaptations for the Mexican context.

The increment of investment and development of biotechnology, in the agribusiness sector, can improve its share in the GDP of Mexico. But, this time, it won't be by primitive and fragile productive activities, like in the past it was. In the future, it has the potential to be, in a more stable and value-added form, using state of the art technology for the production and conservation of food, minimizing natural hazards and capitalizing innovation on GMOs. Even though infrastructure troubles are a challenge, not yet resolved, the increase in financing by banking and non-banking institutions for farms would help to mitigate problems.

On the other hand, the proposed solution, for public bidding, can increase the participation of small and medium sized companies. This would be achieved by the use of a decentralized system, with simplified procedures, assuring fair competition. A friendlier process would motivate the participation for public bidding that would lead to new techniques of production that aim for production and cost efficiency due to the competitive nature of the bidding. In regards to the direct awards, a more agile process for different sizes of public bidding should also motivate the government to increase its use due to the faster results and better deals, in contrast with those awards that have little opportunity to compare different options.



It was previously stated the low percentage of FDI, in the Agribusiness industry, in Mexico. In addition, the tensions with the US and NAFTA negotiations have made the scenery for FDI, in agriculture, more complex due to uncertainty. Mexico needs to keep promoting collaboration with other nations that have more advanced technological knowledge, in the interest of overcoming the possible future food supply disruption, caused by climate change.



### Limitations and Future Research

This research was a theoretical revision, based on secondary data. Its exploratory type has several limitations. On one hand, although the literature review includes recent and related documents, this one is not an in-depth revision yet. Future research should continue searching for documents that can add specifications to this case. On the other hand, practical recommendations follow a rationale based on the literature review. Future research would benefit by conducting empirical inquiry and by including information from primary sources. Since this sector is not homogeneous, a continuation of this research can start by analyzing subsectors of the agribusiness industry in detail. Asymmetrical differences in power, R&D, technological means, and troubles with property rights should be examine in a forthcoming quest.

Since the evaluation of the efficacy of Plant Variety Law and SNICS is out of the scope of this exploratory research, we did not assessed its impact yet. However, further research about GMOs in Mexico may benefit from a revision of these information (SNICS, 2017).

In spite of these limitations, we consider that this paper's advances knowledge in the field because it analyzes an important industry in Mexico that is under documented. It also integrates elements that previous analysis did not consider. Finally, because this research makes two original and practical suggestions that are not included in other reports and should be subject of consideration and further evaluation of policy makers in Mexico.

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