ASPARAGUS IN PERU

Microeconomics of Competitiveness

Kaveh Azimi | Claudio Ferrero | Jaime Loucky
Hely Olivares | Agnes Rojas

Boston, May 2012
Executive Summary

This paper analyzes the core components of Peru’s agricultural competitiveness, focusing primarily on the asparagus production cluster concentrated in the Ica and La Libertad regions of Peru. The paper draws upon a variety of data sources, including interviews with leading Peruvian asparagus producers.

At the national level, Peru has seen significant economic growth due mostly to increasing world commodity prices, particularly in minerals. Emerging from a past, Peru has exhibited strong growth over the past decade, while prudent fiscal and macroeconomic policies have provided consistent stability. Further, foreign direct investment (FDI) has increased significantly on the heels of new free trade agreements (FTA) and improved investor protections. Nevertheless, the development of the country’s political institutions lags behind, and consequently, education quality and poverty alleviation metrics have underperformed.

Peru’s asparagus production cluster is highly competitive in both the fresh and processed market. Globally, Peru is the leading fresh producer and second leading processed producer. While the cluster has experienced uneven growth, its success is built on major irrigation infrastructure investment and has coincided with a wave of FTA and increasingly stable macroeconomic conditions.

To maintain Peru’s competitive position, the country should focus on continued improvements in education quality, innovation capacity, IFC development, input quality, and infrastructure expansion, aided in particular by greater leverage of public-private partnerships.
1. Peru Country Analysis

Peru is an Andean country in western South America with a multi-ethnic population of approximately 29.5 million and a 2010 per capita income (PPP) of nearly $10,000 (IMF 2010). Primarily Spanish-speaking, Peru benefits from a strong and stable system of government, a diverse variety of climatic zones and a long coastline allowing access to the rich fishing waters of the Pacific Ocean. Peru also enjoys relatively open borders with its neighboring countries, including Ecuador and Colombia to the north, Brazil to the east, Bolivia to the southeast and Chile to the south.

a) Economic Performance

Peru has experienced impressive economic growth over the past decade, with significant increases in real GDP growth and GDP per capita. Despite a sharp downturn in 2009 due to the global financial crisis, Peru’s economy has rebounded sharply, outpacing average regional growth rates and making Peru one of the fastest-growing countries in Latin America (IMF 2010).

Peru’s economy remains focused primarily on services (55%) and industry (35%), with agriculture composing only 10% of the economy in 2010 (CIA 2012). Peru’s growth over the past decade has been driven mainly by gains in the metal, mining and manufacturing clusters, as well as the jewelry and precious metals industries.
Agriculture, which employs up to 30% of Peru’s rural population, has seen gradual declines over the past decade.

b) Social Infrastructure and Political Institutions

In general Peru’s economic growth has resulted in significant declines in national poverty levels, from nearly 45% in 2004 to less than 25% in 2010 (World Bank 2010). However, because much of this growth has been focused in the extractive industries, poverty rates remain high in rural areas, particularly in the mountain and lowland areas.

In addition to high levels of rural poverty, Peru has seen mixed progress on basic social and political indicators. Over the past decade the country has seen significant improvements in reducing government wastefulness and decentralizing economic policymaking, as well as improvements in legal efficiency and property rights. However the country has struggled with growing corruption and diversion of public funds, as well as decreased primary school enrollment and low quality of primary and secondary education (ISC 2012).

c) Productivity

Furthermore, Peru’s productivity continues to lag far behind the Latin American average, with Peru’s GDP per person employed currently close to $15,000, compared to the average of nearly $20,000 (Conference Board 2012). Peru lags far behind most other countries in innovation and patent rates and its has seen widespread declines in the
quality of its scientific research institutions, quality of math and science education and availability of scientists and engineers (ISC 2012).

Overall, this suggests that Peru’s economy may be overly reliant on capital-intensive, endowment-based extractive industries, including mining, oil and precious metals. Increasing the performance and efficiency of alternate economic clusters, including agriculture, will therefore be a key factor in improving overall economic performance and related social and political indicators.

2. Macroeconomic Factors

The past decade has seen Peru demonstrate solid fiscal discipline and strong macroeconomic policymaking. Historic government deficits, mounting debt, and runaway inflation have disappeared in the face of prudent policies. Since 2000, Peru’s inflation-targeting framework has kept inflation within a 1-4% bound, save for two years (EIU 2012). During this period, Peru recorded average annual inflation rates of 2.6% versus 6.8% for Latin America. Public debt as a percentage of GDP has decreased steadily and now stands at less than half the regional average. Budgetary surplus is the new norm in Peru. Except for two years following the global financial crisis – when the government pursued a countercyclical response to the economic downturn – the government has avoided a budget deficit since 2005. And according to IMF analysis, Peru’s free-floating Nuevo Sol is among the most stable currencies in Latin America.
(IMF 2012). On the heels of this successful decade, Peru was awarded investment grade status by leading bond-rating agencies in 2008, and then upgraded again to BBB in 2011 (Bloomberg 2011).

Source: Economist Intelligence Unit

3. National Business Environment

a) Factor Conditions

In terms of competitiveness of factor conditions, Peru’s relative ranking on the GCI has stagnated since 2001 and the country now places behind the region’s top performers. Peru’s poor showing is due to dreadful education quality, inadequate physical and logistical infrastructure, and weak innovation capacity. Over the past decade, primary school enrollment has worsened and Peru’s education quality now ranks as one of the worst in Latin America. On the World Bank’s Logistical Performance Index (LPI), Peru lags behind regional leader Brazil on all but one measure. The country’s air and ground transportation rank 78th and 121st respectively on the LPI, reflecting an inability to
provide efficient transport of goods to international markets. Further, the Association of Private Pension Funds estimates Peru’s infrastructure gap at close to $35 billion. The same group estimates it takes 70 months to bring an infrastructure project from proposal to execution (Emerging Markets 2012). Finally, with a poor education system, low public spending on R&D (0.15% of GDP; 1/3 of Mexico), and few examples of university-industry collaboration, Peru ranks poorly on labor force and innovation capacity metrics. As illustrated below, these weaknesses conspire against Peru as it strives to upgrade and deepen existing clusters.

In positive developments, Peru is in its “demographic window” with 65% of the population at working age. The increase in the ratio of working age population to dependents should boost national productivity and diminish the burden of dependents on the state. Peru also benefits from an advantageous geographic position, which includes abundant natural resource endowments like agricultural, aquaculture, and mineral deposits. In 2009, agriculture, fishing, and mining accounted for 78% of total exports (Ernst & Young 2011).

b) Context for Firm Strategy and Rivalry

With open FDI, trade, and capital flow policies and strong investor protections, Peru has created a highly competitive environment for firm strategy and rivalry. Between 2001 and 2011, Peru improved its ranking on this metric from 49th to the 30th position, demonstrating the country’s efforts to strengthen competition policy. However, moving forward Peru will need to address the high informality of its labor force (~70%) and the difficulties in business formation. According to the World Bank’s enterprise surveys,
Peruvian entrepreneurs complain that competition with unregistered, informal economy firms is a disincentive for greater investment and business upgrading (World Bank 2010).

Peru’s growth strategy is premised on opening up domestic markets to foreign capital and expanding access abroad for Peruvian producers through FTAs. Peru has recently entered into a wave of FTAs, with countries including Canada, China, Chile, the European Union, Japan, Panama, Singapore, South Korea, Thailand, and the United States. Concurrently, Peru has reformed investor protections at home to attract greater inflows of FDI. As a signatory to the World Bank’s Multilateral Investment Guarantee, Peru promises equal treatment of foreign and local companies, including access to preferential intra-Andean community tariffs, tax incentives, and eligibility for

Source: Professor Michael E. Porter; Institute for Strategy and Competitiveness; Revised with Team Analysis
development financing. Peru offers foreign investors 100% equity ownership in all economic sectors, with the exception of transportation. Due to open FDI policies, and reformed investor protections, FDI inflows spiked from $4.8 to $7.5 billion between 2009 and 2011. However, FDI inflows are concentrated in the extractive industries, telecommunications, and the financial services industry, reflecting the need to diversify Peru’s national production and export baskets.

c) *Related and Supporting Industries*

In spite of the high informality, local firms are improving products and services and Peru offers high-quality local suppliers. However, cluster development remains shallow and national cluster initiatives scarce. As a result, the breadth and quantity of related and supporting industries is quite limited. Part of Peru’s constraints can be traced to the country’s poor tradition of collaboration between the public and private sector. In addition, with venture capital financing limited and a high-level of firm informality, Peruvian entrepreneurs face considerable obstacles in accessing financing to launch and grow businesses.

d) *Demand Conditions*

Local buyer sophistication is improving in Peru, but demand-side conditions are constrained by stagnating domestic incomes. Between 1991 and 2008, domestic incomes grew at a compound annual growth rate of -0.004%, effectively remaining unchanged nearly two decades later. Nevertheless, Peru ranks 38th on the GCI metric of buyer sophistication – up 27 places from 2011. While local producer enjoy access to numerous international markets in regions across the globe, exports, particularly in
agriculture, remain heavily concentrated and over-dependent on several key markets. As such, Peruvian producers have yet to take advantage of the market opportunities afforded by the wave of FTA signings. One positive development, however, is that after ten years of intense debate, Peru’s Consumer Protection and Defense Code entered into force in 2010. The new law protects Peru’s consumers with demanding new regulatory standards in the areas of advertising, sales promotion, telemarketing, and product labeling.

4. Asparagus Cluster Analysis

a) **Global Market Share**

Asparagus is a spring vegetable grown in green and white varieties. The asparagus world market is divided into two main segments: fresh (35%) and processed – canned and frozen – (63%). Fresh green asparagus are mainly consumed in the U.S.A. and
white canned asparagus in Europe. The world’s largest producer is China with almost 90% of the total production, followed by Peru (4%) and Germany (1.3%). About 80% of China’s production is consumed domestically (ISO 2011).

Peru is the leading exporter of fresh asparagus, with 41.8% of the world market share in 2009, followed by Mexico (23.4%), the U.S. (9.7%) and Netherlands (4.2%). Peruvian fresh asparagus main destinations are the U.S. (71.8% of overall U.S. fresh asparagus imports) and Europe. In the segment of processed asparagus, in 2009 the world’s top two leading exporters were China (48.3%) and Peru (39.8%). The United States market pays lower prices per metric ton (MT) relative to most EU markets, which pay a premium for quality.

b) Average Import and Export Prices

In the asparagus cluster, productivity is also enhanced by allocating the production of each country to the markets that pay higher prices per MT. In 2008-2009, Japan, Belgium and Switzerland had the highest average import price for fresh asparagus, while Switzerland, France and Austria had the highest average import price for processed asparagus. In 2008, United States, France and Netherlands had higher average fresh asparagus export prices than Peru, while Spain, Germany and France had higher average processed asparagus export prices than Peru.

This evidences that European Union and U.S. exporters of fresh and processed asparagus are more productive than the Peruvian exporters because they are able to secure higher average prices for their products. This is probably explained because they
benefit from a quality premium and they have better commercial relations with high-end costumers.

c) **Formats, Margins and Demand**

Fresh asparagus has higher gross margins than that exported in preserved format, while the preserved format has higher gross margins than that exported in the frozen format. However, given fresh asparagus higher price point, it attracts less consumer demand than the other formats (Camposol 2012). According to ISO, since the 1990s the trade of fresh asparagus has been growing continuously, while preserved/canned asparagus has stagnated since the 2000s.

Demand for nutritious fresh vegetables as asparagus is growing in developed countries, but they are price sensitive in times of financial distress and when it is possible to find substitutes like broccoli or artichoke.

**5. Cluster Region Analysis**

a) **Overview**

Peruvian asparagus production is concentrated in 7 regions:

- North: Piura, La Libertad, and Lambayeque.
- Center: Ancash and Lima.
- South: Ica and Arequipa.

The regions of Ica and La Libertad alone represent 83% of national asparagus production, with 39% and 44% of the total, respectively. Green asparagus accounts for 87% of national production. In La Libertad white processed asparagus is the main
produce, while in Ica production is mostly of green asparagus. Total planted acreage has nearly quadrupled since 1988 (Peru 2012).

GDP growth in Peru’s top asparagus producing regions – Ica and La Libertad – has outperformed the national average. During 2001-2010, Ica had the highest average annual GDP growth among the 24 regions of Peru. In 2009, adequately employed workforce in Ica surpassed the national average (49.8% vs. 42.7%) and Regional Human Development Indicators in Ica and La Libertad are among the highest in the country.

In 2001, agriculture was the main economic activity in both Ica and La Libertad with 18.1% and 21.87% of participation, respectively, but in 2011 the importance of this sector in both regions has lost ground to construction, manufacturing, and mining. In both regions, this trend has reflected in agriculture’s GDP growing at slower paces and in a reduction in the percentage of the labor force working in agriculture.

b) **Cluster Development**

The history of asparagus production in Peru dates back to the 1950s when Guillermo Ganoza first planted white Asparagus in La Libertad. His efforts were quickly followed by a group of local agricultural investors. In 1968, General Juan Velasco Alvarado took power through a military coup and implemented an Agrarian Reform that led to the creation of several large agricultural cooperatives that negatively impacted Peru’s agricultural productivity. Land tenure became limited to 45 hectares per person.

After the return of democracy in 1980, new efforts to revive the agricultural sector emerged. In 1984 The Ica Agricultures Association (IAA) began research to find
profitable crops for the region, requesting support from the International Development Agency. In 1986 the Chavimochic irrigation project was launched in La Libertad by the central government. The following year, Rafael Quevedo introduced dripping irrigation equipment from Israel, which allowed asparagus cultivation to expand into large-scale desert areas rapidly.

In 1990 Alberto Fujimori was elected President, beginning a phase of neoliberal structural reforms. The government announced the completion of the Chavimochic irrigation project, leading Nicolini, one of the largest produce companies in Peru, to purchase 100 hectares of land for asparagus production. In 1991, Peru signed the Andean Trade Promotion and Drug Eradication Act (ATPDEA), lowering trade barriers with the United States and opening the American market for Peruvian agricultural products.

In 1997, PROMPEX starts promoting the formation of associations while in 1998 the Peruvian Asparagus Institute (IPE) is formed. Also in 1997, the Association of Exporters (representing 40% of industry) form the Frio Areo Association, designed to increase the cluster’s logistical capacity with support from the Ministries of Agriculture and Trade and PROMPEX.

After the reforms of the 90s, in the 2000s the Peruvian asparagus industry began to consolidate. During this decade, Peru signed several trade agreements with the European Union, the United States and China. Asparagus also became a Peruvian “flag product”.
c) **Cluster Performance**

The asparagus sector is considered to be structurally strong, with high historic growth and relative stability. The cluster’s overall export values and production have increased but its export volumes have remained relatively flat. Still, those volumes make Peru the largest asparagus exporter in the world.

The cluster’s performance is mixed across product categories. While the value of fresh asparagus has grown consistently since 2003, the values and export volumes of processed asparagus has been declining. The cluster does not produce organic asparagus, mostly due to sanitary issues. In this category, asparagus ranks 10th among Peru’s organic crops. It represented only 0.6% of the organic production. In contrast, non-organic fresh asparagus is the second largest agricultural crop in the country, after coffee.
An indicator of the cluster’s performance within the Peruvian agricultural sector is that three of the top five largest non-traditional agricultural companies are asparagus producers. Their operations are based in the La Libertad area.

d) **Major competitors**

Peru’s main competitor in the fresh asparagus export market is Mexico and its main competitor in the preserved form export market is China. Peru and Mexico both entered the U.S. market with zero tariffs. However, in the case of the European Union, Peruvian exports enter with zero tariffs, while Mexican asparagus exports are levied with a 6.7% tariff. China has no trade privileges in the U.S. and European Union, so their asparagus exports have comparatively higher tariffs in the U.S. and European Union. This represents a comparative advantage for Peruvian exporters relative to China.

To achieve its position as a key producer and exporter of asparagus, Peru has relied mainly in its natural endowments and some competitive advantages. Peru’s weather and availability of low cost labor relative to European and American producers enabled the cluster to produce all year round with higher yields in terms of
volume (Kg) per hectare at a lower cost. Along with this, Peruvian producers have relied on free trade agreements to enter the U.S. and European Union markets without paying tariffs, have built a logistic chain to maintain fresh asparagus refrigerated under a controlled temperature environment, have developed extensive commercial relationships with customers all over the world and service providers like freight forwarders and have built value in the brand “produce of Peru” by meeting consistently high quality standards.

Some of the most important producers like Camposol and Danper have enhanced their value chain by standardizing their production and logistic chain by using international standards designed by ISO. In addition, they have vertically integrated production fields, crop nurturing, packing facilities, logistics and refrigerated transportation up to the controlled temperature warehouses, where fresh asparagus are exported by air and processed asparagus by sea. They also have close commercial ties with customers in the main European markets and in the U.S. and have opened commercial offices in Europe and the U.S. for this purpose. Camposol recently issued bonds for a total value of US$ 125 million in the Luxembourg Stock Exchange to pre-repay its commercial long-term debt and finance its expansion and working capital, lowering its financial cost. This has build competitive advantages within the main players of the cluster and has opened the door for other companies to finance its operations in the public capital markets instead of using expensive bank lines of credit.
e) **Distribution Chains**

There is a certain degree of specialization in the operations of asparagus-exporting companies, which are usually either in the business of exporting processed asparagus or fresh asparagus. This specialization determines the existence of 2 distinct production chains for green and white asparagus. Asparagus exporters usually work with brokers rather than retailers, limiting the margin they can obtain when selling their product abroad.

6. **Cluster Competitiveness**

The Peruvian asparagus has several comparative advantages given the country’s endowments. However, its performance is significantly undercut by the lack of competitive advantages. The cluster’s most pressing binding constraints are in logistics, the large farms needed to benefit from economies of scale and the lack of strong R&D to achieve product differentiation and high quality standards.
a) **Factor Conditions**

The main comparative advantage of Peru in asparagus production is its climate. Temperature along the coast of Peru is relatively mild and constant which allows asparagus to be produced and harvested year-round and with up to three harvests every two years (FAO 2011). This climate advantage allows Peru to supply Northern Hemisphere markets in their off-season and in a different export window compared to other exporters, particularly during the second semester, when competitors decrease or stop their production.

An additional advantage to the fact that Peru can produce asparagus all year long is that it allows for year-round utilization of labor and production facilities, resulting in strong operational efficiencies and reduced costs.
Asparagus Annual Production Areas, by Country.

<table>
<thead>
<tr>
<th>Country</th>
<th>jan</th>
<th>feb</th>
<th>mar</th>
<th>apr</th>
<th>may</th>
<th>jun</th>
<th>jul</th>
<th>aug</th>
<th>sep</th>
<th>oct</th>
<th>nov</th>
<th>dec</th>
</tr>
</thead>
<tbody>
<tr>
<td>North America</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mexico</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>U.S.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Canada</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>South America</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Argentina</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chile</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ecuador</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peru</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>China</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thailand</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Europe</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spain</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>France</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Netherlands</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Italy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Portugal</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Germany</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oceania</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New Zealand</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Australia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Technoserve

I. Logistics

The cluster is negatively impacted by poor logistical capacity. While the port of Salaverry in Trujillo is 5-10 kms away from main production areas, products are transported by land to Lima (610 kms/ 377 miles) and Paita (510kms/317 miles) where they are later shipped by sea or air. The Port of Salaverry ranks 5th in exports and 3rd in imports traffic. Similarly, Carlos Martinez de Pinillos airport in La Libertad lacks infrastructure and customs capacity to receive international flights. Lima’s Jorge Chavez airport is the only significantly carrying international cargo in Peru.
As products have to be transported by multiple modes, transportation prices for Peruvian asparagus are significantly higher than those of its competitors. The distance of Peru from the U.S. and Europe, the main fresh asparagus markets, relative to Mexico, grants the latter a comparative advantage in a context of high air transportation costs. Mexico uses mainly road transportation by trucks to transport its produce to the U.S. market. In addition, the cost of air transportation from the Mexican production centers to Europe is lower relative to the average paid by Peruvian exporters.

II. Cheap labor

Asparagus production is very labor intensive (35% of production costs) and Peruvian producers enjoy low labor costs. Underemployment and an abundant supply of unskilled workers have reflected in average wages below those many of its competitors (Camposol 2012).

Government regulations have also contributed to reducing labor costs. The Agricultural Sector Promotion Law 27360 grants tax and labor benefits to agribusinesses. Low labor and in general, low production costs, have reflected in Peru having the lowest farm prices of asparagus in the world. However, a bill is currently being proposed in the Peruvian Congress to eliminate several of the cost-minimizing labor incentives granted through Law 27360. Labor exploitation in the industry is being argued by bill proponents. In the last years wages have increased in the cluster because of the declined availability of seasonal workers in Ica and La Libertad, which are the regions with the lowest unemployment rates. Asparagus companies compete for workers during peak harvest periods, driving wages higher as a result (Peru 2012).
III. Water

A major concern for the asparagus cluster is the difference in the irrigation systems used in the main producing regions. In La Libertad, the large-scale irrigation project Chavimochic brings water to asparagus fields from major rivers in the Andes Mountains. Conversely, asparagus producers in Ica depend on groundwater (Asparagus Report 2012).

This reflects in distinct costs of irrigation water in both regions. In Ica, the cost of underground water is $0.25 per m$^3$, while the cost of water coming from Chavimochic aqueducts in La Libertad is $0.018$ per m$^3$. This difference is partially explained by the heavy subsidization of Chavimochic’s water, as producers pay $30 per hectare/year, when the true cost is $200 per hectare/year (Peru 2012).

Overexploitation of water resources is another challenge for the cluster. In La Libertad, expanded agricultural area, poor infrastructure, and inefficient irrigation methods have led to dwindling water supplies. In Ica, the extraction of groundwater is progressing rapidly due to overexploitation of wells by agricultural activity, illegal wells and inefficient irrigation systems. The deficit of underground water in Ica is estimated at around 126 million m$^3$, and studies estimate that their water supply will be exhausted within 15 years unless dramatic action is taken (Problematica del Agua 2012).

IV. Land

A favorable business environment and strong land ownership rights have supported capable producers and agricultural entrepreneurs who have adopted state-of-the-art technology and organizational standards.
In the last two decades, a process of vertical integration has occurred in the cluster, with large exporting companies also including production activities in their operations. The structural reforms introduced in the 1990s made it legal for companies to own unlimited hectares of land but currently, there are two bills pending to be debated in the Peruvian Congress to limit the extension of land owned by one company/entity, in an effort to reduce concentrations of large firms and in response to claims of unfair competition conditions among large and small producers (FAO 2012). This bill could potentially put a limit to the efforts of asparagus exports to improve efficiency by having control over the entire chain, from production to distribution.

V. **Capital Constraints**

Currently only large-scale companies have wide access to capital. Some of these companies have been able to raise funds through bonds, which offer more competitive rates than private banks. However, the availability of funds for SMEs is limited and with high interest rates. This further constraints the capacity of small farmers to acquire large areas of land to benefit from economies of scale or have access to more sophisticated technology to improve their productivity and crop quality.

VI. **Sanitary Certification**

The USDA Animal and Plant Health Inspection Service (APHIS) is trying to prevent entry of the moth *Copitarsia decolora*, which has been found on asparagus in Peru but not on asparagus in the United States. APHIS requires every shipment of fresh green asparagus to the United States to be fumigated with the pesticide methyl bromide.
b) **Context for Strategy and rivalry**

**I. Competition from large companies**

At the production level, the cluster is characterized by the presence of large firms that dominate asparagus supply. Approximately 40% of producers are small-scale farmers, but account for only 8.4% of the total asparagus supply (Economic Benefits 2012). High investments for the production and processing stages, and the need to achieve economies of scale and ensure quality and homogeneity of production for export, are reasons of this concentration. Lack of access to financial resources and farm atomization are the main constraints hindering smallholders from reaching higher stages in the production chain.

The cluster is also highly concentrated at the export level. In 2010, more than 130 companies exported asparagus, but only five companies represented 39% of the total product shipped (Economic Benefits 2012). Mergers and acquisitions have contributed to this higher concentration. Large exporters prefer not to deal with small-scale producers and prefer large and medium scale suppliers to complement their own production, as they can provide asparagus in large quantities and with the quality required by clients.

**II. Fully integrated companies**

Most Peruvian companies exporting asparagus are fully integrated and manage the entire supply chain: fields, processing, and distribution. The need to reduce costs, improve efficiency and reduce uncertainties is pushing towards higher concentration and vertical integration in the cluster (FAO 2012).
III. Partnerships with foreign companies

The asparagus industry has benefitted from partnerships with foreign companies, mostly through acquiring technology to improve its farming processes. In particular, producers have made partnerships with Israeli firms that have provided technical capacity to improve irrigation methods. An example of this is the “dripping irrigation” methods that allowed for large-scale farming in the desert regions.

c) Demand conditions

I. Small domestic market and high sensitivity for product substitution

Exports account for a considerable proportion of total sales. Lower economic growth or a downturn in primary export markets, in particular the European Union and the U.S., could have a negative effect on the cluster's performance. This could take the form of reduced demand, losses on receivables resulting from customers’ inability to pay their debts, or other factors. This could have a negative impact on sales, profitability and results of operations.

Furthermore, the governments of countries in which asparagus products are sold, including the European Union, the U.S., China, Japan and Canada, from time to time consider new regulatory proposals relating to raw materials, food safety and environmental regulations. This makes the cluster even more vulnerable to unpredictable demand conditions, due to a limited domestic market.

The asparagus market is highly price-competitive and sensitive to product substitution. Consumers have been shown to change their fruit and vegetable purchasing
preferences based on material changes in price. For example, consumers may substitute asparagus for broccoli.

II. **High Sophistication of Peruvian gastronomy**

Peru has a highly sophisticated gastronomy, though not large in quantity of high-end restaurants. Consumers have high quality standards for ingredients for food, especially after the growth of gourmet restaurants in large metropolitan areas like Lima.

III. **International Certification Standards**

Because growers have vertically-integrated production systems they are able to achieve a very high degree of traceability of products, which is essential for obtaining key food safety certifications. Some of the international certification standards are HACCP, Global Gap, TNC, GMP, GAP, Kosher, BASC, IPM, BRC VR5 and Global Compact.

*d) Related and supporting industries*

I. **Universities**

There is an important deficit of R&D in the cluster. Intensive research is needed in areas where other countries have competitive advantages, like the quality of seeds. Few universities have enough resources and experimental land to conduct large agricultural research. Only a few national universities, such as the Universidad Agraria La Molina and Universidad Nacional de Trujillo, are conducting some research.

In addition, there is little coordination between academic institutions and the private sector to align educational and labor needs. A few new technical institutes have been created with the initiative of asparagus producers, to train students in 3-year technical agricultural degrees.
II. *Industry Associations*

Most associations in the cluster have been funded with the initiative of the private sector, and mostly represent the largest exporters. Some civil associations have been created to support SMEs.

III. *Government Agencies*

The main focus of government agencies is export promotion. For example, asparagus has been named a flag product, which gives it preferential trade treatment by the government. However, the government has not been involved in significant efforts to expand the scope and quality of R&D, nor to facilitate a better alignment between universities and the needs of the private sector. The government has also supported infrastructure projects affecting the agricultural sector, such as Chavimochic, and the current irrigation initiative in Olmos (Northern coast).

IV. *Dependence on importing goods*

The cluster’s dependency on imported goods, makes it vulnerable to an increase in production expenses relating to the cost of packaging materials, fuel, fertilizers or crop protection products—negatively impacting its profitability.
7. Recommendations

a) **Factor Conditions**

**Weak logistics.** The government should liberalize air service agreements and allocate greater efforts to improving logistics infrastructure and performance. Some important actions should include:

- Developing synergies with other industries to expand port and air infrastructure, in a similar way than the concession model used with Lima Airport Partners in Jorge Chavez International Airport and the Callao Port.
- Simplify customs and port procedures and standardize contracts to reduce lag between decision and execution.
- Invest in R&D and attract technology to promote improvements in refrigeration techniques and improvements in transportation turn-around for fresh and preserved products, modeling other successful examples such as the Dutch Flower cluster.
- Support efforts to increase public-private partnerships to better align incentives and risks for large-scale infrastructure projects.

**Water shortages.** The Government should gradually lift subsidies to incentivize public-private partnerships for the construction of large-scale irrigation systems, modeling the Chavimochic and Olmos projects. Special emphasis should be given for the Ica region, using the flows of the Pisco river. Secondly, environmental standards should be enforced to mitigate water and land pollution.
Access to capital. The government should expand COFIDE, Peru’s development bank, to a first floor organization to provide more credit access to small-scale farmers. Alternatively, the government could model this program after Mi Vivienda housing project, where COFIDE provided lines of credit to first-floor banks for mortgages for low-income families. The Government should also consider a loan guarantee program to provide more access to finance to new entrepreneurs for acquiring large segments of land.

In the short term COFIDE can enter to match 50% of the line of credit achieved by an agribusiness entity from a Peruvian commercial bank in exchange for an increase of 5% in the entity’s income tax rate for the years in which this facility is received. COFIDE benefits from the credit and risk analysis done by the commercial bank. COFIDE’s loan must be repaid under the same terms to the commercial bank loan, only that at a lower interest rate (2/3 of the rate paid under the commercial loan) and be subordinated only to the commercial bank’s debt.

Enhance input (seed) and productivity with machinery. Higher average export prices of the U.S. and European Union producers suggest that they benefit from a quality premium. Peruvian producers should seek to also benefit from this quality premium by acquiring better seeds and nurturing techniques from these countries. In addition, a way to benefit from the appreciation of the Peruvian Nuevo Sol and lowering the producer’s exposure to incrementing labor costs in La Libertad and Ica is to acquire production technology and machinery from Germany and Netherlands which benefit
from better productivity driven from implementing technology and machinery in their value chain.

b) Context for Firm and Strategy

**Competition from small farmers.** The Congress should revise legislation to approve quotas of land ownership to stimulate competition and mitigate social instability. Land caps should internalize needs of large-scale agricultural developments to benefit from economies of scale, allowing for individual tenure of at least 10,000 hectares. In this regard, COFIDE should execute its intention to buy lands and compete in land auctions of new irrigation projects, to resell them to smaller farmers. Additionally there should be more emphasis on training and partnerships to improve quality standards of small-scale farmers that do not meet international production volumes and quality criteria.

**Horizontal coordination within the cluster with service providers.** Transportation costs are significant for the cluster. Horizontal coordination within the cluster and with other perishable agribusiness clusters vis-a-vis air cargo carriers may increase the cluster’s bargaining power in negotiating fees.

c) Demand Conditions

**High product substitution.** IFCs should promote organic fair trade from smaller producers, as an alternative niche markets for customers that value social standards in agriculture. Efforts should be implemented to strengthen Peruvian asparagus national brand by conducting R&D to develop new varieties of crops using the models of the potato industry in Peru.
Low domestic consumption. Peru currently exports approximately 99% of its asparagus production, due to extremely limited local demand. IFCs should strengthen partnerships with national gastronomic associations and push for the incorporation of asparagus into local cuisine and restaurants. The Government should develop a large scale, far reaching, advertising campaign similar to the one implemented for the Perico fish in the 1990s.

Diversity markets. Peru’s export destinations are focused on United States and Europe, with limited regional exports. The Government should leverage the FTAs signed with other countries in Asia and strengthen regional exports to neighboring Brazil and Chile.

Production all year round can be very attractive to consumers like Wal-Mart and supermarkets in U.S. and Europe. Producers can agree to an average price to supply all year round and limit risk to price fluctuations, creating a win-win scenario.

d) Related and Supporting Industries

Weak IFC initiatives and collaboration. Existing IFCs and producers should promote symposium and trade fairs for collaboration between different actors. This should include better aligning the interests of the private sector and universities, to develop technical careers in agricultural engineering and science. To promote R&D in universities, land should be made available to experiment with crops. The Government should Increase R&D expenditures from 0.15% to 0.45% of GDP, to the level of Mexico. The effort should be coordinated by FONDECYT and be heavily influenced by private sector input. Finally, innovation policy must move away from a focus on resource-based
industries and toward more knowledge-intensive production in clusters. The FONDECYT led program is the ideal vehicle through which to promote this type of economic diversification.

IFCs should also seek collaboration with related clusters such as tourism that also depend on air transportation to lower the entrance barriers of air carriers. Open skies policies with the U.S. and the European Union, which are the main origins of tourists and the main markets for asparagus, should be implemented.
References


Camposol S.A. Offering Memorandum for the US$ 125 Million Senior Notes due 2017, issued on the Luxembourg Stock Exchange on 2012


Interviews

Asparagus Industry

Andre Jochamowitz, General Manager, ProAgro

Armando Grados, General Manager, FrioAereo
Fernando Ferrero Costa, General Manager, Agroparacas S.A.

**Government Institutions**

Fernando Munive, Foreign Trade Specialist, Ministry of Foreign Trade and Tourism

William Arteaga, Agribusiness Department Coordinator, PROMPERU

**IFCs**

Alex Morales Guzman Barron, Researcher, Northern Private University

Carlos Zambrano, General Manager, Instituto Peruano del Esparrago y Hortalizas

Lionel Arce, President, Instituto Peruano del Esparrago y Hortalizas

**Other**

Natalia Esteves, Cattle Entrepreneur, La Libertad

Bruno Camere, former asparagus industry executive, consultant

Martin Vasquez, General Manager, New Transport