

Agro-industries characterization and appraisal: Asparagus in Peru



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by Luz Díaz Rios



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Preface

Peru has recently benefited from the strong global demand for commodities. The continuing favourable outlook for global commodity prices provides an extraordinary opportunity for Peruvian policy-makers in further supporting the consolidation of the non-traditional export sector to generate growth, reduce poverty, and social inequalities and avoid vulnerabilities associated with dependence on traditional exports.

Diversification of exports has been a high priority for the Peruvian Government since the mid-1990s, emphasized by the policies put in place during President Toledo's administration. Non-traditional agriculture exports have expanded and diversified significantly in recent years, reaching a value of US\$1.02 billion in 2005. In the years 2000-2005 the sector grew at an average annual rate of nearly 20 percent, led by the astonishing growth of high added-value export products. Asparagus exports rank at the top, with a 25 percent share of the total value of non-traditional exports in 2005.

Peru's asparagus industry enjoys a privileged position in international markets resulting from private and public efforts to develop competitive advantages within the framework of strong international competition, strict sanitary and phytosanitary market access requirements, growing private demands for high-quality and safe produce, and traceability requirements.

The asparagus industry has certainly been an engine for economic growth, reflected in its contribution to the generation of export revenues and employment. This study is aimed at analysing the institutional, structural, and policy factors related to the development of the industry. It addresses the opportunities, including those for smallholder horticulture enterprises, and the possible challenges that may impede or foster the industry's long-term competitiveness and sustainability. The study is based on the qualitative and quantitative data collected from informal interviews with key actors and informants, available secondary data and information collected during the author's participation in the 3rd Asparagus Technical Congress held in Lima, Peru, in July 2006.

The study begins with a brief historical perspective on the development of the industry, followed by an overview of the performance of the Peruvian asparagus industry on the global stage, highlighting key elements that have contributed to the development of competitive advantages. This is followed by a general analysis of the asparagus value chain, describing actors, interactions and bottlenecks to competitiveness, and the participation of small and medium-scale horticulture enterprises. Finally, the challenges ahead for the industry to achieve long-term sustainability are highlighted.

This working document is aimed at those working at ministries of agriculture and extension services, Non-Governmental Organizations (NGOs) and related projects concerned with agricultural development.

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Acronyms

ADEX	Exporters' Association of Peru
AGROKASA	Sociedad Agrícola Drokasa S.A.
ANTCS	Asparagus National Technical Committee of Standardization
APHIS	Animal and Plant Health Inspection Service, United States
AGAP	Association of Agro-Exporters
ATPDEA	Andean Trade Preference and Drug Eradication Act
BASC	Business Anti-Smuggling Coalition
CAF	Andean Development Corporation
COMEXPERU	Peruvian Association of Foreign Trade
CAN	Andean Community
CITES	Centros de Innovación y Desarrollo Tecnológico
COPEME	Consortium of Private Organizations to Promote the Development of Small and Medium Enterprises
COPRA	Comercializador de Productos Agrícolas
DIGESA	General Directorate of Environmental Health
EU	European Union
EUREPGAP*	Euro Retailer Produce Good Agricultural Practices
FAO	Food and Agriculture Organization of the United Nations
FDA	Food and Drug Administration, United States
FTA	Free Trade Agreement
FOB	Free On Board
GDP	Gross Domestic Product
HA	Hectares
IDB	Inter-American Development Bank
IIC	Inter-American Investment Corporation
INDECOPI	Instituto Nacional de Defensa de la Competencia y de la Protección de la Propiedad Intelectual
IPA	Ica Producers' Association
IPEH	Peruvian Asparagus and Vegetables Institute
IPM	Integrated Pest Management
GAO	General Accounting Office, United States
GAP	Good Agricultural Practices
GEXCE	Proyecto Generado Capacidades para las Cadenas de Exportación
GMP	Good Manufacturing Practices
HACCP	Hazard Analysis and Critical Control Point
IDB	Inter-American Development Bank
MINCETUR	Ministry of Foreign Trade and Tourism
MINAG	Ministry of Agriculture
NSEP	National Strategic Export Plan
NTP	National Technical Standard

PAIA	Peruvian Asparagus Importers' Association
PRODUCE	Ministry of Production
PROINVERSION	Private Investment Promotion Agency
PROMPEX	Peruvian Export Promotion Agency
PROMPYME	Commission for the Promotion of Small and Medium Enterprises
SENASA	National Agrarian Health Service
SME	Small and Medium Enterprise
SEP	Sierra Exportadora Programme
SWOT	Strengths Weaknesses Opportunities Threats
USDA	United States Department of Agriculture
USAID	United States Agency for International Development
USDA	United States Department of Agriculture
USITC	United States International Trade Commission

* Note, EurepGAP, as of September 2007, is referred to also as GLOBALG.A.P. (Global Partnership for Good Agricultural Practices). By January 2009, GLOBALG.A.P. will be used exclusively and will replace the EurepGAP term.

1. Development of the asparagus industry in Peru

1.1 HISTORICAL PERSPECTIVE

The asparagus export sector in Peru began in the early 1950s in the Virú Valley. The export project was begun by a family initiative (F. Robles, PROMPEX, 2006). In those years, asparagus was grown and exported as a canned product to Denmark. In the 1970s, the agrarian reform and resulting land fragmentation caused a very slow growth of the incipient asparagus industry. Diaz and O'Brian (2004) reported that the real development of the asparagus industry in Peru occurred after 1985. According to Shimuzu (2006), this development was characterized by an initial period of expansion of white asparagus production (1980s to the mid-1990s), exported mainly as a preserved product, and the subsequent expansion of fresh green asparagus from the mid-1990s to the present day.

After a gradual expansion in the mid-1990s, the export volume of fresh asparagus began increasing rapidly at the end of the decade. The strong development of the fresh asparagus sector in Peru resulted from the initiative of a group of visionary producers, organized into the regional Ica Producers' Association (IPA), who decided to explore diversification possibilities for their traditional production. With funds provided through international cooperation, the United States Agency for International Development (USAID), a group of Peruvian experts carried out visits to different production areas in the southern part of the United States. Among the products identified with the greatest export potential (asparagus, paprika, melons), asparagus was seen as the most attractive, given the high international prices obtained during off-season periods. Twenty years ago, the price paid per kg of asparagus reached US\$2.80; today, the price can go below US\$1.00 kg, depending on the fluctuations of international prices.

The IPA invited its members to be part of a project to establish 500 hectares(ha) of asparagus. For the assembly and commercialization of asparagus production, a packaging plant was built. During the plant design, 14 plants in California were visited by the Peruvian experts. Subsequent visits to the United States were carried out with the objective of establishing contacts with potential buyers. Additionally, a new asparagus variety was developed by the University of California (Hybrid UC-157) that had perfect adaptability to the Ica conditions and USAID provided technical assistance during the various phases of production, packaging and distribution. This resulted in a technical knowledge transfer from the northern to the southern hemisphere.

The lack of available financial resources was not a constraint to the development of the sector, since the pioneers of the asparagus industry in Peru were producers with investment capacity and access to credit. The industry also benefited from the legacy of the long cotton boom in terms of a great number of experienced farmers, agronomists and input and transport firms that were geared to commercial agriculture (Escobal, 2002).

The success obtained with the asparagus project initiated in the Ica Region was a stimulus to the producers in other regions of the Peruvian coast where irrigated farmland was available. By the end of the 1990s, the first and second stages of the CHAVIMOCHI irrigation project were completed, benefiting the Chao Valley, post-1991; the Viru Valley, post-1992 and the Moche Valley post-1996. Gradually, new actors became involved in the business by producing and/or exporting asparagus through vertical coordination and/or vertical integration.

1.2 OPPORTUNITIES FOR EXPANSION

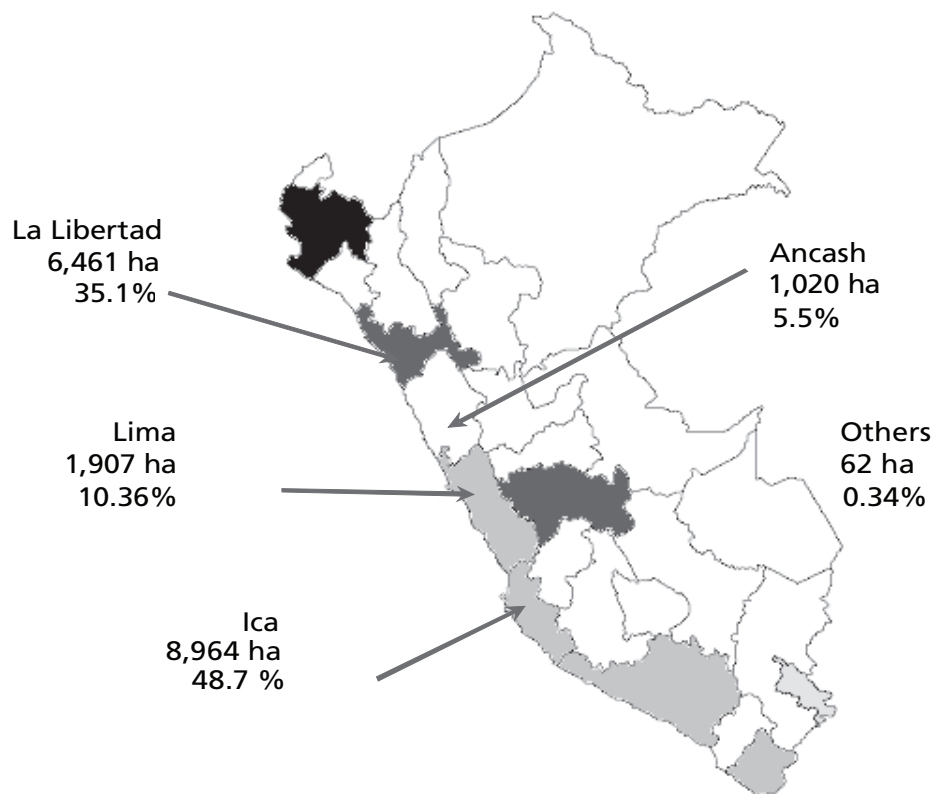
The market-oriented economic policies adopted in the 1990s, including the privatization of land to promote a modern agro-export sector through large land extensions, resulted in the mid-1990s, with an expansion of cultivated land under non-traditional crops, such as asparagus, avocados, grapes, citrus. For example, Camposol S.A., the largest asparagus export company in Peru, started in 1997 by acquiring 4 900 ha in the Chavimochic irrigation project and 2 900 ha in the Piura Valley, through auctions. Although the process of land privatization occurred initially on irrigated land, it expanded gradually to cover non-irrigated land, with the objective of promoting private investments in water drilling, extraction and derivations. In 2006, the government sought to auction 6 000 ha in lots with an extension of 1 000 ha each, located in Lambaye and La Libertad regions, as part of the Olmos Project, which comprised hydropower and irrigation components (ProInversion, 2006c).

As the asparagus industry gradually consolidated and gained international recognition, new actors came onto the scene. The agro-export sector benefited from the transfer of financial surplus originating from the pharmaceutical, mining and fishery industries. This is the case of Sociedad Agrícola Drokasa (AGROKASA), the largest Peruvian exporting company of fresh asparagus and table grapes, created in 1994. AGROKASA is a family business group founded in 1951, a leader in the Peruvian domestic market of pharmaceutical products and consumer goods. The group's entry into agribusiness was a direct response to the opportunities provided by the market-oriented policies adopted by the government and the need to diversify domestic business through engaging in export activities.

Most recently, Intradevco, a Peruvian group founded in 1947, a leader in the domestic market of consumer goods (cleaning and sanitation) and packing materials, acquired Agroindustrias Backus, an asparagus agro-export company with a four percent share of the total asparagus export in 2005. The plan for the agro-industrial exporter was to increase annual sales from approximately US\$20 million to US\$35 million in a three year period (ProInversion, 2006b).

The development of the industry has been concentrated in very specific geographical areas. The Departments of Ica and La Libertad had 83.8 percent of the asparagus-cultivated area in 2004, as illustrated in Figure 1.

There is a certain degree of specialization among regions, for example, the production in the Ancash region is mainly exported as fresh produce; in La Libertad, processed asparagus is the main activity; and in the south (Departments of Ica and Lima), production is mainly exported as either fresh and/or frozen. Apparently, the large difference in temperature between summer and winter, and the greater amounts of sunlight in the harvest season, favour the production of fresh green asparagus in the south, which accounts for over half of the total asparagus-cultivated area.

Figure 1. Geographical distribution of cultivated land devoted to asparagus (2004)

Source: IPEH and MINAG data. Reported by TechnoServe Inc., 2005a

This trend is better illustrated by the asparagus export figures. According to the Peruvian Asparagus and Vegetables Institute (IPEH), in 2005 Peru exported 80 020 metric tonnes of fresh asparagus, representing 61.8 percent of the total asparagus exports, of this 40 542 metric tonnes represented processed asparagus (31.3 percent) and 8 850 metric tonnes represented frozen asparagus, (6.8 percent of the total exports). The social importance of the industry cannot be ignored. The industry employs more than 65 000 workers (permanent and temporary), around 60 percent of whom are women. Ica and La Libertad are the regions with the lowest unemployment rates.

The Peruvian asparagus industry has been able to successfully overcome some of the technological, logistical and macroeconomic constraints faced during the last two decades. The industry has been proactive in the implementation of initiatives promoting quality improvements, ensuring product safety and protection of the supply chain. The asparagus industry has invested more than US\$1 million in product quality improvement programmes (Campbell, 2006). Public initiatives have been crucial for the development of the sector, for example, by promoting coordinating mechanisms between producers and exporters through the creation of IPEH, and within exporters through the creation of the Asociación Civil Frío Aéreo, in efforts to reduce logistical costs and improve efficiency.

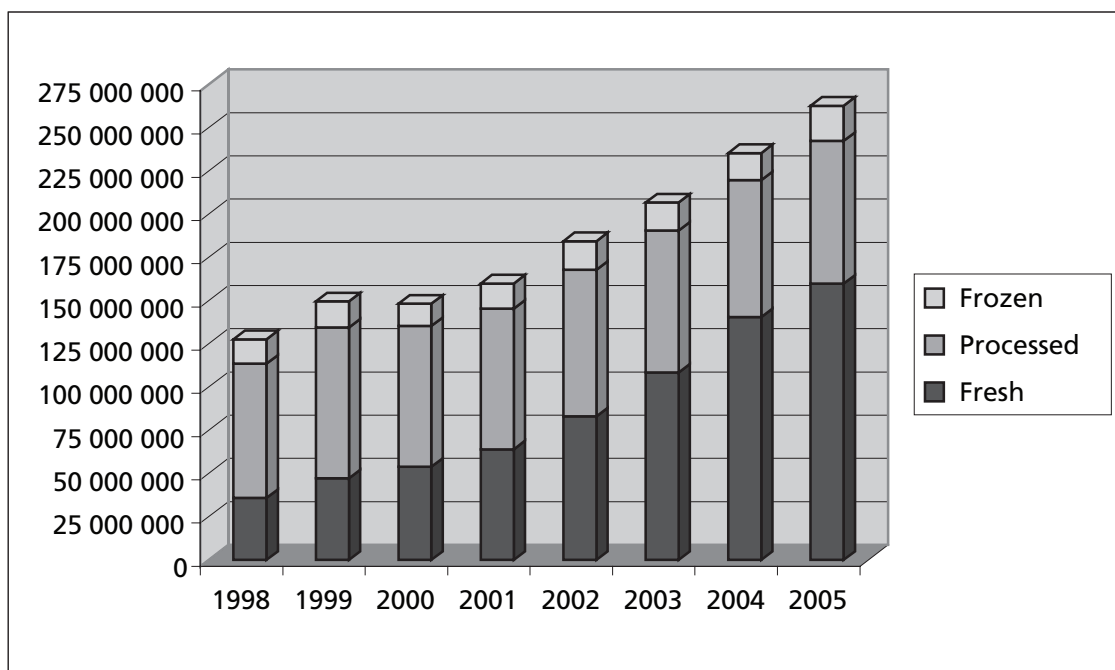
Presently, Peru's consolidated asparagus industry enjoys a privileged position in international markets. The challenge ahead is to be able to implement the measures that will ensure its long-term sustainability and a more equitable distribution of its benefits to other regions of the country.

2. Performance of the Peruvian asparagus industry on the global stage

2.1 CONSOLIDATION OF THE ASPARAGUS INDUSTRY: THE EXPORT BOOM

Peru exports 99 percent of its asparagus production. This can be in fresh, canned (including bottle) and frozen forms. Figure 2 presents the evolution of the country's asparagus exports since 1998. In less than a decade, the Peruvian asparagus industry has been able to double its total export asparagus revenue, from US\$127.6 million in 1995 to US\$262.6 million in 2005, and it is expected to continue growing in the coming years. According to projections by IPEH, from 2005 to 2006 the exports of asparagus are expected to grow 11-12 percent, 5-6 percent and 10-15 percent for fresh, canned, and frozen asparagus, respectively.

Figure 2. The evolution of Peruvian asparagus exports (US\$ FOB)



Source. Benson, 2005.

The dynamics of the Peruvian fresh asparagus exports are impressive. Peru has risen to become one of the world's largest exporters of asparagus, ranking as the number one exporting country of fresh asparagus (mainly green) and as the second largest exporter of processed asparagus, after China. According to Shimizu (2006), the factors that explain the expansion of the Peruvian preserved asparagus industry are:

- The market opportunities created from the changes in the international market environment, in which Taiwan, one of the major providers of preserved asparagus, withdrew from the market as result of the industrialization of its economy. (This factor was responsible for an initial period of small expansion, from the 1970s to the mid-1980s);
- The expansion that occurred between the mid-1980s and the mid-1990s can be explained by the introduction of drip irrigation systems at the end of the 1980s, the entry of new companies into the industry, mainly during the 1990s, and the completion of a large-scale irrigation project (CHAVIMOCHIC).

On the other hand, the expansion of the fresh green asparagus export sector in the mid-1990s can be partially explained by the worldwide increase in consumer demand and the changes in the economic conditions in producing and consuming countries (Benson, 2005). This will be explained in further detail below.

Table 1 illustrates the changes in total share of export and domestic markets for the top eight asparagus-producing countries. In less than a decade, the percentages of local production supplying foreign markets has been significantly reduced in countries such as China and Germany, particularly marked in the former, shifting from 99 percent of the total production supplying foreign markets in 1997 to 55 percent in 2005. The growing domestic demand in China has greatly contributed to the stabilization of the international asparagus market.

Table 1. Asparagus production in the top eight producing countries (in percentages)

Countries	2005		2001		1997	
	Export	Domestic	Export	Domestic	Export	Domestic
China	55	45	65	35	99	1
Germany	1	99	20	80	20	80
Spain	30	70	50	50		
France	10	90	20	80	20	80
Italy	5	95	5	95	5	95
USA			20	80	20	80
Mexico	95	5	95	5	95	5
Peru	99	1	99	1	99	1

From 1993 to 2003, the world imports and exports of fresh asparagus showed a stable trend, with an annual growth rate of 3 percent for imports and 2.9 percent for asparagus exports. The United States, Germany, Japan, Switzerland, France and Canada are the main importing countries. Peru leads the list of main exporting countries followed by Mexico, the United States and Spain.

China and Peru are the leading countries in processed asparagus. China ranks as the largest exporting country sharing 38.7 percent of the total world exports, followed by Peru with

a share of 32.4 percent. Among the importing countries, Spain leads the list, followed by Germany and France (see also Annex 1 and 2).

2.2 MARKET DESTINATIONS FOR PERUVIAN ASPARAGUS EXPORTS

The main destination markets for Peruvian asparagus in all forms (frozen, fresh and canned) are the United States and the European Union (EU). As illustrated in Annex 3, the United States market represented 50.26 percent of the total asparagus exports in 2005, followed by Spain with 19.28 percent, and France with 7.45 percent of the total export value. Peru has been losing its market share of Spanish asparagus imports, falling from US\$59 080 452 (Free on Board (FOB)) in 2003 to US\$52 071 979 (FOB) in 2005, but gaining participation in other markets, for example, the United States market, where the value of the exports increased from US\$93 220 589 (FOB) in 2003 to US\$132 038 682 (FOB) in 2005.

The main destination country for Peru's exports of green asparagus is the United States, sharing 73 percent of the total fresh asparagus exports in 2004 and 67 percent in 2005. In terms of frozen asparagus exports, 41 percent were shipped to the United States in 2004. Regarding processed asparagus, in 2004, 55 percent of Peru's exports went to Spain, 18 percent to France and 13 percent to the United States.

Although the Peruvian asparagus export markets are relatively concentrated, Peru has been gradually consolidating its leading position and gaining participation in these markets as a key reliable supplier of consistent quality products year-round.

The United States market

The United States imported more than 239 million pounds of fresh asparagus in 2005, with Peruvian asparagus representing over 54 percent of the total United States supply (see Figure 3). Until 2003, Mexico had always been the largest foreign source in both volume and value; however, in 2003 Peru surpassed Mexico, resulting in market shares of 53 percent and 44.5 percent, respectively (Lamb, Velez and Barclay, 2005). In 2004, the corresponding figures were 55.8 percent and 41.5 percent (TechnoServe, 2005a).

The United States consumption of fresh asparagus from 1987 to 2003 increased rapidly, from 0.6 pounds per capita to 1.0 pound, while the consumption of canned asparagus fell and the consumption of frozen asparagus stagnated (Lamb, Velez and Barclay, 2005). Imports by the United States of fresh asparagus started to grow during the 1990s, enabling opportunities for exporting countries to be able to provide out-of-season produce.

United States importers of fresh asparagus are organized in the Peruvian Asparagus Importers' Association (PAIA). The PAIA works closely with Peruvian exporters to promote the Peruvian asparagus industry and to find approaches to jointly increase sales and profits in the United States market.

The data presented by PAIA during the 3rd Asparagus Technical Congress organized by IPEH in Lima (July 2006), can partially explain the generalized confidence among the

Figure 3. United States fresh asparagus imports

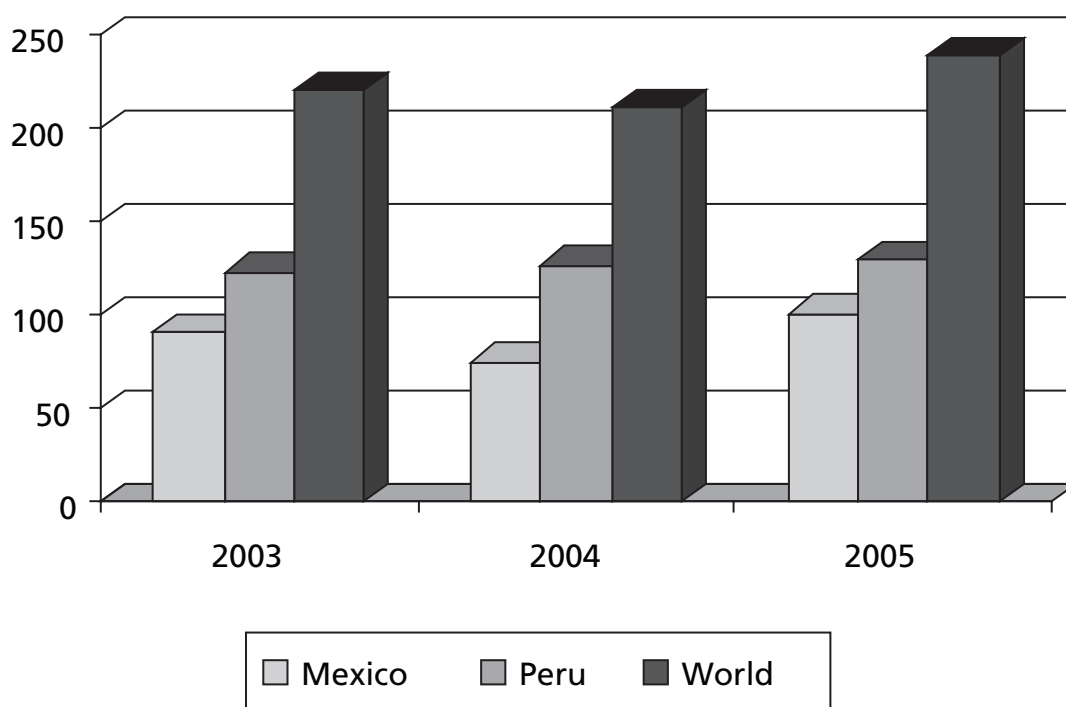
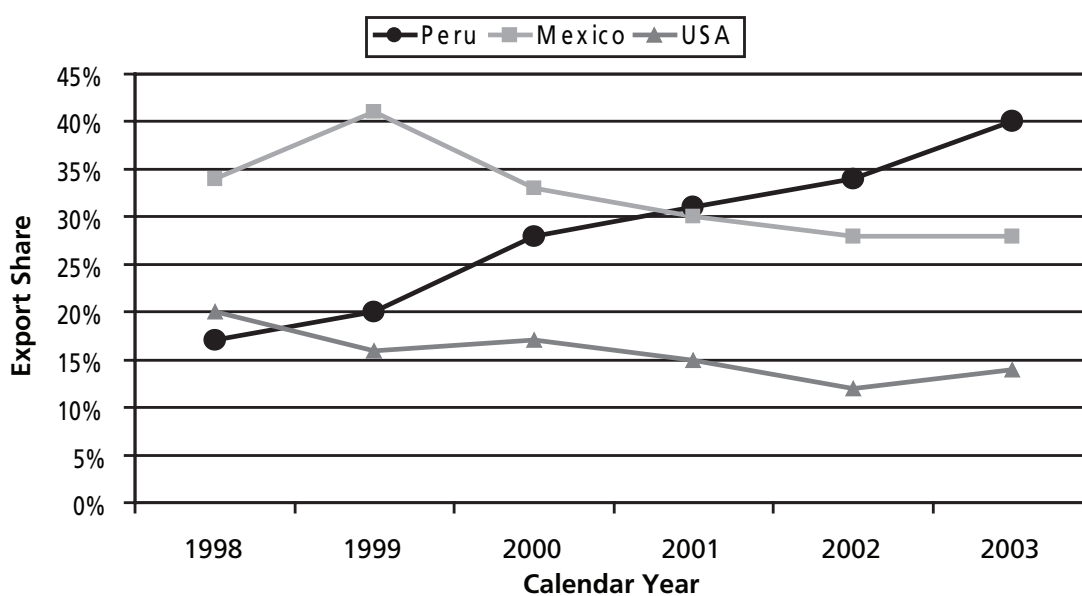


Figure 4. Major suppliers' share of fresh asparagus in the United States market by quantity



Source. Peruvian Asparagus Importers' Association. Presentation at the 3rd Asparagus Technical Congress. July, 2006.

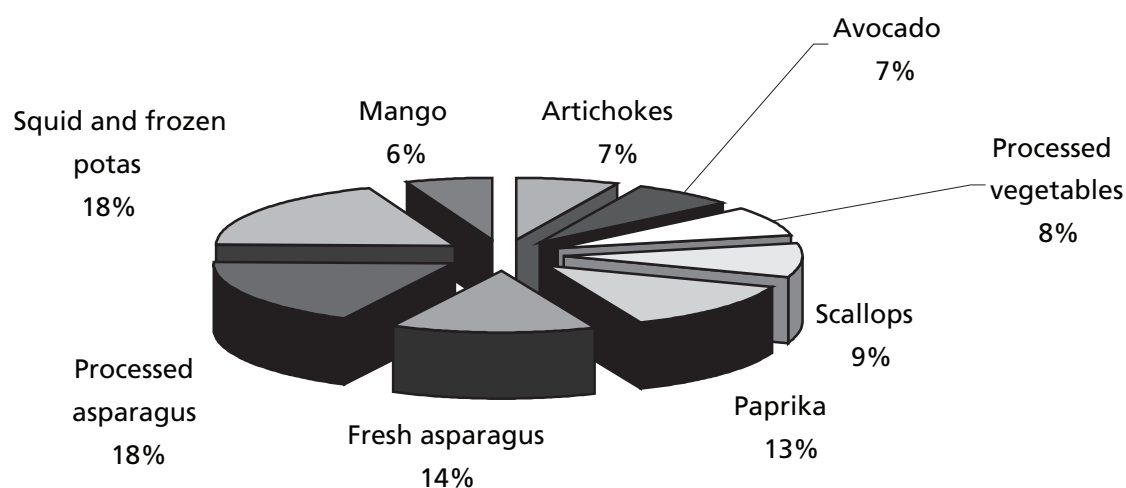
private and public sectors in Peru regarding the favourable situation for increasing exports of fresh asparagus to the United States market in the coming years. The data presented the positive performance of the United States market for fresh asparagus in terms of increased supermarket sales (from US\$601 million in 2004 to US\$688 million in 2005), increased per capita consumption (by more than 67 percent since 1995) and increased asparagus purchases (up to 6 percent in 2005).

Peru has also been consolidating its position as the main supplier of processed asparagus to the United States market. In 1995, Peru exported 820 tonnes to this market; in 2004 this figure reached 6 900 tonnes.

The EU market

Exports of non-traditional products from Peru to the EU have showed a steady growth, up 85 percent over the last five years (EU, 2006). Asparagus ranked at the top of the non-traditional exports to the EU, as illustrated in Figure 5. Although asparagus imports by EU member countries decreased by 9 percent in value and 5 percent in volume from 2001 to 2003, Peru increased its share in this market, accounting for 18 percent of the EU asparagus imports in 2003 (CBI, 2005a). Europeans have traditionally consumed white, rather than green asparagus, however in the past few years, green asparagus has also gained popularity to the point where most off-season fresh asparagus imports are of green, rather than white varieties. This situation has favoured imports from Peru. The leading EU importer of asparagus is Germany, accounting for almost 40 percent of total asparagus imports (in value) in 2003, followed by France (17 percent), the Netherlands (10 percent), Spain (8 percent), and the United Kingdom (8 percent).

Figure 5. Peruvian non-traditional exports to the EU (above US\$15 million -2005)



Source: EU 2006

Peru is the second largest supplier of processed asparagus to the EU market, with a 34 percent share of total EU imports value in 2003, behind China, whose share was 38 percent (CBI, 2005b).

2.3 THE WORLD'S ASPARAGUS SUPPLIERS

As mentioned previously, the increasing demand by consumers in developed countries for year round asparagus has created great opportunities for off-season producing countries. The main harvest season for Peruvian asparagus occurs during the second semester of the year, mainly from September to December.

Peru has consolidated its position as the world largest exporting country of asparagus, with a total export value of US\$262.7 million in 2005, followed by China (US\$154.4 million) and Mexico (US\$115.0 million).

Table 2. Main asparagus exports in the world (2005)

Asparagus exports	US\$FOB (millions)		US\$FOB (millions)		US\$FOB (millions)	US\$FOB (millions)
	Peru	%	China	%	Mexico	USA
Fresh	159.00	61.00	1.90	1.00	115.00	33.30
Canned	82.00	31.00	127.00	82.00	0.00	0.90
Frozen*	20.40	8.00	25.50	17.00	0.00	0.90
Total	262.70	100.00	154.40	100.00	115.00	35.00
Percentage of total (%)	46		27		20	6

* For the estimation of exported frozen asparagus from China, the United States and the EU were the market destinations considered.

Source: Elaborated by IPEH with data from Chinese customs, Peruvian customs, EUROSTAT, Secretary of the Economy of Mexico, United States. Census Bureau – Department of Commerce.

China has great potential in both white and green asparagus production, however, with national economic development, domestic demand might exceed that of overseas markets and contribute to stability in the international markets (Guangyu, 2002). China is a strong competitor for Peruvian processed asparagus in international markets. Despite the 16 percent import duty imposed on Chinese asparagus in the EU market, it is still cheaper than Peruvian asparagus, which enters the EU duty-free. For canned and frozen asparagus, the Chinese market has driven down asparagus prices sharply in Europe over the last three years (FAS, 2005c). However, Peruvian industry leaders agree that China's threat as a major competitor in terms of its dimension and reach has been reduced in the last years. According to Ríos (2006), some of the factors that have reduced this competitive threat are related to the challenges faced by the asparagus industry in China in terms of increasing labour costs, permanent risk of flooding, increased profitability of other crops and increasing prices of the Chinese product in the European market. Ríos (2006) also pointed out that Peru's major sources of competitiveness in comparison to China are high yields, consistent quality and continuous industry improvement and innovations.

In the United States market the main foreign suppliers of fresh asparagus are Peru and Mexico, followed by Colombia and Chile, which have a minor share of the market. Although Peru has been able to keep its position as the largest supplier of fresh asparagus to the United States market, Mexico's increase in the United States import volume from 2004 to 2005 has been dynamic, increasing 34.5 percent, compared to 2.4 percent for Peru.

Peru's increasing participation in the United States asparagus market has come mainly as a result of the opportunities provided by the growing demand for fresh asparagus and the possibility to enter the United States market during the off-season periods. Peru does have a disadvantage in terms of transportation costs. Historically, air freight costs from Lima to Miami have been around \$0.85 per kg, the current cost is \$1.25 per kg. The main reason for this increase is the lack of merchandise for the return freight. Currently, freight is up to 40 percent of the total cost of the landed price in the United States (FAS, 2005d). But none the less Peruvian asparagus has been able to enter into the United States market when neither Mexican nor United States producers can harvest asparagus (September to December), solidifying Peru's position as a leading fresh asparagus provider to the United States market during this market window. Peruvian exports outside of this 'niche period' aim to fulfil demands established through year-round supply contracts. Peru is also trying to diversify its destination markets by supplying other niche markets such as Japan during off-season periods, which Australia, Mexico or China cannot do.

Additionally, increasing competition from Peru and Mexico has resulted in the decline of United States asparagus production and exports, and the consequent climb in United States imports. Over the last decade, United States asparagus imports from Peru and Mexico increased nearly 500 percent to US\$98 million and 100 percent to US\$73 million, respectively (FAS, 2005b).

The competitiveness of the Peruvian asparagus industry are mainly owed to: favourable weather conditions that allow year-round harvest of high quality asparagus production; supplying the United States market 52 weeks/year; high average yields per ha reached in the Peruvian coastal plains; the rapid adoption of modern technologies; low costs of labour; high integration of production and exporting activities and the duty preferences under the Andean Trade Preference and Drug Eradication Act (ATPDEA).

Peruvian asparagus exports to the United States market have benefited from the ATPDEA, which allows for a zero import tax. The agreement will conclude at the end of 2006, but the benefits are expected to continue under the Free Trade Agreement (FTA) with the United States, which is likely to be approved by the United States Senate before the conclusion of the ATPDEA.

Given the busy political calendar and a tough environment for trade deals to get congressional approval before the end of the year, Peru could start 2007 with neither a trade deal nor preferences. This situation could certainly hurt the Peruvian agro-export industry, mainly small and medium-sized exporters, because of their limited financial capacity to comply with duty obligations. According to a Peruvian entrepreneur, this situation would imply that many small and medium-sized asparagus exporting companies would not participate in the asparagus export chain as direct exporters, but rather as providers of raw materials to the processing industries dispatching produce, mainly to the EU market. The larger exporting companies, able to comply with the duty obligations, would benefit from the expected increase in asparagus prices in the United States market, resulting from reduced export volumes from Peru. According to this entrepreneur, four years ago Peruvian exporters faced a similar situation and were reimbursed the duties paid (interest added), once the extension of the preferences agreement was approved by the United States Government and it is highly possible that the same circumstances will occur in 2007. Considering that the situation is likely to be resolved, either through the ratification

of the FTA or the extension of the ATPDEA, there is an important role for government interventions through the implementation of contingency plans aiming to facilitate access of small and medium-sized entrepreneurs to financial mechanisms in order to comply with their tariff obligations, thus reducing the impacts of a possible break in the United States duty preference system.

Peru provisionally became part of the European Union's Generalized System of Preferences in 2005, which allows 7 200 types of product, including asparagus, to enter the EU duty-free.

This is not the case of Mexican asparagus exports. The United States has been gradually reducing import tariffs on Mexican asparagus, with full elimination in 2008. A similar situation exists under the bilateral agreement between Mexico and the EU (TLCUEM) (Guajardo and Castillo, 2005).

In conclusion, the prospective for increasing participation of Peruvian asparagus exports in international markets will depend on the ability to maintain a reliable supply of product with the most desirable quality to satisfy consumer needs, as well as to be able to overcome the internal problems faced by the industry.

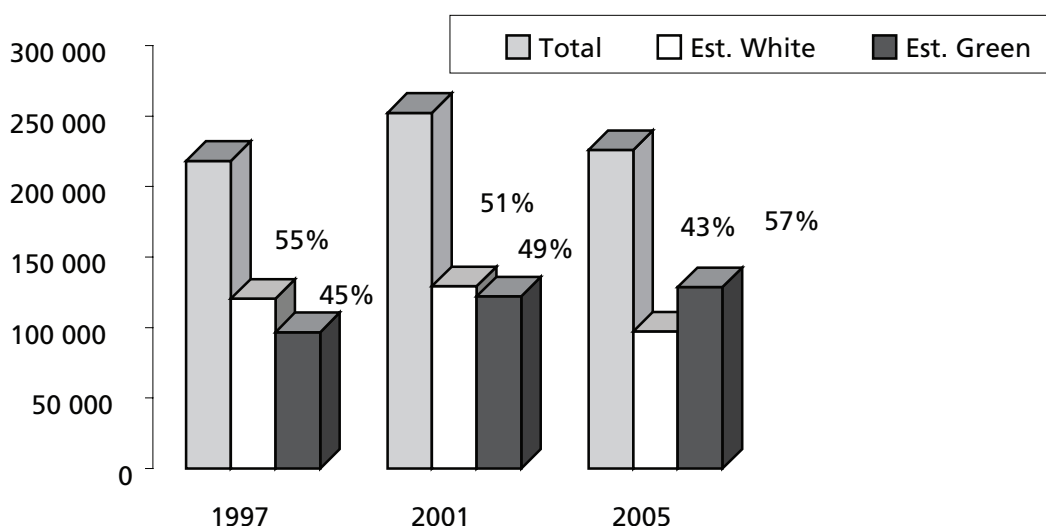
3. Key elements of success: development of competitive advantages

3.1 INCREASED PRODUCTIVITY

World asparagus production trends

The worldwide asparagus production showed an 8 percent annual growth during the last decade, reaching a total of 6.5 million tonnes in 2004 (reported by TechnoServe, 2005a). In terms of cultivated land, according to Benson (2005), the worldwide total production areas have increased during the last decade, reaching a total of 225.235 ha in 2005, of which 43 percent were producing white asparagus and 57 percent producing green asparagus (see Figure 6). For the first time ever, green asparagus production surpassed the production of white asparagus.

Figure 6. Worldwide estimated hectares of asparagus production in 1997, 2001 and 2005



Source. Benson, 2005

Benson (2005) also mentioned that from 2001 to 2005 there was a reduction of 25 672 ha as a result of the devastating floods in China in 2003, together with a reduction in harvested areas in other producing countries, such as the United States, France, Spain and Greece. This reduction in harvested areas has been associated with economic pressures in terms of increased competition from other producer countries, facing lower costs or benefiting from market access opportunities and year-round production.

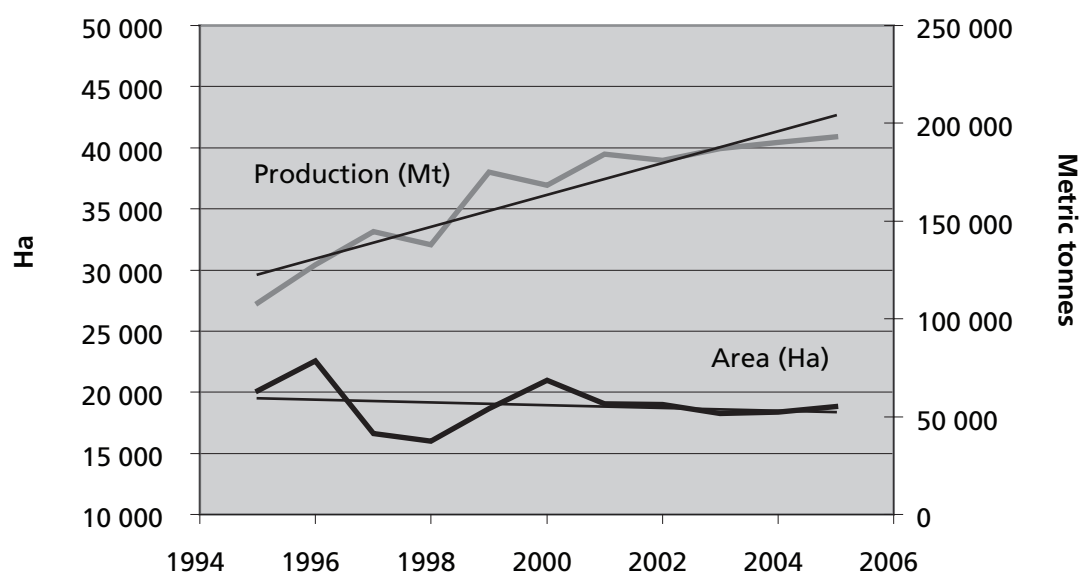
Peru ranks within the top six asparagus-producing countries, accounting for 8 percent of the total worldwide asparagus production areas in 2005. China is the largest producing country.

Asparagus production in Peru

In 1992, the total Peruvian asparagus production was estimated at 64 600 tonnes, produced on 11 000 ha. In 2005, the statistics present impressive figures; a total of approximately 190 100 tonnes were produced in 18 000 ha. The annual growth production rates for fresh asparagus during the last decade reached 3 percent, while the corresponding figure for production supplying the processing industry showed a 5 percent annual growth (Ministry of Agriculture, reported by TechnoServe, 2005a).

According to official figures, the asparagus-harvested areas in Peru stagnated during the last decade (see Figure 7). The Food and Agriculture Organization of the United Nations (FAO) data shows a decrease in this area from a total of 22 582 harvested ha in 1996 to 18 800 ha in 2005. This trend is also supported by the data reported by Benson (2005). The results of the Asparagus Census carried out by the Ministry of Agriculture (MINAG) and IPEH in 1998, and by IPEH during the first half of 2006, showed different figures. According to these censuses, there was a total of 17 552 ha under asparagus cultivation in 1998. The corresponding figure for 2006 is 22 971.94 ha, of which 83 percent correspond to green asparagus and 17 percent to white asparagus.

Figure 7. Peru: asparagus production vs. area in hectares (1995-2005)

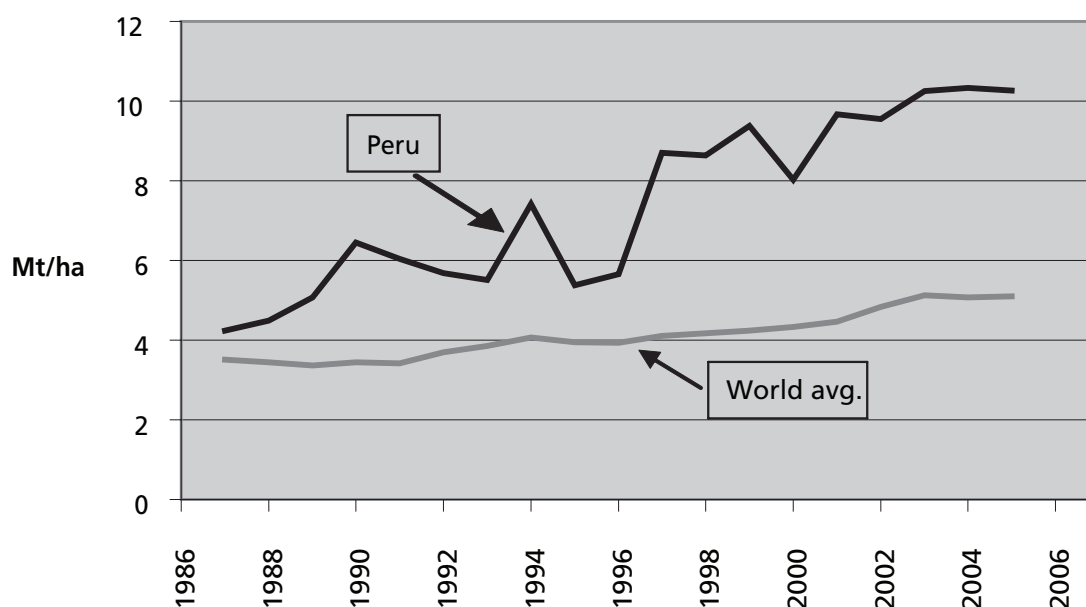


Source: Data from FAOSTAT

Peruvian asparagus productivity rates

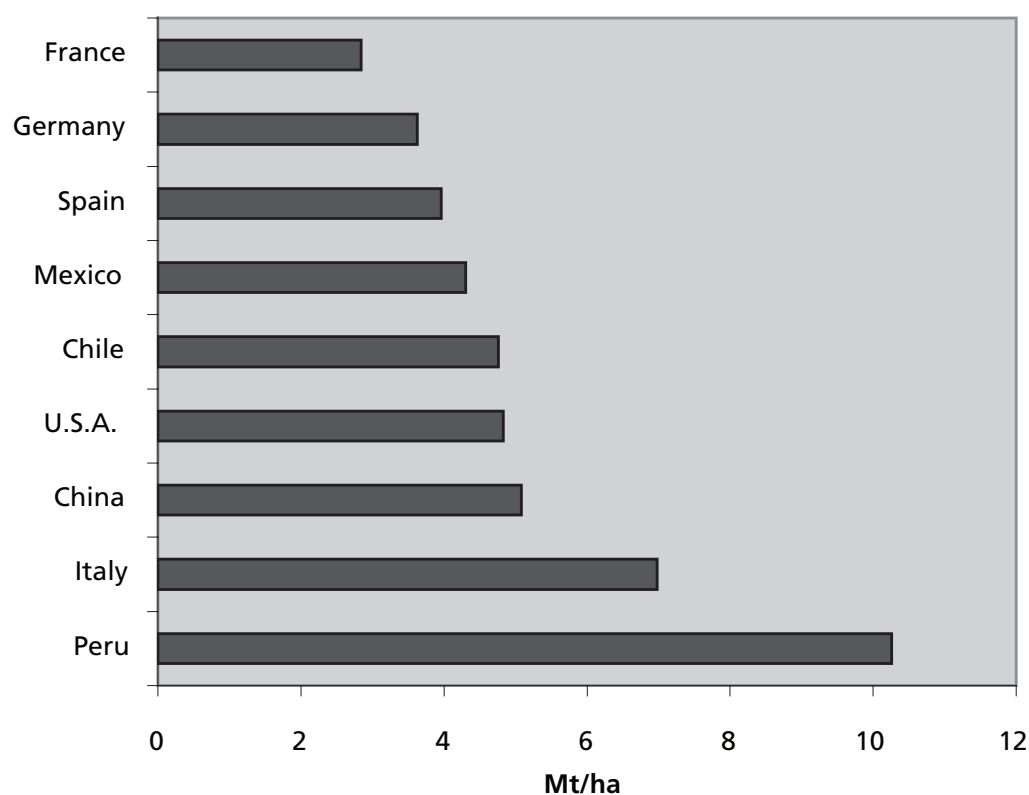
The results are certainly remarkable in terms of yields/ha. Peruvian asparagus production has the highest yields/ha in the world (see Figures 8 and 9) as a result of the favourable climatic conditions that allows almost year-round production and up to three harvests every two years. In addition to the comparative advantages provided by nature, the efforts of the Peruvian producers to overcome technical disadvantages and improve productivity have paid-off. For example, the introduction of modern irrigation systems conserves water resources and increases efficiency in its distribution. More efficient methods for the control of pests and diseases have also been implemented. According to FAO data, at present Peru enjoys the world's highest yields/ha – 10.26 tonnes/ha.

Figure 8. Evolution of asparagus yields: Peru vs world



Source: FAOSTAT

Benson (2005) reported average yields of 14 tonnes/ha/year in 2005. The producers interviewed during the preparation of this report mentioned an average yield of 16 tonnes/ha/year. In some fields, this figure can go up to 20-24 tonnes/ha, depending on the growing conditions and the production technologies applied. Certainly, the increased yields/ha have been determinant in the productivity gains achieved during the last decade, which has been reflected in the rising privileged position of the Peruvian asparagus industry in international markets. The possibility to obtain the highest yields/ha in the coastal plains gives Peru a competitive advantage, at least for now, which is difficult for other key country players to replicate in the international asparagus market.

Figure 9. Yield/Hectare: eight major asparagus-producing countries (2005)

Source: FAOSTAT

3.2 COMPLIANCE WITH SANITARY AND PHYTOSANITARY REQUIREMENTS

From a holistic point of view, achieving competitive advantages in export is a function of several factors, including strong supporting institutions and policies. The several reforms implemented in the 1990s, which led to the creation of institutions such as the Peruvian Export Promotion Agency (PROMPEX) and the National Agrarian Health Service (SENASA,) have represented important government efforts to create the institutional framework required to support the development of the Peruvian agro-export sector. Proactive and reactive efforts of the public and private sector to overcome bottlenecks associated mainly with phytosanitary issues are certainly notable in terms of compliance with market access requirements. Although there is a long way to go before solutions to the inefficiency and costs associated with quarantine treatments are found, the road map for future achievements is being defined, as presented in the following section.

Phytosanitary issues

The institutional reforms implemented by President Fujimori's government led to the creation of SENASA in 1992. SENASA has played a key role in consolidating market opportunities for the Peruvian agro-export sector by facilitating access to specific markets through the compliance of sanitary and phytosanitary requirements. Since its creation, SENASA has been

able to keep its technical role outside of political bargains and instabilities; this has been possible because the institution is headed by a directive committee integrated with public and private sector representatives.

The close relationship between SENASA and the asparagus sector started in 2001 as a result of closer scrutiny by the United States inspection authorities of fresh asparagus imported from Peru in search for *Copitarsia decolora* eggs. The eggs and larvae of this noctuid moth can be found in the tips of cut asparagus. Initially, when eggs of this moth were found, the shipment was subject to fumigation. However, according to the Animal and Plant Health Inspection Service (APHIS) of the United States Department of Agriculture (USDA), Peruvian asparagus were so frequently infested, that since 2001, all the shipments have required treatment with methyl bromide prior to importation. This treatment is applied by an independent contractor in the port of entry, and requires a break in the cold chain (4 to 8 hours) and increasing temperature, which affects the quality and condition of the product and reduces its shelf-life (Lamb, Velez and Barclay, 2004).

Since 2001, SENASA and IPEH, in coordination with APHIS, have been working closely on approaches to deal with this quarantine pest. Their work has been concentrated in two main areas; the evaluation of the potential risk of the moth as a quarantine pest, and the evaluation of alternative treatments to fumigation in port of entry. Fumigation has serious effects on the quality of the product and represents a high cost to the industry, estimated by IPEH at approximately US\$2.6 million in 2005.

Pests risk assessment: The need for the evaluation of *Copitarsea* as a quarantine pest arose after discussions on the quality and availability of data used by APHIS. At present, APHIS is implementing a study to produce an accurate science-based risk assessment to either validate or refute the need for high vigilance and expensive treatments, and to identify parts of the supply chain, from shipment to retail, most at risk, so that mitigation measures could be taken (Gould *et al.*, 2006). The study was recently finalized and the results will be soon shared and discussed with the Peruvian Government authorities.

Alternative treatments: The public and private sectors have been working together on alternative treatments to fumigation, including approaches to reduce pest incidence, as follows:

- (i) Hot water: the evaluation of hot water as a quarantine treatment has proven to have a negative effect on the product's quality.
- (ii) Metabolic stress: this study is being developed by APHIS in agreement with the University of California, Davis.
- (iii) An Integrated Pest Management (IPM) programme: SENASA and IPEH have been working on the implementation of an IPM programme based on the application of quarantine thresholds, rather than economic thresholds, with the objective of changing the need for compulsory fumigation to conditional fumigation after inspection of shipments. The IPM programme aims to establish an integrated pest surveillance system, from the fields to the port of dispatch. Frequent reports on the incidence of the pest will be sent to APHIS. Phase I of the programme was implemented by SENASA; IPEH is responsible of ensuring its continuation.

- (iv) Irradiation: the evaluation of irradiation as a quarantine treatment yielded promising results, which were presented by SENASA to APHIS for consideration. The commercial feasibility of the treatment greatly depends on the costs of irradiating product in the country of origin, and what is possibly more determinant, the market acceptability of the treated product.
- (v) Fumigation in the country of origin (pre-clearance treatment): this programme is an initiative of some asparagus exporters to free up the port of entry during the period of high influx of asparagus exports to the United States market. The plan is to set up seven fumigation chambers among five exporting companies by the end of 2007. The operation of the chambers is authorized by SENASA and the implementation of the treatment needs to be supervised by APHIS. Only 15 percent of the total exported product would be initially fumigated in the country of origin (around 10 000 tonnes), during the period of high influx of exports. The cost of the treatment is being assessed and will certainly define the feasibility of its implementation. The proposal was presented by SENASA to APHIS in mid-May 2006.

From a market access perspective, *Copitarsia decolora* is at present the most important phytosanitary issue for the Peruvian asparagus industry. Public and private efforts are in place to find suitable solutions to improve efficiency and reduce fumigation costs. Nevertheless, asparagus production is affected by a set of pests and diseases not subject to quarantine treatment, and their management and control is addressed through the application of integrated pest and disease management programmes.

Sanitary issues

In terms of sanitary issues, Peru lacks a food control system that clearly identifies the roles and responsibilities of SENASA and the General Directorate of Environmental Health (DIGESA), basically in terms of food safety issues related to microbiological contamination. So far, DIGESA has a clear role in sanitary matters concerning the agro-processing industry, yet the institution with regulatory responsibilities in the area of food safety at the production level has not been determined. At present, SENASA is working on the preparation of a bill to be submitted to Congress, extending the institution's responsibilities to cover the food safety area. SENASA aims to be a promoter of food safety initiatives rather than have a regulatory role.

Peruvian fresh asparagus exports have not yet been associated with outbreaks resulting from microbiological contamination. Similarly, up to now, the presence of pesticide residue seems not to be a problem for Peruvian asparagus exports. In this regard, the main problem has been the registration of pesticides with specific use in asparagus production. However, this has not yet represented a real challenge since the asparagus industry has been in place for more than 20 years. In the case of the agro-export chains currently under consolidation, such as avocado, this aspect is becoming a critical problem to be solved.

In terms of processed asparagus exports, the situation has been slightly different. In 1997, Peruvian exports were associated with two cases of botulism reported in Spain. Although never proved, the public sector reacted by implementing a very strict auditing programme, mainly targeting small processing facilities. This led to the approval of D.S. No.007-98-

SA (Reglamento sobre Vigilancia y Control Sanitario de Alimentos y Bebidas), which establishes quality and safety controls on the food industry based on the application of Good Manufacturing Practices (GMP) and the Hazard Analysis and Critical Control Point (HACCP) system, with a clear definition of critical control points (e.g. thermal treatment). The asparagus agroprocessing companies must obtain a sanitary certification provided by DIGESA to be able to ship products to international markets. Currently, a total of 32 exporting companies have this certification (DIGESA, 2006).

In contrast to the SENASA's situation, DIGESA's capacity to effectively respond to the needs of the asparagus sector has been seriously constricted by political influences and instabilities. This has restricted DIGESA's regulatory role and the continuity of the initiatives and programmes. For example, the asparagus industry is strongly demanding a regulatory requirement for the thermal treatment. However, little progress has been done in this regard.

In spite of the constraints at the institutional level, the future looks promising. SENASA's budget has doubled during the last five years. Further steps have been taken to improve coordination among public agencies and private institutions. For instance, SENASA is working closely with the port customs office to achieve efficiency in information management, and initiatives are in place to address the constraints in laboratory infrastructure by updating facilities and procedures.

It is expected that the political decisions that have facilitated SENASA's positive performance can be used as an example for carrying out institutional changes in other public agencies. In this regard, the private sector is looking for ways to participate in the direction of DIGESA and other key public institutions, in an effort to reduce political influences and maintain the institutions' technical and regulatory role.

Unquestionably, the additional costs associated with the compliance of current sanitary and phytosanitary requirements have significant effects on the industry's competitiveness. Although public and private efforts to overcome this bottleneck are in place, the threat imposed by the emergence of new market access requirements could seriously affect the positive future performance of the sector in international markets.

3.3 APPROACHES TO QUALITY AND SAFETY ISSUES

The Peruvian asparagus industry has responded, reactively and proactively, to the challenges imposed by the increasing regulatory demands of the national or importing countries' authorities, as presented above, and to the quality and safety demands imposed by the private sector. The ability to ensure a reliable supply of quality and safe produce has certainly been one of the pillars of the success achieved by the Peruvian asparagus industry in international markets, as illustrated below.

The asparagus industry's commitment to quality and safety issues

In response to the D.S. No.007-98-SA emitted by DIGESA on quality and safety controls to the processing industry, and in order to anticipate the possible impacts of the United

States initiative published by the Food and Drug Administration (FDA) in 1998 on reducing microbiological contamination in fresh fruits and vegetable production, PROMPEX in coordination with IPEH, promoted the creation of the Asparagus National Technical Committee of Standardization (ANTCS), which operates under the auspices of Instituto Nacional de Defensa de la Competencia y de la Protección de la Propiedad Intelectual (INDECOPI). INDECOPI is the main national institution in charge of standardization and accreditation. The Commission consists of representatives from the public and private sectors, and in less than ten years has published five national asparagus standards harmonized with Codex standards. Diaz and O'Brian (2004) highlighted the practical applicability of these standards by the industry. For example, Frío Aéreo, created by a group of Peruvian export companies to optimize logistics operations associated with air transportation, developed a ranking system for quality attributes based on national standards that allow companies to monitor their quality performance and introduce corrective measures as required.

At the beginning of the decade, the industry faced the challenge of complying with stringent quality and safety standards imposed by retailers – initially European retailers – in importing countries. The initiatives undertaken at the national level – such as the publication of the standards; National Technical Standard (NTP) 209.401:2001: Hygiene practices for fresh asparagus handling, and NTP 209.402:2003: Good Agricultural Practices (GAP) in Asparagus – provided a quality and performance baseline for the industry that allowed many firms and farms to generate the skills and experience needed to be certified under stringent international standards.

Initially, the asparagus industry considered third-party certifications as an additional cost with no benefits associated with its implementation. However, although not a market access issue, private certifications have become a requirement to maintaining companies' positions as reliable suppliers of asparagus to international markets. Peruvian companies have clearly understood this issue, and at present, the Peruvian asparagus industry enjoys a consistent, high quality that can be internationally certified with respect to safety and other quality product and process attributes.

The exporting Peruvian companies are certified under several schemes; AGROKASA, for example, the largest fresh asparagus exporting company, has been certified under eight schemes. Agroindustrias Beta, ranked as the fourth largest exporting company of fresh asparagus, has been certified under six schemes. In general, most of the companies are certified with respect to GAP, GMP and the HACCP system. However, as a market strategy for differentiation, schemes certifying compliance with labour standards and prevention of drug smuggling in international trade shipments, such as the Business Anti-smuggling Coalition (BASC), are gaining importance in the market for private certifications in Peru.

Several of the largest world certification and auditing companies have established their regional operations in Peru as a consequence of the dynamic market for third-party certification. The increased competition among third-party certification bodies has contributed to some extent to the reduction of the certification costs assumed by producers and exporters. These companies offer a wide portfolio of services, which include not just audit and certification services, but also the provision of training, and microbiological and chemical analysis. Companies are certified according to the schemes requested by their clients in the international markets. For

example, Euro-Retail Produce Good Agricultural practices (EurepGAP), Natural Choice and British Retail Consortium are the most demanded standards/schemes by European clients. The Peruvian asparagus importers in the United States prefer schemes such as SQF 1000 and 2000, GAP, GMP and HACCP certifications and Prosafe.

Although there are no specific reports documenting the benefits associated with the implementation of third-party certifications in the agro-export sector in Peru, the leaders of the asparagus industry interviewed during the preparation of this report agreed that the certifications have contributed significantly to the positive transformation of the Peruvian agro-export sector in terms of better quality products, but also in terms of environmental sustainability of the production systems and better social welfare conditions. Under EurepGAP, for example, the agro-export companies must comply with the national labour legislation in terms of salaries and workers' benefits. Appropriate sanitary and dining facilities must also be available to the workers. In some cases, the agro-export company provides free transportation and lunch, day care services and recreation facilities, and has facilitated access to primary and secondary education to its workers.

The above achievements have been possible by the continued strong leadership of the Peruvian producers and exporters and the public-private cooperation, as presented below.

Public and private institutional efforts to ensure compliance with standards

Coordinated public and private institutional efforts have been very successful regarding standardization of the sector, but they have not been restricted to the normative level; possibly more important has been the work undertaken by public and private institutions to ensure the sector's compliance with the national and international standards. In this effort, international cooperation has played a key role. Clear examples of these efforts are presented below.

The programme *Exporta Calidad* promoted the implementation of the HACCP system in the fresh asparagus industry. The programme was led by PROMPEX, with funds provided by international cooperation. At present, all the companies exporting fresh asparagus have implemented the HACCP system. More recently, with funds provided by the Inter-American Development Bank (IDB), IPEH implemented a project to promote the application of GAP; a total of 54 farms achieved the GAP certification, corresponding to approximately 3 000 ha under asparagus cultivation (reported by IPEH. 2004).

In July 2006, Asociación de Gremios Productores y Agro-exportadores del Perú (Association of Agro-Exporters - AGAP), in coordination with IPEH, PROVID (an association of grape producers and exporters) and PROCITRUS (an association of citrus producers and exporters) started a one-year project to promote social responsibility in the Peruvian agro-export sector by implementing good labour practices to ensure compliance with the national law in terms of labour conditions. The funds to support the project activities come from the 26 companies taking part in the project.

Ongoing talks between industry leaders and public institutions concern the convenience of creating a national scheme – PeruGAP – under which a producer/exporter can comply with several certifications requested by the clients in the importing countries, similar to those

implemented in Chile (ChileGAP) and Mexico (Mexico Calidad Suprema). However, these talks have not yet produced specific results. So far, AGAP is promoting the implementation of a national seal, aimed at consolidating the reputation of the Peruvian agro-export sector as a world supplier of products with the highest standards of quality and safety.

3.4 HORIZONTAL COORDINATION TO REDUCE INEFFICIENCY AND COSTS

During the preparation of this report, industry leaders and representatives of the public sector were asked to identify the major contribution of the public sector to the development of the asparagus industry in Peru. Surprisingly, there was a generalized agreement that the market-oriented reforms implemented in the 1990s, which reduced the role of the state and left room for private sector interventions, were fundamental in the development of the asparagus industry. Similarly, the valuable contribution of the policies implemented by PROMPEX to promote quality improvements and coordinating mechanisms between producers and exporters were also identified as a very positive public sector intervention.

PROMPEX was created in 1996 with the objective of contributing to the development and competitiveness of the Peruvian export sector. IPEH was established in 1998 as result of the initiative promoted by PROMPEX's attempt to strengthen the links between producers and exporters. Although IPEH's initial mandate was to promote development and competitiveness of the asparagus sector, its mandate was expanded to cover artichoke and paprika; sectors that had shown an excellent export performance and yet were not represented by product-specific associations, as was the case for producers and exporters of grapes, avocado and citrus (PROVID, PROHASS and PROCITRUS, respectively), for example. At present IPEH has 50 members including producers and exporters, who together represent approximately 70 percent of the total asparagus, artichoke and paprika cultivated land. IPEH's structure includes several committees – a producers committee, a fresh asparagus and vegetable processors and exporters committee, a frozen and canned asparagus and vegetable processors and exporters committee, and a paprika committee. Moreover, as mentioned throughout this report, IPEH initiatives have greatly contributed to the development of the asparagus industry. Its work has concentrated on approaches to solve the bottlenecks faced by the industry in terms of knowledge, research and development, and availability of information, etc. Sanitary and phytosanitary issues are an IPEH key area of work. The number of professionals devoted to work in this area, eight in total, is a clear indication of the importance given to these issues. IPEH also provides reliable information to the asparagus industry, holds congresses and seminars, and carries out periodic censuses of the sector as well as several other promotion activities.

AGAP is a very recent initiative, led by the private sector with the support of PROMPEX. AGAP works as an umbrella organization representing the interests of product-specific associations – PROVID, PROCITRUS, PROHASS, Asociación Peruana de Exportadores de Mango (Peruvian Mango Exporter Association – APEM), Prolúcuma, Junta Nacional del Café (National Coffee Board – JNC), IPEH and Asociación de Productores de Limón (PROLIMON). AGAP acts more as a business council, and since its foundation four years ago, has been working in the consolidation of its role as facilitator and strategic partner of the government in the decisions concerning the agro-export Peruvian sector.

Asociación de Exportadores del Perú (Exporters' Association of Perú – ADEX) and the Peruvian Association of Foreign Trade (COMEXPERU) are two exporters' organizations with longer traditions than AGAP; the former was created in 1973 and the latter in 1989. These private sector institutions include committees or groups addressing concerns of specific export sectors (mining, textiles, agriculture, agro-exports, etc.) and have been active in promoting agro-export culture in Peru. ADEX has recently launched the Data Trade System, a tool to help Peruvian exporters in the analysis of international markets. In addition, it is also implementing an initiative for the creation of an educational institution, specialized in strengthening the skills of the new generation of exporters in an attempt to create an export culture in Peru.

There is no doubt the Peruvian agro-export sector will benefit from improved coordination of export development and promotion efforts among these private sector institutions (AGAP, ADEX and COMEXPERU) to avoid duplication and improve effectiveness.

The creation of the Association of Peruvian Importers of Fresh Asparagus, based in Atlanta, Georgia, United States, was another remarkable achievement of the Peruvian asparagus industry, resulting from its perseverance and coordination with the importers in the United States. The association is made of more than 30 member companies and works together with the Peruvian agro-exporters to improve the participation of the fresh asparagus imports in the United States market.

Horizontal coordination in the provision of services is also seen in the agro-export Peruvian sector. Frío Aéreo Asociación Civil was created in 1998 by the initiative of a small group of visionary agro-exporters to address the problem of breaks in the cold chain owed to the lack of cold facilities in the Jorge Chávez international airport (Lima, Peru). The initiative was developed with the support of the private sector (ADEX) and the public sector (PROMPEX, the Ministry of Agriculture, and the Ministry of Transport). In its initial stages, the association consisted of only nine member companies, which represented 40 percent of the agro-export industry. Currently, 29 companies are members of the association, representing 70 percent of the industry. Frío Aéreo boasts the largest cold terminal in South America and around 77 percent of the total Peruvian exports of perishable products dispatched by air, pass through its cold facilities. Since its foundation, Frío Aéreo has greatly contributed to reducing inefficiency in the logistic chain of perishable products associated with quality losses and long loading times (from 4 hours in 1998 to 1.5 hours in 2005), and provides reliable information for the industry to improve strategic planning. Although the joint public and private efforts to improve logistic inefficiency have yielded important results, the high logistic costs of the sector remain one of the biggest challenges faced by the industry in improving its competitiveness in international markets, as will be analysed in the next section.

4. Analysis of the Peruvian asparagus value chain

Although the asparagus industry in Peru emerged in the mid-1980s, the period of highest prosperity started in the mid-1990s. This can be explained by the shift of commercial farms from the production of traditional crops to more profitable crops such as asparagus, avocados, citrus and grapes. Further, success was owed to the creation of a new category of ‘farmers’, a group of visionary entrepreneurs from the mining, fishery, pharmaceutical and financial sectors who were motivated by the market-oriented policies implemented by the government in the mid-1990s and who decided to invest in the agro-export sector. This section will attempt to characterize the key actors and the Peruvian asparagus value chain in terms of production, logistics, and marketing, within the framework of the encompassing policy environment, infrastructure, institutions, and industries related to the sector.

4.1 THE INDUSTRY ACTORS

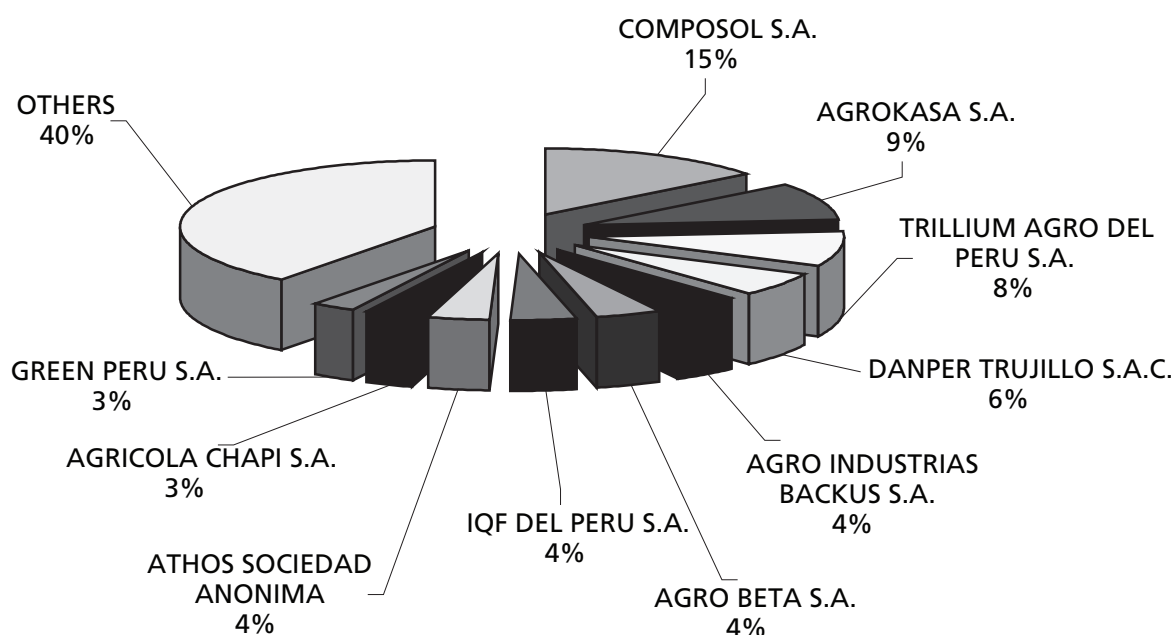
Concentration at the export level

At present, a total of 122 companies dispatch asparagus to international markets; in 1995, only 49 took part in the asparagus exports business. Although these figures indicate the entry of new players, they do not necessarily mean less concentration in this export-oriented industry. For example, in 2005, the share of the two top exporting companies in the value of total asparagus exports reached 23.69 percent. The top five exporting companies shared 42 percent, and the largest 50 companies shared 95 percent of the total Peruvian asparagus export value. The remaining 72 companies shared 5 percent of the total export market (see Figure 10). In other words, 59 percent of the sector shared only 5 percent of the total asparagus export value.

Concentration seems to be higher in processed asparagus exports. The top five companies exported 84 percent of the total value of the processed exports in 2005. Camposol, the largest of them, had a share of almost 30 percent.

In the fresh asparagus export industry, AGROKASA, the largest exporting company, shared 15 percent of the total exports in 2005, a growth of 29 percent compared to the previous year.

Mergers and acquisitions are also clear indicators of higher concentration in the industry. It was recently announced that AGROKASA had agreed to buy Agroguayabito, paying US\$15.2 million to cover the latter’s liabilities, while it will undertake new expenditures of US\$15 million to upgrade the company in the next few years (ProInversion, 2006b).

Figure 10. Companies' share of the total asparagus export value, 2005 (US\$ FOB)

Source: ADEX Statistics, 2005

There is a certain degree of specialization in the operations of the agro-export companies; they are usually either in the business of exporting processed product or fresh products. There are only a few examples of companies that have delved into both – Camposol, Agroindustrias Backus, TAL S.A., Green Perú, and to a lesser extent, Agroguayabito S.A.

Specialization is not the rule when referring to performing exporting or production activities. Most exporting companies are also involved in production activities, and in most cases, for example, AGROKASA, even before engaging in export activities.

AGROKASA, which was founded as a producing company, grows asparagus in an area of 200 ha, marketed through a Spanish processing company located in Ica; it also carries out operations in China. AGROKASA gradually expanded its production areas, and once economies of scale were achieved – calculated on 250-300 ha for vertical integration (based on 2006 interviews) – the company progressively engaged in exporting activities. Initially, AGROKASA rented a packing house and in 2003 built its own. Currently, the company owns three packing houses and a total of 2 704 ha in three *fundos* (farms) are under asparagus (1 814 ha), grapes (367.7 ha) and avocado (521.6 ha) cultivation. The company's exports have showed tremendous growth – 67 163 000 boxes (5 kg) of asparagus were exported in 1998 and 2.08 million in 2005.

But not all exporting companies started by cultivating relatively large production areas. The boom of the sector in the mid-1990s attracted professionals from agriculture disciplines to invest in asparagus production. They started asparagus cultivation in relatively small areas, which were gradually expanded as a result of the profitability of the business and the

productivity growth resulting from the experience acquired and the application of modern production technologies. For example, one of the entrepreneurs interviewed during the preparation of this report got involved in asparagus production in 1995 by establishing 18 ha of green asparagus, representing an estimated investment of US\$100 000. The company has expanded its operations and today dispatches product to international markets. Although the company currently has 150 ha under asparagus cultivation, according to the manager, there is a need to expand the cultivated area to achieve the economies of scale needed in terms of product volume and inputs supply, etc. to facilitate its participation in the export business.

Despite the fact that an important number of producers have been able to integrate upstream in the chain, those with less investment capacity and limited access to credit remain as suppliers to the exporting companies generally through long-term relations (either formal contracts or informal arrangements).

Concentration at the production level

The asparagus industry is highly concentrated at the production level. According to the 1998 asparagus census, around 40 percent of the asparagus producers were considered small-scale producers (with less than 4.9 ha under cultivation), but accounted for only 8.36 percent of the total asparagus supply. Overall data resulting from the census carried out by IPEH in 2006 indicates that concentration in asparagus production is an increasing trend. Specific data from 1998 onward were not available from IPEH to be included here to assess the specific changes in the structure of the production system, resulting from the increased participation of large exporting companies in the production of asparagus since the mid-1990s.

The trend towards concentration in asparagus production can be explained by the highly capital-intensive nature of the asparagus production and processing activities, and the strong coordination needed in the production, post-harvest and distribution stages to produce and maintain quality products and prevent its contamination.

The fresh asparagus supply chain involves several steps from production to export. In the production component, the process begins with selection of varieties, nursery, planting, application of chemical inputs and irrigation, disease control, and harvesting. In the logistics/post-harvest component, fresh asparagus are loaded, weighed, cut, washed, and then sorted, graded, and bunched (0.5 kg). Next, the asparagus are packed in specialized cartons (5-12 kg), pre-cooled and loaded onto refrigerated trucks. They then pass through customs clearance, cold storage and airport handling, and are finally shipped by air; more recently, they are also shipped by sea. The marketing component consists of identification of and negotiation with buyers, market research information, and ensuring completion of sale, etc. Timing is fundamental to maintaining quality product, for example, harvesting is a very coordinated activity, no more than 30 minutes are allowed from harvest to arrival in the packing house in order to avoid deterioration of quality.

Among the production activities, irrigation takes a significant share of total costs. Although the production costs are very much influenced by the ability to operate under economies of

scale, official and unofficial data indicate that this component is important in determining the total cost structure. In the Ica Region, water irrigation comes mainly through the exploration of wells; the exploration of a 50 m-deep well has an estimated cost of US\$20 000–US\$25 000 (data provided by producers interviewed by author, 2006). According to estimations carried out by the Universidad Tecnológica de Peru in February 2006, the cost of establishing a hectare of green asparagus in the Ica Region under modern production technologies was calculated at US\$6 638.35; the cost associated with the irrigation infrastructure represents 75 percent of the total establishing costs. According to unofficial sources, the average cost of irrigation water is US\$0.25 per cubic metre if water wells are used. If the land is irrigated with water from the Chavimochic District, the average cost is approximately US\$0.018 per cubic metre. In the Ica Region, where wells are used, irrigation accounts for around 18.8 percent of the total operative costs per year. According to a study carried out by Escobal, Agreda and Reardon (2000), in the Chincha Valley in Ica, large farmers irrigate 95 percent of their land from wells using the drip method. Small-scale farmers, on the other hand, irrigate only 70 percent of their cultivated land, and use the gravity method, which results in less productivity and poorer quality. Since 2000, private and public programmes promoting the adoption of modern irrigation methods have had a substantial impact on small and medium-scale producers.

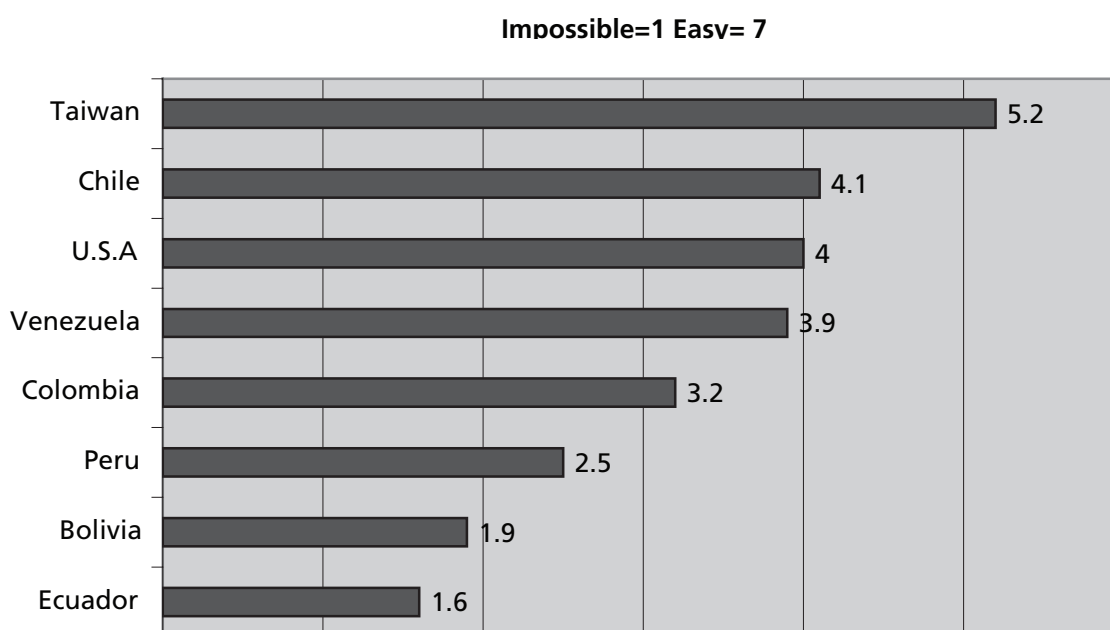
In 2005, imports of technical irrigation equipment for agro-export crops totalled US\$15 million, after doubling between 2003 and 2004. These imports reached their highest level in 1998 (nearly US\$18 million) when most of the initial investment for AGROKASA and Camposol took place (ProInversion, 2006b). This trend is likely to continue with the expected expansion in land under cultivation and the implementation of modern irrigation systems in the land already cultivated.

Official data indicate total estimated establishment costs per ha at US\$5 530 and operational costs at US\$3 660. In terms of labour used, one ha in production generates on average 210–215 labour days per year, with average wages of US\$5.5 per day.

High investment and operative costs, together with the working capital needed to keep an operation running with the level of efficiency required, have been a constraint to the engagement of smallholder horticulture in asparagus production. Access to financial resources has restricted the possibilities of smallholder horticulture to take part in high-value export chains. Although the situation has improved in recent years, access to credit is still an important constraint to the development of the industry, mainly at the small and medium enterprise (SME) level.

Clearly, the need to reduce costs, improve efficiency and reduce uncertainties is pushing towards higher concentration and vertical integration in the industry.

Figure 11. Access to credit



Source: Encuesta empresarial (business survey). The Global Competitiveness Report 2001-2002. Reported by MINCETUR, 2003, in the National Export Strategic Plan (Plan Estratégico Nacional Exportador-PENX).

4.2 COORDINATING MECHANISMS: PRODUCER-BUYER LINKAGES

The asparagus supply chain is not very complex. Companies' supply needs for asparagus are satisfied through formal or informal relations with producers or market intermediaries, and/or through vertical coordination. Although there are informal assemblers buying the product from farmers, mainly small-scale farmers, and then selling it to the agro-export companies, this is not the usual system implemented by export companies for the supply of asparagus. Companies prefer reliable suppliers and tend to enter into medium- and long-term verbal or written relationships with their suppliers.

Vertical coordination

The relationship between the agro-export companies and the *fundos* is generally formalized in a written agreement or contract. There is not a standard contract. The terms of the contracts vary from the very basic agreement on quality, volume, duration and mechanisms for determining price (market specification contracts), to including a provision of technical assistance and inputs (supplying resources and production management contracts). Prices can be negotiated on a weekly, monthly or yearly basis. The agro-export firms prefer to enter into long-term relationships with large- and medium-scale producers that can supply large volumes and consistent quality product, and more specifically, in the case of fresh asparagus producers, can also prove that they observe GAP.

While contracts are usually made directly between the producer and the agro-export company, in the Chincha Region, an interesting model involving the participation of an intermediary party

has arisen. Barraco and Ruíz (2006) describe the example of Comercializadora de Productos Agrícolas S.A.C. (COPRA). This company acts as an intermediary broker between the producer and the exporter, and functions more as a logistic and administrative operator facilitating the linkages between producers and exporters. From the production side, COPRA acts as a technical adviser by supervising the crop, ensuring a market for the harvested product, and representing the producers' as well as other farmers' interests in negotiating the contractual conditions with the company. For the latter, COPRA guarantees an opportune and consistent quality product supply, with the subsequent reduction in transactional costs for the firm involved in supervising the fields and searching for reliable suppliers. Most of the contracts imply exclusivity on the total harvested volume, which is classified in three categories (quality A, B, C, and rejections), with differential prices according to each category. The duration of the contract depends on negotiations, but it can last up to four years, with adjustment of prices every year. A penalty is established in the case that either party fails to comply with the terms established. However, several exporters interviewed highlighted that relationships are based on trust, so producers failing to comply with the contracts are excluded by the companies from their list of suppliers.

Verbal agreements are also in place and are built on the basis of successful long-term relationships with reliable suppliers.

Vertical integration

It takes years to open new markets and build a name as a reliable supplier, but just a few minutes to ruin it. Asparagus exporters have understood this well. Most if not all exporting companies have established asparagus crops on owned or rented land to fulfil an important part of their needs. The structural reforms introduced in the mid-1990s made it legal for agro-industrial firms to own cropland and then vertically integrate. Although further studies are needed to quantify the share of the companies' supply coming from vertically integrated operations, it is certainly significant. Many agro-export companies are increasingly expanding production on their own land. AGROKASA, the leading export company of fresh asparagus, is completely vertically integrated. Camposol S.A. acquired 4 900 ha in the Chavimochic irrigation project and 2 900 ha in the Piura Valley, many of which are cultivated with asparagus and other high-value exported products. Trillium Agro del Peru, the third main exporting company, is setting up a very expensive hydraulic infrastructure to irrigate 484 ha (obtained through auction in 2004), reported by the Chavimochic Project, to expand the production of mainly green asparagus. Agricola Chapi has 500 ha of asparagus under cultivation and Green Peru is expanding its own crops by establishing 118 new ha of green asparagus. In general, the trend is towards higher vertical integration.

Reduction in transactional costs resulting from the economies of scale and the need to ensure a consistent quality supply are some of the reasons motivating companies to vertically integrate as a way of reducing product supply uncertainties. Given the highly competitive asparagus international market, Peruvian exporters are working hard to improve efficiency and competitiveness, which may be achieved by having control over the upstream operations, from production to distribution.

In addition, based upon interviews with industry representatives (July 2006), previous negative experiences with contract farming have also been one of the reasons persuading companies to

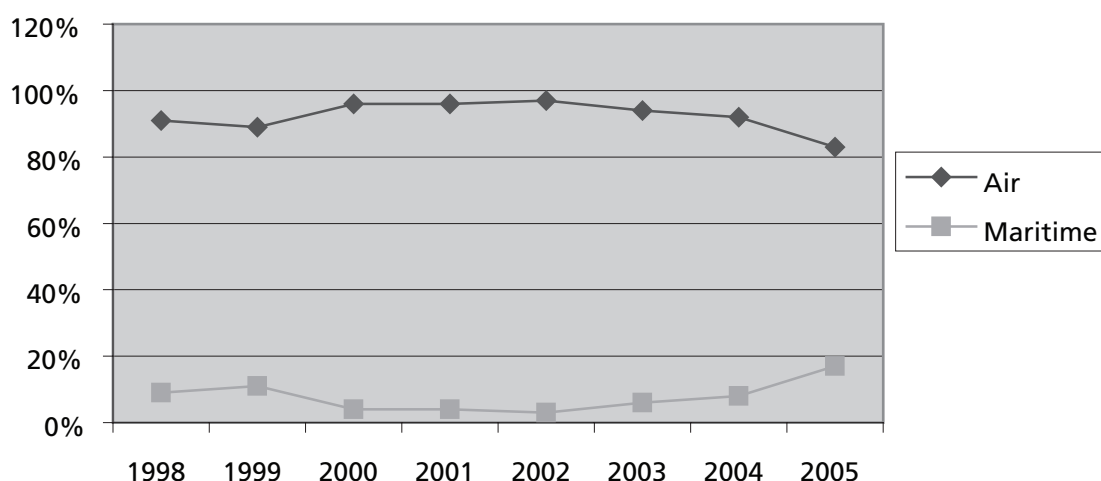
fully integrate in order to avoid uncertainties associated with failed contracts. Contract farming works well with the category of producers that have developed managerial skills and who have a clear understanding of the business – those that recognize the importance of quality and safety improvements, the role of innovations, and the importance of working together with buyers in achieving efficiency and improving competitiveness.

Developments in the distribution systems are showing signs of further upstream integration in the chain. Traditionally, asparagus exporters have negotiated with brokers rather than directly with retailers. Most recently, some companies have been entering into direct relations with retailers in an effort to improve the Peruvian exporters' share on total market margins. Although still in an early stage, the trend is towards the establishment of distribution centres and sales centres in destination markets.

4.3 LOGISTICS COSTS

Logistics is a major determinant of an industry's competitiveness or weakness. In the Peruvian asparagus industry, the latter is the case, owed mainly to the lack of proper infrastructure for transportation, storage, packing, and inefficient handling and administrative procedures in the ports. In 2004, 91 percent of the total volume of fresh asparagus was exported through air customs in El Callao, whereas 6 percent was exported through maritime customs in the same port, with increasing participation of sea transportation in 2005 (see Figure 12). In the same year, fresh asparagus accounted for 92 percent of the total Peruvian air exports of perishable goods.

Figure 12. Air and maritime transportation for fresh asparagus (in percentages)



Source: Frío Aéreo, 2006.

Air transportation is relatively efficient in reducing quality deterioration, compared to maritime transportation, but is increasingly costly. It represents around 45 percent of the total cost of the product, approximately US\$1.1-1.2 per kg, and is highly influenced by fuel prices. Table 3 shows the price structure of a kg of asparagus dispatched to the United States market.

Deficiencies associated with poor packing, loading, lack of coordination and delays imply additional cost and product losses, mainly during the period of major concentration of exports (weeks 23 to 51).

Table 3. Price structure of fresh asparagus exported to the United States (Miami, Florida)

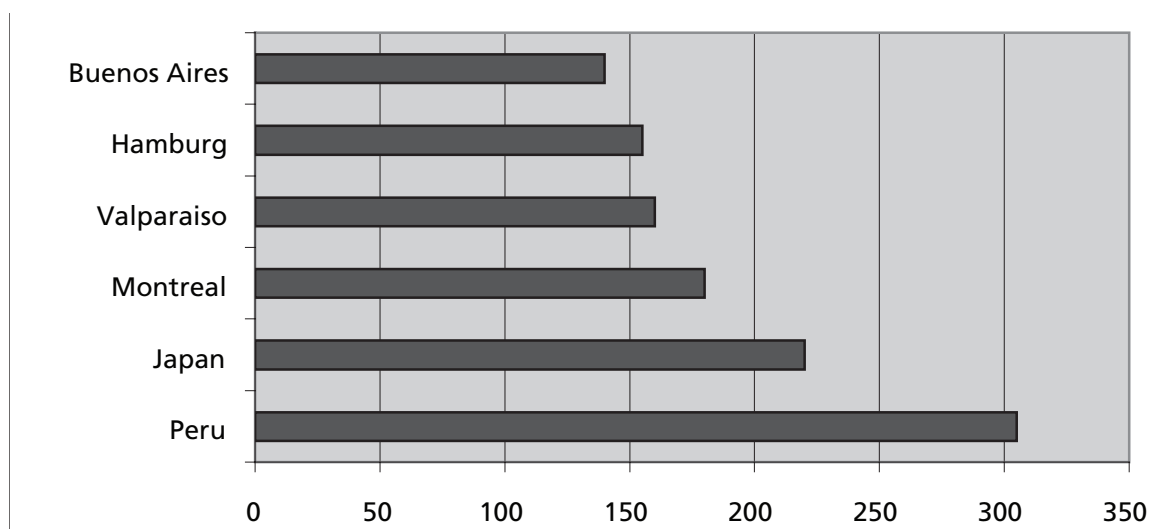
	1 Box (5 kg)	Price/kg	Percentage	Price/kg*	Percentage
Raw material (harvested product)	4.50	0.90	30.00	0.90	35.71
Packing	2.00	0.40	13.33	0.40	15.87
Land transportation	0.20	0.04	1.33	0.04	1.59
Storage and loading	0.20	0.04	1.33	0.04	1.59
Air transportation	5.70	1.14	38.00	1.14	45.24
External logistics	1.10	0.22	7.33		
Wholesaler	1.30	0.26	8.67		
Total	15.00	3.00		2.52	

* No activities in destination markets are included.

Source: Data presented by Frio Aéreo, 2006

According to the study carried out by the Andean Development Corporation (CAF) in 2004, El Callao port is the second most inefficient port of the Andean Region, behind the Puerto Cabello port in Venezuela. Operational costs are extremely high compared with other ports in the region (see Figure 13). Also, deficiencies are evident in the infrastructure network, particularly access roads to El Callao, and in the quality of the stock and service of the freight transport providers. In Peru, the average age of the fleet is over 15 years old; the supply of appropriate transport service containers and other vehicles with temperature control is very low, at around ten percent of the fleet (World Bank, 2005).

Figure 13. Port costs



Source: National Strategic Export Plan (PENX) 2003-2013. MINCETUR, 2003.

Peru's main challenge for improving the competitiveness of the agro-export sector is to increase efficiency in the logistics chain. According to IPEH, the asparagus industry needs to work hard to reduce maritime and air transportation costs by freeing up El Callao port and facilitating the operation of ports in other strategic locations (e.g. Trujillo and Pisco); promoting investments in infrastructure for storage, packing and distribution; improving the supply of maritime and air freights and increasingly using multimodal transportation systems, for example, by combining sea and air transportation. Although progress in sea transportation has been achieved, product quality problems need to be solved before an expected take-off in the use of sea transportation can occur.

On the other hand, fragmentation of exports is also a constraint for improving competitiveness and reducing logistics costs. In 2005, a total of 122 companies took part in the asparagus export business – with 59 percent of the companies sharing only 5 percent of total asparagus exports. Certainly, the sector would benefit from a higher concentration of export volumes through the development of export consortiums. Horizontal coordination to perform export activities would contribute to achieving economies of scale, reduced transactional costs, and improved negotiation power in relations with buyers.

CONTRIBUTIONS OF THE ASPARAGUS INDUSTRY TO THE DIVERSIFICATION OF PERUVIAN AGRO-EXPORTS AND PROMOTION OF DEVELOPMENTS IN RELATED INDUSTRIES

Peru has mainly depended on primary product exports, with mining and fisheries production ranking at the top of the traditional country exports. Dependence on traditional exports exposes the economy to shocks from volatile commodity prices and weather conditions. Diversification of exports is encouraged to mitigate the impact of international prices and increase value-added levels (World Bank, 2005). However, increasing the value of exports is not an end in itself, but rather a means of accelerating the pace of economic growth (FAO, 2005). Diversification of exports, by increasing participation of high-value products, is progressively showing remarkable results in Peru, reflected in their contribution to agriculture Gross Domestic Product (GDP), 8 percent in 2005. Undoubtedly, the asparagus industry has contributed to the export boom of high-value products and to the promotion of developments in related industries, as well as acting as a key driver for employment generation.

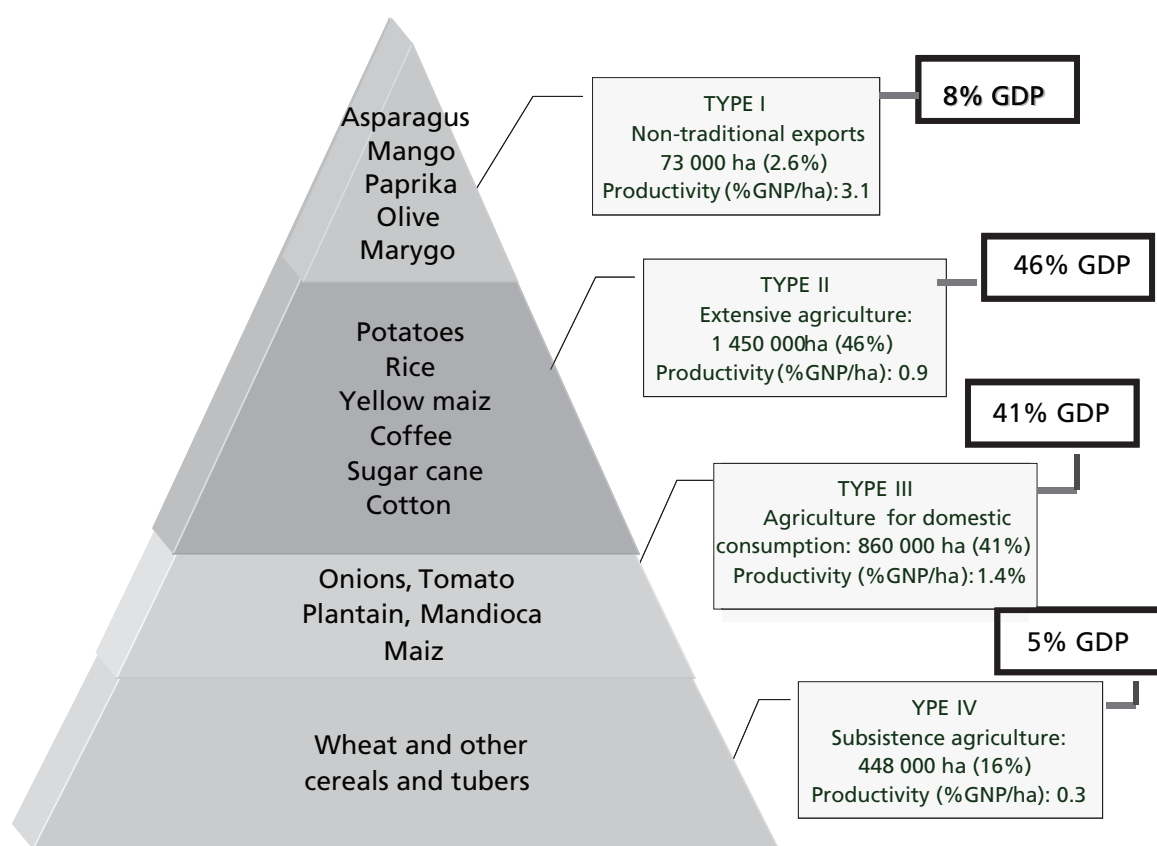
Asparagus industry and non-traditional exports

Although the focus of this study is to analyse the development of the asparagus industry, it is important to take into account that this development has not occurred in isolation. The export boom experienced by the non-traditional Peruvian export sector involved not just asparagus but also other high-value export products. Non-traditional exports have expanded and diversified significantly since the mid-1990s, growing at an average annual rate of 20.3 percent (ADEX, 2006). Impressive growth rates are observed in products such as paprika, artichokes, grapes and avocado.

The contribution of the asparagus industry to the development of other high-value export chains is undeniable. The experience gained by the asparagus industry since the

mid-1980s generated the necessary confidence in the Peruvian entrepreneurs to invest in other high-value export commodities, taking advantage of the installed processing infrastructure and market opportunities; this has been particularly crucial in the artichoke export chain. Artichoke exports have grown at an annual rate of 30.7 percent in the last three years. This development has been possible because of the initiative of a group of green asparagus entrepreneurs in search for export diversification possibilities. The agro-exporting companies are increasingly diversifying their operations by getting involved in the production and export of other high-value products. The growth in exports has largely come as a result of the expansion in land under cultivation. In 2005, non-traditional export crops occupied 2.6 percent of the cultivated land and contributed to 8 percent of agriculture GDP, with a productivity/land ratio considerably higher than that of extensive commercial agriculture.

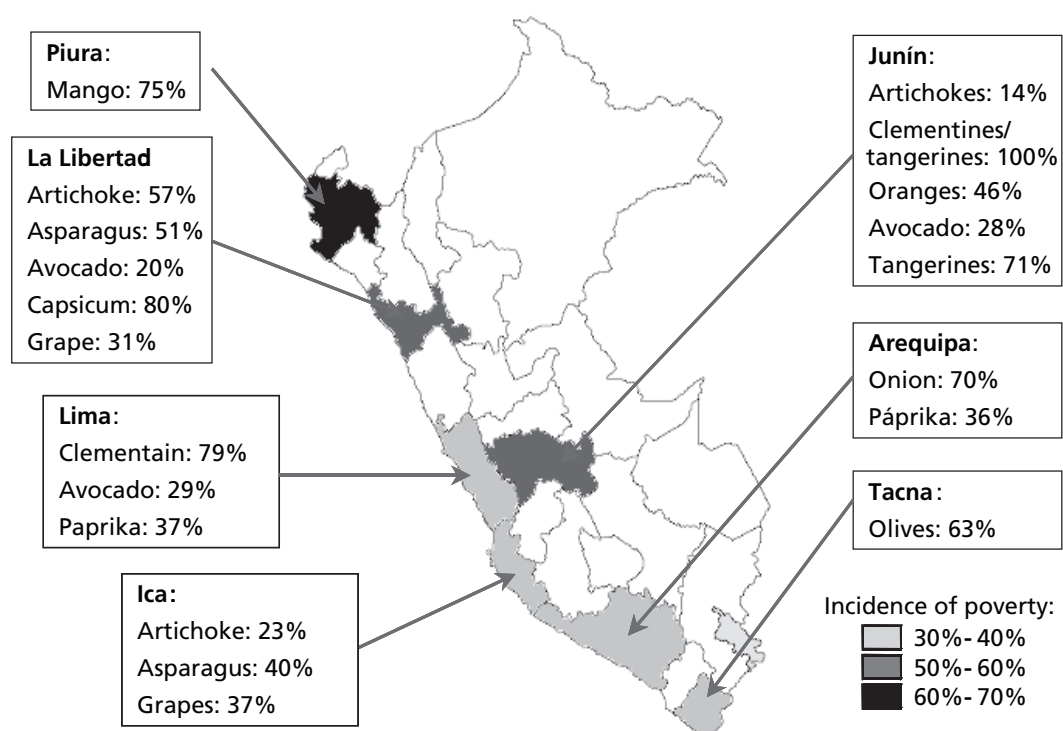
Figure 14. Participation of non-traditional agriculture in total agricultural production



Source: ADEX, 2006.

The agro-export sector has been mainly developed in the coastal plains, as shown in Figure 15, with a certain degree of specialization in the production of specific crops. The geographical conditions give Peru an extraordinary competitive advantage owed to the possibility of achieving high yields per ha and taking advantage of off-season market opportunities.

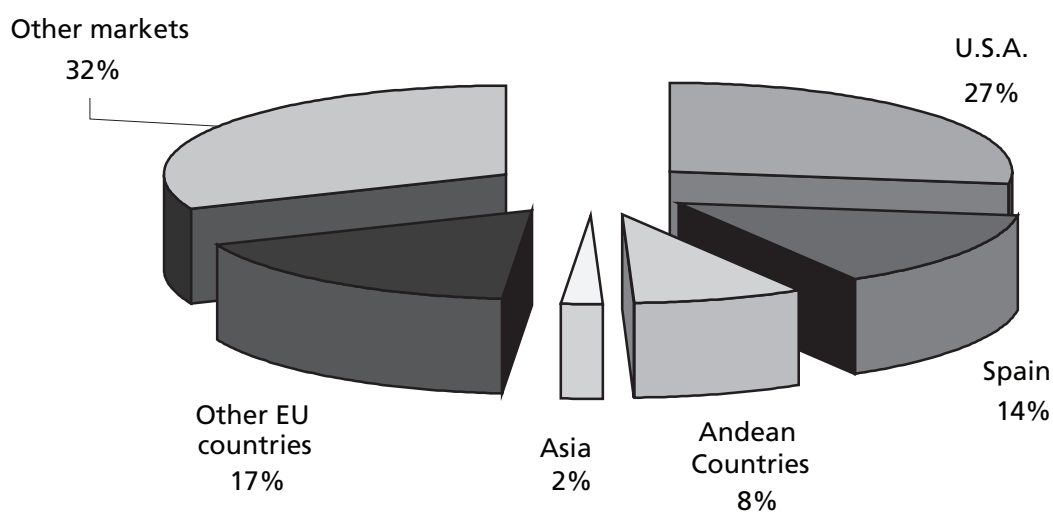
Figure 15. Geographical distribution of Peruvian agro-export production areas



Source: ADEX, 2006

Diversification of markets is also an important achievement. Although the United States and Spain concentrated 41 percent of the non-traditional exports in 2005, there is an increasing participation of Asia and regional markets. New market niches for higher value-added products, such as preserved artichokes and organic mango and banana, are gaining importance within the Peruvian agro-export's 'basket'.

Figure 16. Market destinations for non-traditional exports (2005)



Source: ADEX, 2006

The participation of smallholder horticulture is a clear characteristic of mango, paprika and organic banana supply chains. Unofficial data estimates approximately 19 000 producers involved in mango production covering a total of 9 000 ha; in paprika, 85 percent of the production units have less than 5 ha; in artichoke production, small-scale producers located in Junin produce spineless varieties – the bottom part of the product is used by the processing industries and the remaining part is sold in the domestic market. The spiny varieties are commercially grown by large producers (generally also the exporting companies) and exported either as fresh or processed product.

Linkages between agro-processing companies and small producers are formalized, generally through written contracts, which also usually include the provision of inputs and technical assistance. Vertical integration is common in grapes, avocado, artichoke (spiny) and citrus supply chains.

The prospectus of the Peruvian agro-export sector is very promising. Since 2001, SENASA has opened markets for 51 horticultural products through compliance with phytosanitary requirements, including: melon, watermelon, garlic, tomatoes, medicinal plants, mango and others. In 2006, with the approval by APHIS of the quarantine treatment for citrus, Peruvian citrus can be exported to the United States; export increases of around 40 percent (Llona, 2006) are expected. Continuous private-public investments in the promotion of high-value export products, better knowledge of the markets, improved export infrastructure and innovations, and availability and access to credit are together expected to yield substantial gains for the sector in the coming years. The contribution of the asparagus industry to the diversification boom experienced by the agricultural Peruvian sector in the late 1990s has certainly been significant.

Promoting developments in related industries

The figures on the astonishing growth of the asparagus exports during the last decade are an unquestionable indicator of the positive economic performance of the sector. According to estimations carried out by Frío Aéreo, 35.7 percent of the value generated from production to port of dispatch (including air transportation) corresponds to farm activities; 15.8 percent to activities performed in the packing houses; 1.6 percent to land transportation; 1.6 percent to storage, loading and export logistics in the port and 45.24 percent to air transportation. Although the benefits generated by the asparagus industry to industry-related activities are difficult to quantify, the shared margin of these activities on the asparagus value chain may indicate that in the last decade, parallel developments were needed in these industries to effectively respond to the dynamics of the asparagus and other high-value export chains. Therefore, the indirect effects of the industry on the development of complementary industries supplying services to the chain, such as transportation, packing services, inputs and certifications cannot be ignored. For example, 95 percent of AGROKASA's needs of packing materials came initially from imports, at present 100 percent of its demand (three million boxes per year) is satisfied through domestic suppliers (Mr. Chilmer, General Manager, AGROKASA, press comm., 2006).

4.4 SOCIAL IMPACT

In terms of direct employment generation, regulatory interventions such as Law 27360 launched in October 2000, which approves the norms of promotion of the agrarian sector, introduced important changes to labour conditions to be applied to the agricultural sector.

Although highly criticized by some sectors (*Diario La República de Lima*, 22 November 2004), according to Peruvian entrepreneurs, the law takes into account the seasonal nature of the agricultural activities, facilitating the hiring of temporary workers during specific periods and eliminating the need to enter into long-term labour contracts, thus contributing to improving the labour cost/efficiency ratio, which is fundamental to increasing competitiveness.

Employment rates in Ica and La Libertad are one of the highest in the country. Since 2003, the employment rates have grown 25 percent in Ica, 12 percent in Piura, 9 percent in Chincha, 8 percent in Pisco and 6 percent in Trujillo as a result of agro-export activity (reported by Programa Sierra Exportadora, 2005 – President Garcia's initiative for export development in the Sierra Region). The seasonal nature of the production activities implies the migration of agricultural workers from other regions to engage in asparagus production, harvesting and post-harvest activities. The limited availability of labour during peak harvest periods is one of the difficulties faced by the sector that must be overcome to ensure the expansion of the asparagus industry.

Although not yet quantified, the impacts of the development of the asparagus industry on the reduction of rural migration from Ica and La Libertad towards the main urban centres must be taken into consideration.

Few attempts have been made to analyse the direct and indirect effects of the asparagus industry on farm and non-farm employment. What is clear so far is that the industry has had several positive social impacts. According to some individuals interviewed during the preparation of this report, the development of the asparagus industry has brought an immeasurable change in the mentalities of the actors involved.

4.5 GOVERNMENT STRATEGIES TO IMPROVE EXPORT COMPETITIVENESS

Facilitating exports and trade, and improving diversification of traditional exports were some of the goals of the Toledo administration as part of the government's competitiveness programme, which also focuses on regional competitiveness, decentralization, reduction of logistics costs, improved public service infrastructure, improved investment climate, and contract enforcement resolution.

In 2003, in order to facilitate and promote exports, the government launched the National Strategic Export Plan (NSEP) 2003-2013. To implement this plan, the government has started a series of activities, including the initiative to increase and diversify the regional mix of exportable products and prepare regional export plans in collaboration with the private sector. At present, 12 regional export plans have been prepared and seven promising exportable products have been identified. Detailed studies aiming to identify challenges, opportunities and recommendations to achieve the export potential of these products are under implementation. In an effort to promote and identify market opportunities and diversify market destinations, the government published a study in July 2006 on the market opportunities for Peruvian exports in 17 destination countries. In this area, the Peruvian Government has been active in the promotion of bilateral agreements with the United States, Mexico, Thailand and Singapore, and regional agreements with the EU, through the Andean Community (CAN) (World Bank, 2005).

The government is also working on establishing regional offices as part of the decentralization programme in order to promote increased exports and private investment, improve product quality and enhance variety of exporting goods. These offices are expected to use the expertise of the government agencies involved in export promotion – The Peru Ministry of Commerce and Tourism (MINCETUR), (PROMPEX), Private Investment Promotion Agency (PROINVERSION) and the Commission for the Promotion of Micro and Small Enterprises (PROPYME).

The government initiatives that promise to have a major impact on the asparagus industry in the short and medium term relate to the facilitation of access to financial instruments and improvements in production and export logistics.

The Peruvian Government is working on the establishment of new export-oriented financial instruments (Programa de Financiamiento Integral para el Sector Exportador, Fondo Transandino Peru, Plan Maestro de Facilitación del Comercio Exterior, etc.), including those targeting the needs of SMEs with export potential. For example, the programme *Producto Financiero Estandarizado* was created by Corporación Financiera de Desarrollo (COFIDE) to provide financial support to SMEs in order to implement improvements in production infrastructure, including modern irrigation systems, and to fulfil working capital needs. Additionally, it is expected that during President García's current administration, the Agrarian Bank – created during his first presidential period as part of the government's proposals to facilitate credit to small-scale producers – will be strengthened.

Although there are no government initiatives, the efforts to promote private investments (targeting mainly SMEs) carried out by CAF and the Inter-American Investment Corporation (IIC) – a multilateral financial institution that is part of the IDB group, either through direct loans or the financial sector – have been crucial to the development of the industry. For example, in 2005 the IIC approved a loan to the agro-export company Green Peru for US\$1.5 million to support processing infrastructure and quality programmes. The project is expected to generate 361 jobs and more than US\$50 million in income resulting from increased exports. Initiatives supported by funds from international cooperation are *El Fondo de Iniciativas de Articulación Comercial*, implemented by Consorcio de Organizaciones Privadas de Promoción al Desarrollo de la Micro y Pequeña Empresa (COPEME). The Consortium of Private Organizations to Promote the Development of Small and Micro Enterprises (COPEME), created in July 1990, is a non-profit association dedicated to promoting the development of micro and small enterprises in Peru. It groups together more than 60 institutions. COPEME in cooperation with La Cámara Nacional de Comercio, Producción y Servicios (Perucámaras) and under the auspices of USAID – promise to have important impacts in supporting the development of SMEs in the areas of quality certification, market linkages and information improvements.

In terms of the optimization of export logistics infrastructure, Peru's government agenda includes the promotion of private investments through the establishment of concession programmes for the rehabilitation and modernization of roads (i.e. the road-cost Sierra Programme. The road-coast sierra programme aims to grant in concession 28 existing inland roads that connect the production centres located in the valleys with the trading centres located in the ten departments of the Peruvian coast, building port infrastructure and facilities and promoting private investments in a number of airports and landing strips. Other areas include

the strengthening of customs intelligence and control systems. In this regard, MINCETUR is leading the development of an integrated information system for the export trade to consolidate information on trade statistics, business opportunities and import-export procedures, etc. In parallel, a single web portal (*ventanilla unica*) is being developed to serve as a single access point for information regarding public regulations and importing and exporting procedures (World Bank, 2005).

In terms of promotion and productivity enhancement, the government is working on the implementation of the Plan Nacional de Normalizacion Productiva, which includes programmes such as *Exporta Peru*, *Comprale al Peru*, *Exporta Calidad*, *Programa E-Commerce*, and another programme for strengthening the infrastructure for testing and quality certification, updating laboratories and modernizing procedures, among other activities (World Bank, 2005).

The initiatives undertaken by the Toledo administration are expected to continue under President Garcia's administration, with emphasis on ensuring that the development achieved in the Peruvian coastal plains can be extended to the interior valleys. President Garcia has proposed the Sierra Exportadora Programme (SEP), with the aim of promoting export developments in the interior regions that concentrate high levels of poverty. The programme aims to incorporate 150 000 ha into agricultural production and generate 300 000 new jobs (direct and indirect), in the next five years. The funds needed to implement the SEP are expected to come mainly from multilateral organizations: a loan for US\$25 million from the World Bank; a credit line already ensured by CAF to support the programme and funds coming from the IDB will be directed to support the programme.

The programme has the support of the private agro-export sector, represented by AGAP, ADEX and Sociedad de Comercio Exterior del Perú (COMEXPERU). For example, AGAP, the organization that brings together the associations of agro-producers and exporters, has started a process of identifying possible foreign partners to jointly implement several projects of the SEP. The programme includes, *inter alia*, the provision of incentives for private sector investments in these regions, the improvement of logistics and production infrastructure and access to credit. However, the most interesting components of the programme are: (i) the clear agribusiness approach of the programme in supporting export opportunities in different sectors (agriculture, agro-industry, livestock production, manufacturing, services, etc.) and specific chains (a total of 40 chains with export potential have been identified); (ii) the promotion of linkages among different actors; and (iii) the regional and local approach for promoting rural developments. The programme will prioritize business opportunities according to identified market demands and by focusing on organized producers (associations). The technical and financial components of the programme will be oriented to support intermediary organizations, acting as facilitators in the promotion of linkages between producers and markets, for example, by providing marketing and technical services to farmers, consolidating product supply, etc. In September 2006, the Peruvian National Agrarian Commission approved the creation of the programme as a first step in putting this very challenging initiative in place, which is the pillar of President Garcia's current administration.

5. The challenges ahead

5.1 EXPANSION OF THE AGRO-EXPORT FRONTIER

As mentioned previously, the asparagus industry has benefited from government interventions to overcome failures on land and labour markets. Through these reforms, agro-entrepreneurs were allowed to own land and thus vertically integrate and were given more flexibility in hiring workers according to the specific needs of the production and processing system. Few efforts were made by the government to overcome market failures regarding missing or imperfect capital markets. The use of land as collateral to access credit has been limited by the inefficient process of providing land titles. In some cases, land under asparagus production is still under common property rights, resulting from the land reform implemented in the early 1970s, and property rights on land auctioned-off by the government in the mid-1990s, have not yet been transferred to the new owners through legal documentation.

Contrary to the usual scenario introduced by land reforms, where small-scale farmers are reduced to marginal areas that are more fragile and less fertile, the land reforms implemented in the 1970s fragmented the property land and created a large category of small-scale producers located in the coastal plains, where soils and climate conditions were ideal for agro-export crops. The producers having managerial skills and access to credit or private financial resources have been able to engage in asparagus and other high-value crop production. Lack of credit has been one of the constraints to the participation of smallholder horticulture in the high agro-export value chains, and to the growth of small and medium-size agro-processing companies. Selling labour, renting land or producing alternative crops (requiring less strict and intensive input regimes, and in general, less capital-intensive) have been the small-scale farmers' options. The fragmentation of the land, as result of the land reform, is seen by the asparagus industry as a threat to the expansion of the sector, as indicated in the Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis prepared by IPEH (See Annex 4).

The projections for the Peruvian agro-export sector estimate a total of 250 000 ha dedicated to fruit and vegetable exports in 2010. This will imply the establishment of at least 170 000 new ha. The options for the expansion of the agro-export frontier in the coastal plains are the replacement of crops (e.g. cotton, rice, and sugar cane) on existing agricultural land and/or the recovery of quasi-abandoned land (Proinversion, 2006b).

The conversion of existing cultivated land into asparagus and other agro-export crop production can be done either by renting or buying land – even small plots – to establish crops owned by the companies, or through the promotion of linkages between agro-exporters and producers. The agro-firms' decision on whether to vertically integrate or vertically coordinate will depend greatly on the possibilities to reduce transactional costs and the uncertainties associated with the purchase of quality product from external suppliers. Government and private sector interventions would be crucial in facilitating the involvement of potential

small and medium-scale farmers in the export chain of high-value products through vertical coordinating mechanisms, such as production management and resource-providing contracts. The participation of an intermediary party, either an independent party or a producer's association, providing marketing and technical services to farmers and, on the other hand, consolidating product supply and reducing transactional costs for the agro-exporter, is a possible way to facilitate the participation of small and medium-scale farmers in the agro-export value chain. The government could play a key role in this process by supporting programmes to facilitate the adoption of quality and safety schemes, and providing continued support for the application of modern irrigation and other production technologies in order to increase small and medium-size producers' possibilities to upgrade their operations. The establishment of incentives for the creation and consolidation of intermediary institutions facilitating the links between farmers and agro-exporters is highly desirable.

Successful experiences of vertical coordination through the involvement of intermediary organizations in asparagus can be seen through the participation of COPRA in the Ica Region, as well as artichokes in Junin Region and paprika in Lambaye Region through the participation of TechnoServe Inc.

For mango, the model has included the establishment of direct contracts between the exporting companies and the producers' associations, as in the case of Asociación de Productores de Mango del Alto Piurá (Mango Producers' Association of Alta Piurá – APROMALPI). In these cases, government support for the consolidation of these associations is highly necessary.

However, the trend followed by the asparagus and other agro-export chains towards a high concentration in the supply and demand sides will likely continue and even strengthen in the coming years, mainly owed to the need to achieve economies of scale to ensure sustainability.

Therefore, the opportunities for small and medium-scale horticulture to be engaged in high-value chains seem to be more feasible in the agro-export chains currently under consolidation as well as those yet to be established in the internal valleys and mountains as a result of identified market opportunities. The need for diversification of agro-exports, associated with the costs and scarcity of water resources in the coastal plains, are good incentives for agro-firms to invest in the interior valleys. With the expansion of cultivated land in the coastal plains, the practice of drilling wells to extract groundwater for agriculture use has also expanded, from a total of 800 wells in the early 1990s, to 2 193 at present, of which 733 are for agriculture purposes. This expansion, associated with reductions in the rain levels, has resulted in consequential reductions in the phreatic surface (20-90 cm/year) (reported by *El Comercio Peru Edición Prensa*, 30 May 2005). The practice of drilling wells depends on the understanding of the water table. The feasibility of drilling a viable well depends on the depth of the water table (phreatic surface). With a lower phreatic surface, drilling costs are higher.

However, the expected multiplier effect of the surplus generated by the agro-exports in the coastal plains in promoting developments in the non-coastal regions will be directly linked to the capacities of the public sector to generate incentives for private investments and to overcome market failures in export logistics infrastructure and credit. The SEP attempts to overcome the bottlenecks to the development of agro-export chains in the internal valleys and mountain regions, allowing the engagement of small and medium-size producers in high-value export

chains. Some agro-exporters have decided to initiate pilot projects to assess the feasibility of future larger investments in these regions. The success of these initiatives will depend greatly on the effective coordination of public and private efforts.

5.2 CONSOLIDATION OF EXPORT VOLUMES

As previously discussed, the asparagus industry has also benefited from initiatives promoting horizontal coordination and quality and safety improvements led by PROMPEX and other public institutions. The coordination among exporters and producers through associations has been one of the industry's major achievements. The challenge ahead is to implement coordinating mechanisms allowing the consolidation of export volumes in order to reduce logistic costs and improve negotiation power in the relations with supermarkets, brokers and importers. This is fundamental to the sustainability of the small and medium-sized agro-exporting companies, whose share of the total export volume is only 5 percent, distributed among 62 companies. Initiatives, such as the GECEX project implemented by PROMPYME, which includes incentives for establishing export consortiums, should be encouraged.

The project GECEX aims to develop the capacities of small/micro companies to participate in export clusters suited to the demands of international markets. The project period is two years, from December 2004 to December 2006, and comprises three stages. The first stage is 'strengthening the structure' (2005), in which the capacities of centre staff and staff in local governments (ten states) are developed. Surveys are conducted with 3 000 companies in ten states, of which 2 500 companies that can export in the future are registered in the centre's information system. The second stage is 'strengthening small /micro companies' (2005-2006), which examines surveys from business assessments of 1 800 companies, of which 800 will undergo capacity development to begin exporting. The third stage is 'business collaboration' (2005-2006), in which 240 companies are chosen using a vertical labour specialization scheme. In addition, around ten consortiums are formed with 10-15 companies per consortium.

5.3 MARKET EXPANSION THROUGH INNOVATIONS

Innovations at the production and product level have largely been the result of individual, private efforts. Product differentiation based on innovations as a competitive strategy is clearly one of the pillars in the Peruvian export strategy. For example, AGROKASA's exports comprise a mix of 74 different forms/presentations of fresh asparagus. The need for product differentiation has led to the development of close and long-term relationships with buyers, which facilitate the flow of information and the sharing of promotion costs and other investments. The possibilities for innovations are based on knowledge of the client's desires and needs. Although studies on market opportunities and trends are valuable, they complement, but do not replace, the knowledge acquired through the development of close relationships with the clients in international markets. Therefore, innovations in the industry organizational strategy to perform marketing activities are highly necessary to increase competitiveness and ensure the industry's sustainability. Integration upstream in the chain through the establishment of distribution

centres and sales centres in the importing markets seems to be the road map for future market developments. Frío Aéreo has been quite effective as a model of horizontal coordination for the reduction of logistic costs and increasing efficiency in the port of dispatch. This model for product distribution and sales in importing markets may be a possibility to be considered in order to increase the sector's margin shares and competitiveness.

On the other hand, the centres for innovation and technological development (Centros de Innovación y Desarrollo Tecnológico-CITES), recently created by the Ministry of Production (PRODUCE), as part of the national system for science and technology, play a key role in assisting SMEs in putting into practice identified opportunities for innovations in order to increase their competitiveness in the international markets.

5.4 COORDINATION OF THE PUBLIC AND PRIVATE SECTOR

The participation of the private sector has proved effective in strengthening the capacities of public institutions to perform their technical roles, as in SENASA, whose directive committee is integrated by representatives of the private and public sectors. The challenge ahead is to provide continuing support to strengthen its capacities to effectively perform its role. Institutional changes to reduce political influences and maintain the institutions' technical and regulatory roles are fundamental in supporting the development of the export sector.

The NSEP 2003-2013, established with the private sector, includes policies aiming at reducing the technical, financial and bureaucratic constraints faced by the sector and improving logistic infrastructure. Measures to achieve this have been gradually put in place by the government under the Toledo administration, and are expected to continue under the administration of President Garcia. These measures include: facilitating access to production inputs and modern technologies such as the programme of incentives to promote modern irrigation systems, Proyecto Sectorial de Irrigation (PSI), implemented by the MINAG; mechanisms to facilitate access to credit; mechanisms to facilitate private investments in transportation and irrigation infrastructure; and strengthening of public institutions, etc. At present, a law attempting to facilitate Peruvian foreign trade is pending approval by the Peruvian Congress. One benefit of the law is the creation of a *ventanilla unica* – a single web portal – in the customs department for consolidating trade information into a single access point. Another benefit of the law is that it reduces the overall tax burden to exporters.

In the implementation of these measures, a high degree of coordination is required within the public sector agencies, with the private sector institutions, and between the private and public sector. Public institutions working in the promotion of exports include PROMPEX, MINCETUR, PROPYME, PROINVERSION, the Ministerio de la Producción (Ministry of Production – PRODUCE); and institutions in the private sector include AGAP, ADEX, IPEH and COMPERU represent the interests of the agro-export sector. The sector will certainly benefit from closer coordination and cooperation.

The asparagus industry is certainly made up of a skilful class of entrepreneurs that have been able to overcome technical difficulties, lack of experience and knowledge associated with the production and export of asparagus. Although most of the efforts to consolidate the industry

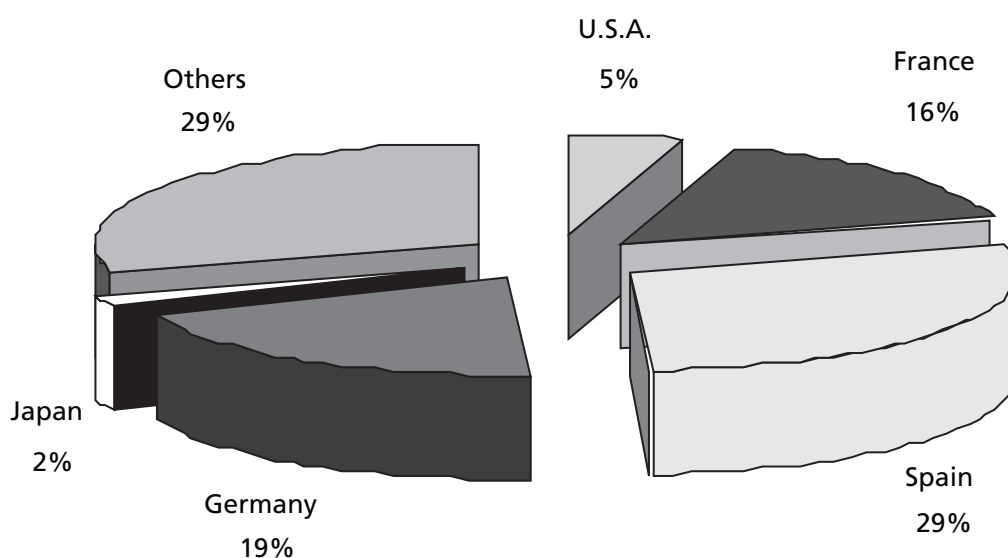
in terms of producing and marketing innovations, investments, etc., have been implemented by the private sector, public sector policies that facilitate private sector interventions have also played a fundamental role.

The sustainability of the asparagus industry will depend greatly on the coordination of public and private efforts to solve the bottlenecks faced by the industry, including the proper management of critical production resources (e.g. water). It will also depend on the industry's ability to diversify the range of agro-export products, reduce logistic inefficiency and implement innovations in the market and distribution systems to increase margins and market participation. The challenge for the government is to create strong and reliable public institutions that provide continuous support to the sector. Further, it should also create a proper business environment that encourages and facilitates private investment in other regions in order to ensure a more equitable distribution of the benefits of diversification within the country. The policies and programmes that have been proposed demonstrate the willingness of the government to generate these proper conditions; their success will depend largely on the suitability and timeliness of their implementation.

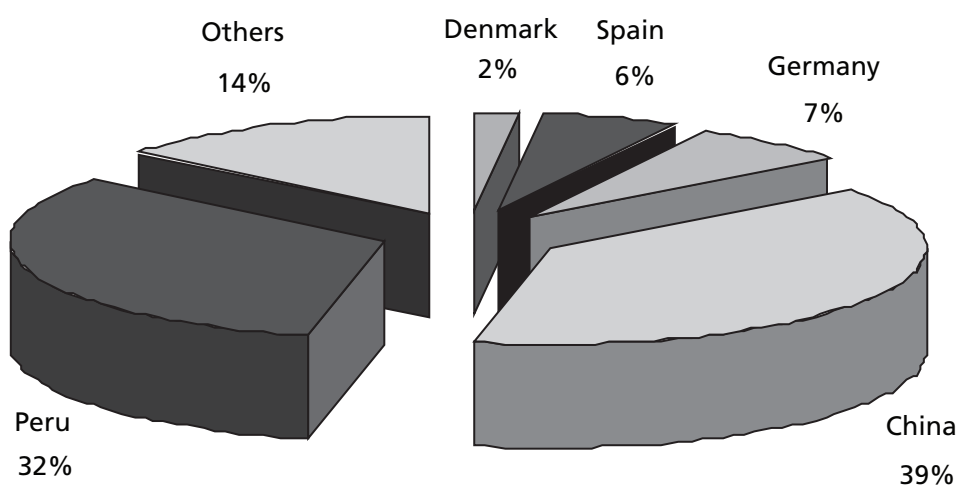
Annex 1

The world's main players in fresh asparagus international trade

Main fresh asparagus importing countries



Main fresh asparagus exporting countries

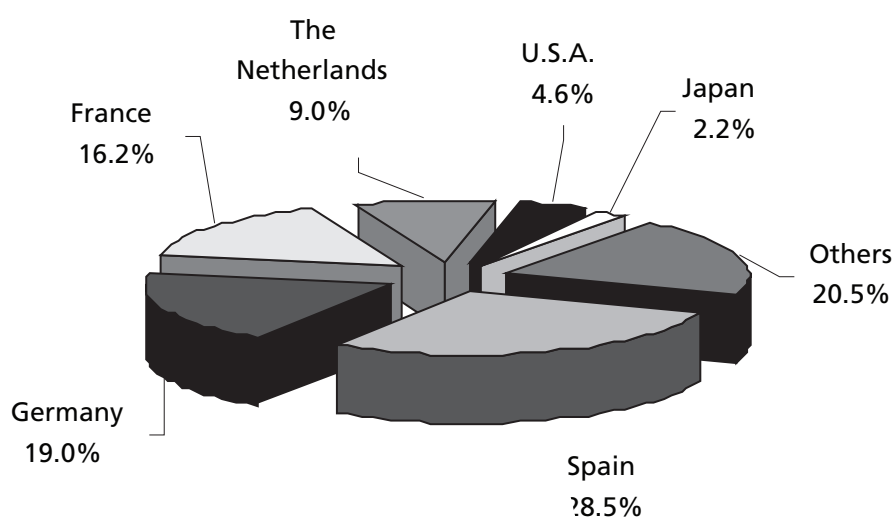


Source: TecnoServe Inc., 2005a.

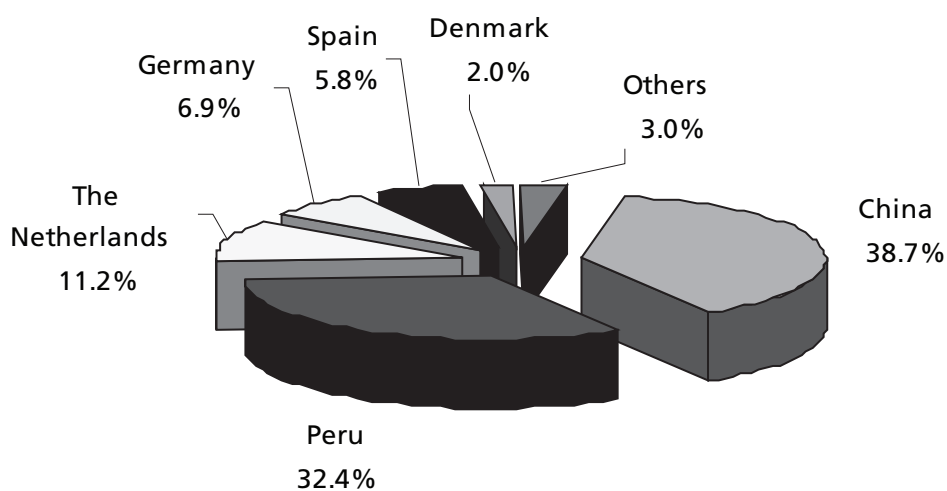
Annex 2

The world's main players in processed asparagus international trade

Main importers of processed asparagus



Main exporters of processed asparagus

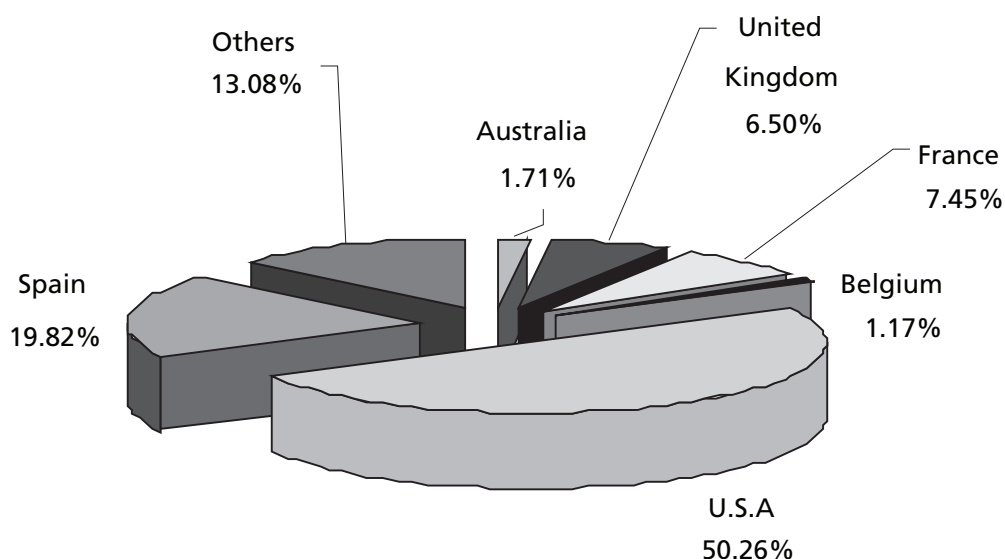


Source: TecnoServe Inc., 2005a.

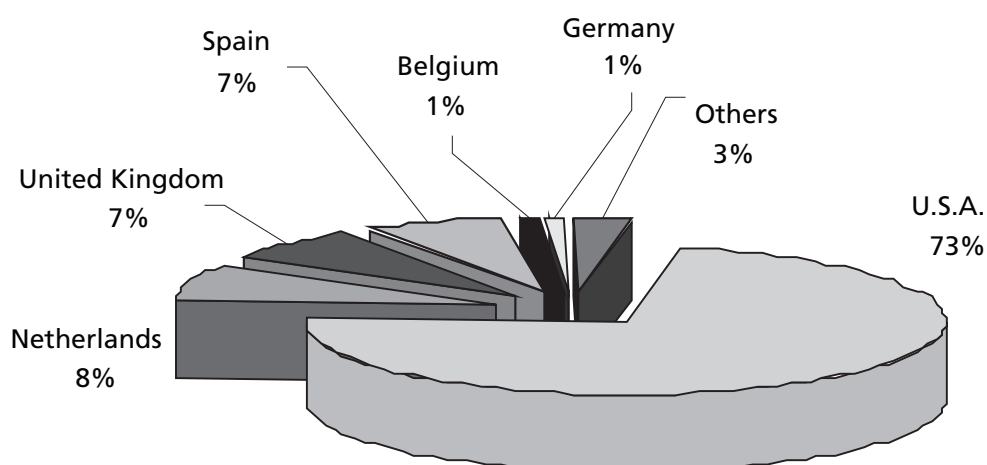
Annex 3

The main destination markets for Peruvian asparagus (fresh, processed, frozen)

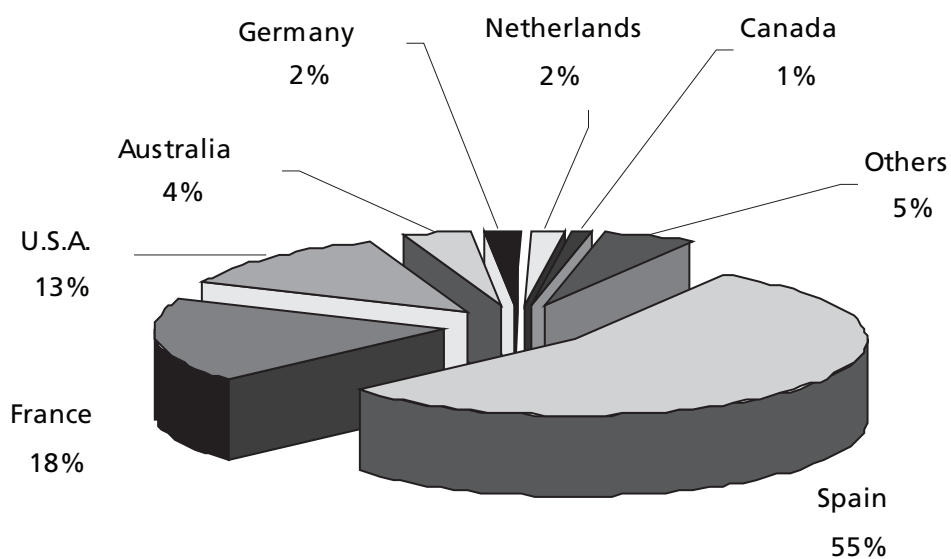
Main destination countries for asparagus from Peru. 2005



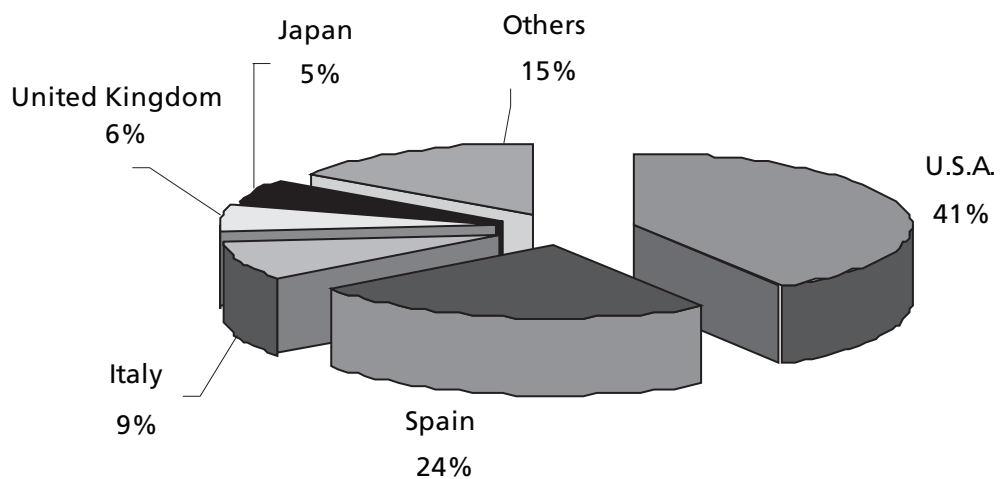
Main destination countries for fresh asparagus exports (FOB value- 2004)



Main destination countries for processed asparagus exports (FOB value- 2004)



Main destination countries for frozen asparagus exports (FOB value-2004)



Source: ADEX Statistics, 2004 and 2005

Annex 4

Peruvian asparagus industry: SWOT analysis

Strengths

- Geographic conditions – natural greenhouse allowing high yields/ha and adequate radiation for proper photosynthesis in green asparagus;
- Off-season production, taking advantage of market windows;
- Solid associations of producers and exporters (IPEH, Frío Aéreo)
- Strengthening of the agro-industry through AGAP;
- Implementation of quality and safety programmes and good labour practices;
- Asparagus experience – diversification into other high-value crops;
- Development of the green asparagus industry in the northern part of the Peruvian coast (La Libertad);
- Private innovations in presentations, logistics, packing, etc.

Opportunities

- Consumer awareness of the importance of health and social issues;
- Market niches (mixture of fresh vegetables, high added-value products);
- Traceability, gaining importance in the international markets;
- Market-oriented policies implemented by the government;
- The decentralization process;
- Technological innovations;
- Promotion of private investments in Peruvian ports and airports.

Weaknesses

- Presence of quarantine pests generating additional costs;
- Concentration of export markets;
- Lack of concentration of the export volume/need to improve negotiation power;
- High logistics costs;
- Lack of distribution and selling centres in the destination markets;
- Lack of promotion of the Peru agro-exportador quality seal.

Threats

- Strong negotiation power of supermarkets;
- Other country competitors receiving government support (subsidies);
- Scarcity of water resources in the agro-export valleys;
- High logistics costs – mainly transport;
- High costs associated with market access – compliance with sanitary, phytosanitary and bioterrorism requirements;
- Lack of stable economic policies, which affect private investments;
- Limited availability of credit;
- Social instability – strikes;
- Legal and tributary instability;
- Limited availability of land because of the fragmented land property;
- Limited availability of labour.

Source: Van Oordt, 2006.

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