

# Chilean Seed Industry

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Chile is a long and narrow country located between parallels 17° 30' and 56° 30' latitude S, at the southwest edge of South America (Figure 1). There are three well-defined geographic and climatic zones: 1) North, with a hot and dry climate, including the Atacama Desert, the world's driest desert, 2) Central, Mediterranean climate with mild, wet winters and long, dry summers, and 3) South, with a maritime climate, colder and humid, with rainfall during almost the entire year, mainly in the fall and winter. Longitudinally, the country is characterized by four topographical



zones: 1) the Andes chain mountains in the east, which is a natural border with Bolivia and Argentina, 2) a central plain, 3) the Coastal Chain, mountains of less altitude than the Andes, and 4) the shore of the Pacific Ocean. In the Central Zone, the plain gives place to the Central Valley, which is approximately 650 miles long and 25 to 50 miles wide. This is the most densely populated area of the country and the most productive agricultural zone, with almost 40% of the country's arable land.

Seed production in Chile can be grouped into two types: 1) seed crops for the national market and 2) seed crops for export. Species like wheat, beans, rice, forage and others are produced for the internal market and are

certified by the national Agriculture and Livestock Services (SAG). But, there is also a significant amount of seed produced without certification for internal use by farmers or for sale in an informal market.

The other group of seed crops designated for international markets is comprised of 1) producers, which contract with companies that develop and/or trade the seed, and 2) companies which have their own production and trials. Over 90% of the seeds produced under these conditions are exported in bulk where they can be repackaged in the importer country and exported to a third country for sale. The remaining 10% is packaged in Chile under international guidelines and exported primarily to South American countries (Fundación Chile, 2002).

According to the last agricultural census (INE, 1997), there are 3,066 producers dedicated to seed production, with a total of 29,778 hectares, with over 70% of them oriented to seed exports. As shown in Table 1, the average area of each grower is variable and depends on the crop. Most seed production is concentrated in the Central Zone of the country with a slight tendency for vegetable and flower seed crops to be produced in the north and maize and sunflower to be produced in the south. Certain types of seed



Figure 1. The three well defined geographic and climatic zones in Chile.

Table 1. Number of seed growers in Chile and area by crop, 1997.

Crop	Number of growers	Area (ha)	Average area by grower (ha)
Maize	694	13,867	20.0
Forage	306	4,750	15.5
Vegetables	1,143	3,332	2.9
Sunflower	114	1,556	13.6
Bean	130	713	5.5
Others	679	5,562	8.2
<b>Total</b>	<b>3,066</b>	<b>29,778</b>	<b>9.7</b>

Source: INE, 1997.

crops, like forage species, are produced primarily in the south. The favorable climatic conditions and high technical level of growers in the Central Zone result in good yields and high quality seeds. For farmers involved in seed production, the activity has represented an opportunity to improve their incomes, as well as challenge and raise their technological level. In general, seed production requires qualified personnel, higher salaries, and has become an attractive employment alternative for people in the rural zones of the country, thus having an important social impact for the country.

In the last 20 years, seed production in Chile has experienced significant growth. Today, seed exports represent more than US \$130 million (Figure 2) and Chile is the sixth largest seed export country in the world. This important seed production position is a result of several comparative and competitive advantages. Among them:

- Counter-season production in relation to the Northern Hemi-

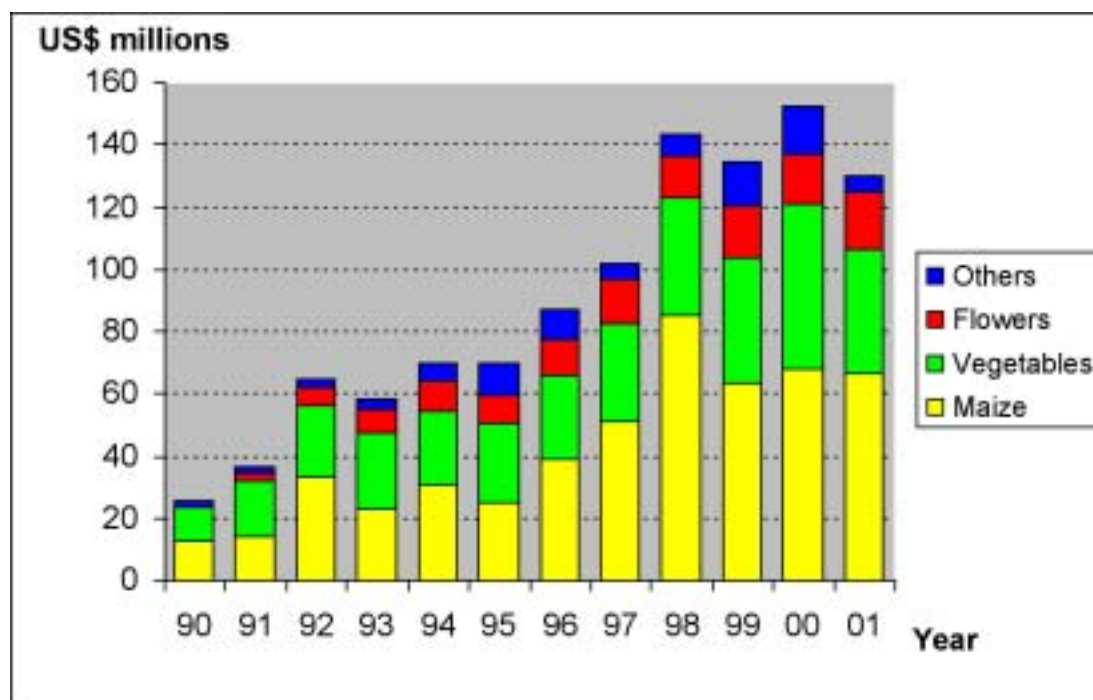
sphere, where most of the seed companies are based. This allows the acceleration of breeding cycles as well as prevention from seasonal hazards due to local climatic stresses.

- Presence of different agro-climatic zones along the country, which allow the production of a wide number of species. Also, there are well-marked seasons during the year, with an absence of summer rains, which is important for the production of high quality seeds.
- Low incidence of phytosanitary problems that affect seed quality. Natural Chilean geographical limits (the Andes, desert and ocean) are barriers that prevent the entry of pests and pathogens.
- The Andes are an important, economic and natural source of water for gravitational irrigation.
- Relatively low production costs, especially in the work

force needed for successful hybrid seed production.

- Good technological level provided by qualified producers and professionals and an adequate infrastructure for the production and export of seed. Multinational companies in the country have favored these advantages.
- *Ad hoc* legislation supports the needs of the seed industry. For example, Chile is an UPOV member, which provides breeders with confidence that their rights will be protected. The Agriculture and Livestock Services (SAG), an institution sanctioned by the Chilean Ministry of Agriculture, is responsible for applying the legal and regulatory laws concerning seeds as well as controlling enforcement, and punishing violators.
- The different companies related to seed production are organized in the National Association of Seed Producers

Figure 2. Evolution of Chilean seed exports during the period 1990 to 2001 (ODEPA, 2002).



**Table 2.** Chilean seed exports and main destination countries by crop during the years 2000 and 2001.

Crop and main destination countries	2000		2001	
	US\$ FOB	Participation (%)	US\$ FOB	Participation (%)
<b>Maize</b>				
USA	56,689,755	85	50,547,954	79
French	6,397,764	10	8,288,358	13
Netherlands	2,449,765	4	2,313,795	4
Others	850,198	1	2,871,671	4
<b>Sub-total</b>	<b>66,387,482</b>		<b>64,021,779</b>	
<b>Vegetables</b>				
USA	28,740,559	54	19,497,872	49
Netherlands	7,889,131	15	6,148,827	15
Japan	6,809,099	13	6,867,357	17
Others	9,669,670	18	7,168,981	18
<b>Sub-total</b>	<b>53,108,458</b>		<b>39,683,039</b>	
<b>Flowers</b>				
Japan	5,382,597	34	6,971,094	39
USA	5,330,276	33	5,382,879	30
Netherlands	2,618,172	16	3,632,954	20
Others	2,704,059	17	1,976,348	11
<b>Sub-total</b>	<b>16,035,104</b>		<b>17,963,275</b>	
<b>Sunflower</b>				
Argentina	9,530,210	68	1,908,144	52
USA	2,244,250	16	1,079,473	30
French	1,965,940	14	342,247	9
Others	185,806	1	327,511	9
<b>Sub-total</b>	<b>13,926,206</b>		<b>3,657,376</b>	
<b>Others<sup>(1)</sup></b>	<b>6,583,616</b>		<b>7,510,177</b>	
<b>Total</b>	<b>154,040,867</b>		<b>132,835,645</b>	

1: Beans, forage, wheat, sugarbeet, etc.

Source: National Customs Service.

(ANPROS), which encourages the strengthening and support of the seed industry.

As indicated in Table 2, among the many species exported, the most important is maize. This crop represents about 50% of the export value of seeds in 2001. The primary destination for the maize seed is the USA, a market with an emphasis towards transgenic seeds. Other important destinations are France and the Netherlands, which demand non-transgenic hybrid seeds. Produc-

tion is carried out largely by six companies, which export about 80% of the maize seed. *Pioneer* is the main producer, with almost 40% of the total (Fundación Chile, 2002).

Vegetables, as a group, are second in importance with about 30% of the total export value. The primary species produced and the percent of the value (in parentheses) they represented during 2001 were: watermelon and melon (21%), pepper (16%), tomato (12%), cole crops (12%), cucumber (10%), squash (8%), allium

crops (6%) and others (7%). The most important company producing vegetable seeds is *Seminis*, which represents over 50% of the exports.

Flowers, a recently growing group, represent about 14% of the seed export value with the USA, Netherlands and Japan as the main destinations. The most important species produced is pansy, which represented over 60% of the flower seed export value. There are two principal flower seed companies producing about 70% of the flower seed

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exports, *Sakata Seed Chile S.A.* and *Sone S.A.*.

Another important Chilean seed crop is sunflower, which is principally exported to Argentina. Therefore, any change in sunflower seed demand from Argentina has a marked response in its export value. This is the explanation for the abrupt decrease in the value exported in 2001 compared to 2000 (Table 2) and is an example of how the Chilean seed industry is vulnerable to external economic conditions in importer countries.

In spite of the significant growth experienced by the Chilean seed industry in recent years, there has been a recent significant decrease in the international demand due to such factors as a poor exchange rate, increased production costs and the increasing presence of other producer countries. As a result, profits have decreased and some production locations transferred to countries with lower costs of production, mainly Asiatic nations. However, some of that production is returning because of the high quality of seeds produced in Chile.

To face present and future seed production challenges, the Chil-

ean seed industry has had to maintain and increase its reputation as a quality seed export country. To achieve this objective, specific areas have been targeted as crucial and specific actions taken. These include:

- To keep and improve the quality of seeds produced,
- To increase the efficiency of production, i.e., to produce more seeds at lower cost in order to successfully compete with those countries with lower production costs,
- To encourage a concerted and focused action of national seed producers, organized in ANPROS, and thus increasing investments in new technologies and identifying new markets, and
- To encourage a higher interaction of different agents of the industry (companies, government entities and institutions dedicated to seed research and development) in order to solve technical and legal challenges related to the improvement of the Chilean seed industry.

In conclusion, Chile offers seed companies exceptional conditions

for high quality seed production that take advantage of natural and technical conditions. As a result, the Chilean seed industry has experienced great growth in the last few decades, and today the country is the sixth largest seed exporter in the world. However, new developments and challenges confront the Chilean seed industry and changes must occur in order for the country to continue this growth and to strengthen its reputation as a high quality seed producer.

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## Training of Seed Testing Personnel in China

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The modern Chinese seed industry started in the early 1970s and the government passed the first seed management law entitled "Chinese Seed Management Rules" in 1989. This "Chinese Seed Law" set forth the rules for training, testing, and managing seed testing personnel. Under this law, the Chinese Ministry of

Agriculture established specific "Seed Testing Rules" which provide guidelines for the qualification of Chinese seed testing personnel. These guidelines identified procedures for how to train and test seed technologists, who should organize the training and testing sessions, the appearance and standards of seed technologist certificates, who produces and awards the certificates and the ethical standards that seed technologists must maintain. This law stipulated that seed testing personnel must have:

- An education not lower than specialized middle school
- Three years working experience in seed testing
- Taken provincial level seed training and successfully passed the certification test

To implement this law, the Ministry of Agriculture established rules for the management of seed testing personnel. Individuals conducting seed quality tests for the government are called "seed testing technicians"