

# Chile

Committed to  
Biotechnology



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Innova Chile - CORFO

## Contents

- Chile's Emerging Economy
- Commitment to Biotechnology



**A Competitive Business Environment**

**2005 - 2006  
World Competitiveness Index**

	Ranking
Among Latin American Countries	1 <sup>st</sup>
Sub-ranking Macroeconomics	1 <sup>st</sup>
Overall Ranking Among 117 Countries	23 <sup>th</sup>

Source: World Economic Forum (www.weforum.org), 2005

**Best Place to Do Business  
2005 - 2009**

	Ranking
Among Latin American Countries	1 <sup>st</sup>
Among Emerging Countries	4 <sup>th</sup>
Overall Ranking Among 60 Countries	19 <sup>th</sup>

Source: The Economist Intelligence Unit (www.eiu.com), 2005

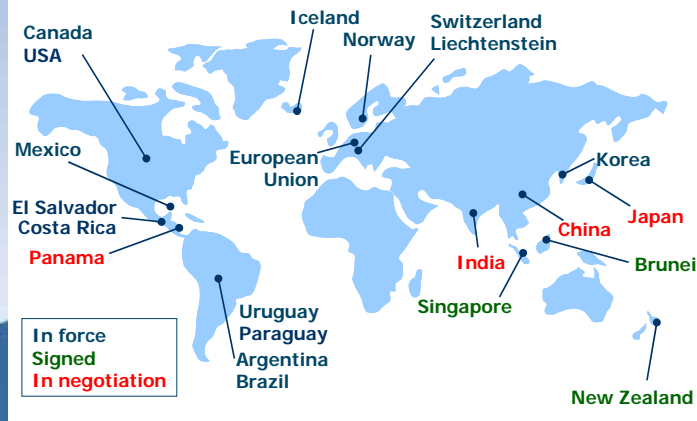
**Corruption Perceptions Index**

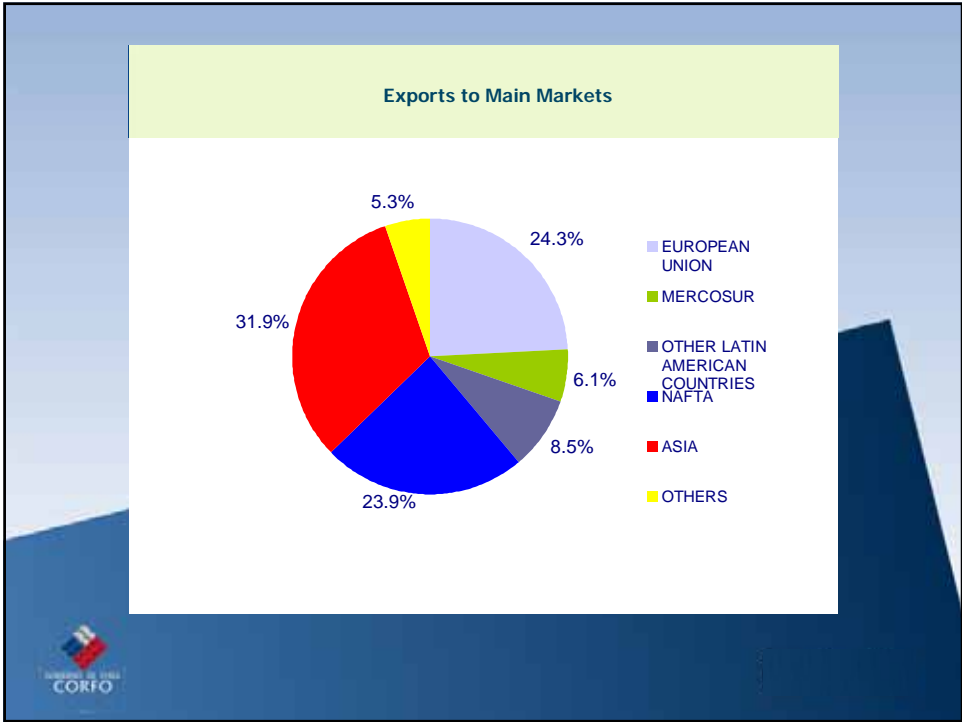
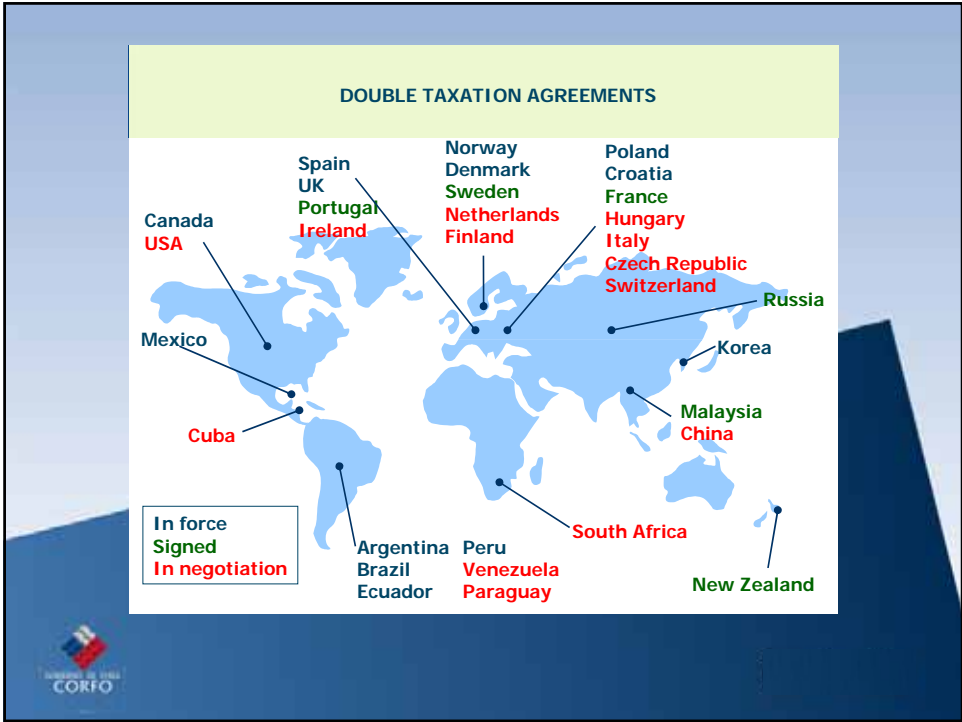
	Ranking
Among Latin American Countries	1 <sup>st</sup>
Overall Ranking Among 146 Countries	20 <sup>th</sup>

Source: Transparency International (www.transparency.org), 2005



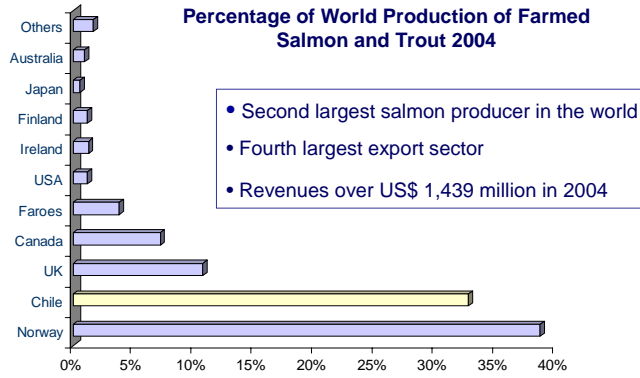
**FREE TRADE AGREEMENTS**





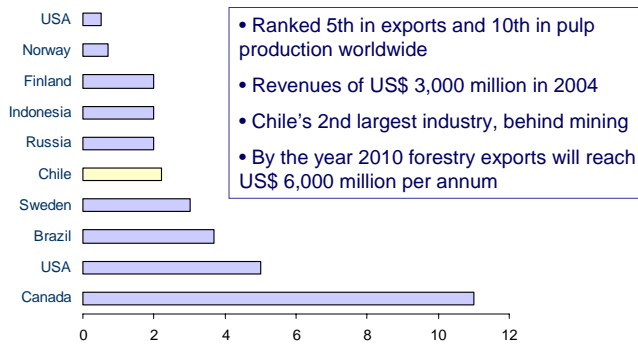
A Regional and World Leader: Natural Resources

**AQUICULTURE**



A Regional and World Leader: Natural Resources

**FORESTRY**  
**Exports (Billions of Tons)**



Source: Association of Lumber Producer, CORMA del Bio Bío ([www.cormabiobio.cl](http://www.cormabiobio.cl))



A Regional and World Leader: Natural Resources

**MINING**

- 2004 mining revenues of US\$16,500 million
- World's #1 producer of copper
- 5th in silver production worldwide

MAIN FIGURES		
	2003	2004
Exports		
<b>Copper</b>	<b>7,553</b>	<b>14,222</b>
Other	1,270	2,294
<b>Total Exports</b> (US\$ millions)	<b>8,823</b>	<b>16,516</b>

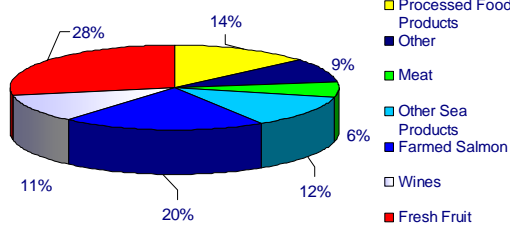


Source: Chilean Copper Committee (www.cochilco.cl)



A Regional and World Leader: Natural Resources

**AGRICULTURE AND FOOD**



- Chile's agro-industrial sector is recognized worldwide
- Revenues of approximately US\$7,000 million in 2004
- Ranked 1st in both the production and export of several products
- 17th in Top Food Exporters Ranking (FAO)



- Chile's emerging economy
- Committed to biotechnology



### National Biotechnology Strategy

"Chile can bet on biotechnology as a key component of our development strategy," - Ricardo Lagos Escobar, President of the Republic of Chile

#### National Strategy

- 1) Strong tradition of medical research and services
- 2) Funds for technological innovation
- 3) Presidential Commission on Biotechnology
- 4) National Policy of Biotechnology Development



## National Biotechnology Strategy

### Action Plan

The national plan involves 4 specific objectives and 23 concrete actions.

#### Specific Objectives:

- Entrepreneurial Development
- Development of Scientific and Technological Capabilities and Training of Human Resources
- Modernization of Regulatory Framework
- Development of Public Institutions and Citizenry Participation

### Public and Private Actors Involved

Ministry of Economy - Ministry of Agriculture - Ministry of Foreign Affairs, ISP (Institute of Public Health) - SAG (Agriculture and Livestock Service), CONAMA (National Environmental Commission), ASEMBIO (Chilean Association of Biotechnology Businesses), Industry Associations (Forestry, Agriculture, Fishing, Mining), among others.



## National Biotechnology Strategy

### New R&D Funds

**Innova Chile** – CORFO: Established in 2004, with biotechnology as a strategic area for development.

**Technology Consortia:** During 2004 new consortia were formed in the forestry, fruit and human health industries, among others, with a significant number of biotech activities underway.

#### Genoma Chile:

- Genome Program in Renewable Natural Resources
- Genome Program in Biomining

**Innovation for Competitiveness Fund:** Based on taxes on the mining sector.



## Infrastructure Development

### Human Resources



### ACADEMIC CAPACITY

Type of Programs	N° of programs
Undergraduate programs that teach different aspects related to biotechnology	48
Masters programs focused on Biotechnology	17
PhD programs focused on biotechnology	13

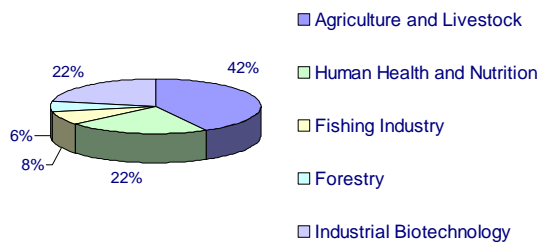
- Chile offers increasing resources to support the immediate and long-term training needs of its workforce.
- The number of professionals working in biotechnology-related jobs has shown steady annual growth of 17% since 1995.
- The total number of scientists in Chile has increased 56.9% since 1990
- Chile's scientists lead Latin America in the production of scientific publications per 100,000 inhabitants.

Source: Current Vision about Biotechnology in Chile, (Gil et al.2001)



## Current Chilean Biotechnology Industry

### Main Sectors Addressed by Chilean Biotechnology



The Chilean biotech industry is comprised of 95 biotechnology-related organizations and companies.

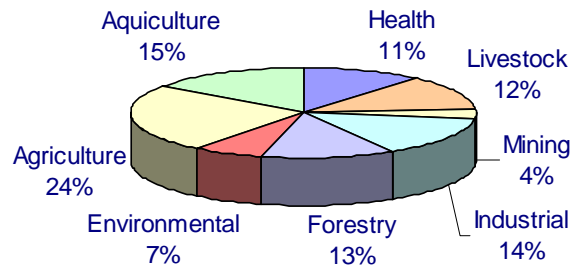
Source: Register of Biotechnology Companies (2005 – ASEMBIO)





## Current Chilean Biotechnology Industry

### Main Research Areas in Chilean Biotechnology



Source: National Diagnosis and Classification of Research into Biotechnology and its Industrial or Commercial Applications, January 2004.



## CHILE: COMMITTED TO BIOTECHNOLOGY

### Regulatory Framework

#### **New Intellectual Property Law**

The law includes the possibility of patenting microorganisms and genes.

#### **Biosafety and Bioprospecting Regulations**

Currently being developed.



## Biotechnology initiatives in Natural Resource Industries

### Mining

#### Chile Genomics in Bio-Mining Program

Biotechnology applied on a production scale will significantly increase copper productivity, as it makes the mining of low-grade sulfide ores technically and financially feasible. The products vary from relatively simple technologies - such as upgrading the currently used processes of bacterial ore leaching - to technologies based on the identification of microorganisms through their genetic material, including genetic management of such information.

**Mining Cluster:** Science and Technology Research Center for the Mining Industry (North of Chile)

With a public-private investment of around US\$5 million, this research center seeks to become the world benchmark in biotechnology disciplines for applications in large-scale mining (bio-mining), mainly in the development of bio-leaching and bio-remediation processes.



## Biotechnology initiatives in Natural Resource Industries

### Agriculture and Food

#### Genome Program in Renewable Natural Resources

This program runs three projects aimed at identifying genes associated with certain pathologies that affect quality. Among the characteristics being researched are: the floury texture of nectarines after being subjected to refrigeration processes for export, the response of table grapes to certain viral infections, and the search for bunches that are less likely to break up.

