

1. Introduction

The fields of the Bío Bío region in Chile have become a sea of blueberries² since the “berry revolution” burst onto the scene a few years ago. The local economy is booming, dotting the rural landscape with construction works: the traditional adobe and gable farmhouses have been renovated and enlarged, while new brick houses have been built to accommodate entrepreneurs and agro-industrial engineers. Orchards have signs indicating that they have achieved certification of good agricultural practices (GAP). Packing houses and agroprocessing plants lend an industrial feeling to the rural roads, where refrigerated trucks loaded with berries swarm like ants.

However, the biggest change of all is not visible to the naked eye: Berry farmers, entrepreneurs, packing house owners, extensionists and other actors have woven value networks, i.e. they have built vertical and horizontal linkages among themselves; have worked with universities and research centres to develop new varieties and new technologies; and have sought partnerships with public agencies and non-governmental organizations (NGOs). In brief, the Bío Bío blueberry cluster has been born.

This is a good illustration of an AC: It is simply a concentration of producers, agro-industries, traders and other private and public actors engaged in the same industry and inter-connecting and building value networks, either formally or informally, when addressing common challenges and pursuing common opportunities.

The Bío Bío blueberry cluster is just one example of the many ACs existing in developing and emerging economies. Not all of them are as successful, and even the successful ones do not last forever: They rise and fall like any other business venture. However, ACs seem to generate a number of advantages for small producers and agribusiness firms, from agglomeration economies to joint-action benefits, such as improving access to local and global markets, promoting local governance, and scaling up and disseminating innovations. Consequently, ACs raise the competitive advantage of farmers and agribusiness firms as they increase their current productivity and their innovative capacity. In addition, they attract new agribusiness that supports the innovation and cluster growth as a whole.

If clustering is an approach that seems to work, why not promote it? In fact, promoting ACs is one of the strategies identified by FAO to support agribusiness and agro-industrial development. ACs are increasingly being recognized as an efficient way to develop and stabilize agriculture and agro-industry and to create an environment that improves the competitiveness of agribusiness, particularly small- and medium-scale companies. They also provide the focus that is needed for agro-enterprises, governments and institutions to align

² The Bío Bío cluster contains nearly 40 percent of Chile’s blueberry production, with more than 3 400 ha planted. Chile’s exports of blueberries reached over 21 000 tonnes in 2006, and they are expected to grow at an annual rate of 30–35 percent for the next three years. Source: Berries of Chile, www.berriesofchile.org

and concentrate their efforts to achieve competitiveness and performance targets. Accordingly, governments can improve the effectiveness of their support for the establishment and improvement of agricultural value chains “by promoting the development of and organizing their assistance around clusters” (ITC, 2005). Moreover, ACs can constitute an important tool for the economic and social development of a given territory: They can have positive impacts on income enhancement, employment generation and well-being of workers and entrepreneurs of the cluster and, more generally, they offer great potential for improving the local economy.

Given all of the above, the promotion of ACs would appear to present a vast potential to encourage agribusiness and agro-industrial development with equitable benefits for agrifood chain participants, particularly in developing countries; and to establish favourable business environments, where policies, institutions and services are conducive to sustainable competitiveness.

But how big is this potential? How can it be fully realized? Would the promotion or induction of ACs be a winning strategy for all subsectors and for all countries? What are the limitations of such a strategy and what are the pitfalls to avoid? FAO has tried to find answers to these and many other questions by carrying out worldwide research on ACs and agricluster initiatives, with an emphasis on developing countries. The results of the research are summarized in this paper, which draws on the experience of ACs in Africa, Asia and Latin America, and the views of those individuals who have been in the forefront of their creation and management. The paper tries to: a) provide “best practice” guidelines on AC creation and development; b) establish the relevance of agriculture clusters to the creation of economic opportunity for small-scale producers and agribusiness in particular, and to rural development in general; and c) assist strategy- and policy-makers that need effective solutions to promote agro-industries in developing countries, by providing them with a framework they can apply when assessing the relevance of a clustering programme for the agriculture sector in their own country, and when defining the approach by which such a programme should be launched and managed. It is hoped that the paper will make a significant contribution to raising the profile of ACs as an effective vehicle for rural development, export expansion and opportunity creation.

The paper is divided into seven chapters. A brief introduction is followed by a chapter devoted to the definition of clusters, ACs, agricluster initiatives and other related concepts. Chapter 3 presents existing literature and methodologies on cluster development, and provides general insights into cluster promotion in different regions and economic sectors. Subsequently, a review of ACs in Latin America, Asia and Africa is provided in Chapters 4 to 6, respectively. Finally, Chapter 7 is devoted to presenting the main findings and conclusions of the research.

2. Definition of clusters, agro-based clusters and related concepts

The present chapter clarifies what is meant by clusters and ACs. It also sheds light on some related concepts, such as agribusiness complexes, agroproduction or food parks, agri-export zones, export consortia and “one village one product” initiatives.

2.1 DEFINITION OF CLUSTERS

A simple definition of a cluster is “the geographical concentration of industries which gain advantages through co-location” (Bosworth and Broun, 1996). A broader definition is the “geographic concentrations of inter-connected companies and institutions in a particular field” (Porter, 1998). Clusters can be an array of linked industries and other entities important to competition. They include, for example, suppliers of specialized inputs, such as components, machinery, and services, and providers of specialized infrastructure. Clusters also often extend downstream to channels and customers and laterally to manufacturers of complementary products and to companies in industries related by skills, technologies or common inputs. Many clusters include governmental and other institutions, such as universities, standard-setting agencies, think tanks, vocational training providers, and trade associations that provide specialized training, education, information, research and technical support (Porter, 1998).

The idea is that clusters evolve, and in so doing reinforce their competitiveness, through the combination of inter-firm rivalry and collaboration (so called “co-opetition”), innovation and the rapid transmission and adoption of ideas, and the generation of important local externalities, such as a skilled labour pool, the availability of specialized inputs – physical, technical and legal (such as those relating to certification) – and enhanced access to information on, for example, technologies and markets.

2.2 AGRO-BASED CLUSTERS³

In many developing countries, the greatest potential for sustainable growth lies in the agricultural sector. Yet ironically, it is this sector where poverty is most widespread and found in its worst forms. Small-scale farmers, and the rural communities in which they live,

³ This chapter is based on a contribution of Brian Barclay, Director of Modicum Strategy Consulting Inc, Vancouver, Canada, and former Executive Coordinator of the Executive Forum of the International Trade Centre (UNCTAD/WTO).

are imprisoned within a “cycle of equilibrium” of low margins, resulting in low risk-taking ability and low investment, which leads to low productivity, low market orientation and low value addition which, in turn, nets low margins (ITC, 2006a).

From a conceptual standpoint, the creation of “value networks” represents the most effective means by which to break this cycle, while concurrently raising prospects for long-term competitiveness within the agricultural sector. In this context, a value network is the aggregation of:

- vertical relationships among suppliers of raw materials and production inputs, agricultural producers, processors and exporters, branded buyers and retailers;
- horizontal relationships among producers, which take the form of growers’ cooperatives or various types of smallholder business consortia;
- support relationships between producers and facilitating organizations (e.g. local governments, business service providers, research institutes, universities and non-government service organizations) that reinforce the quality, efficiency and sustainability aspects of the chain (ITC, 2006b).

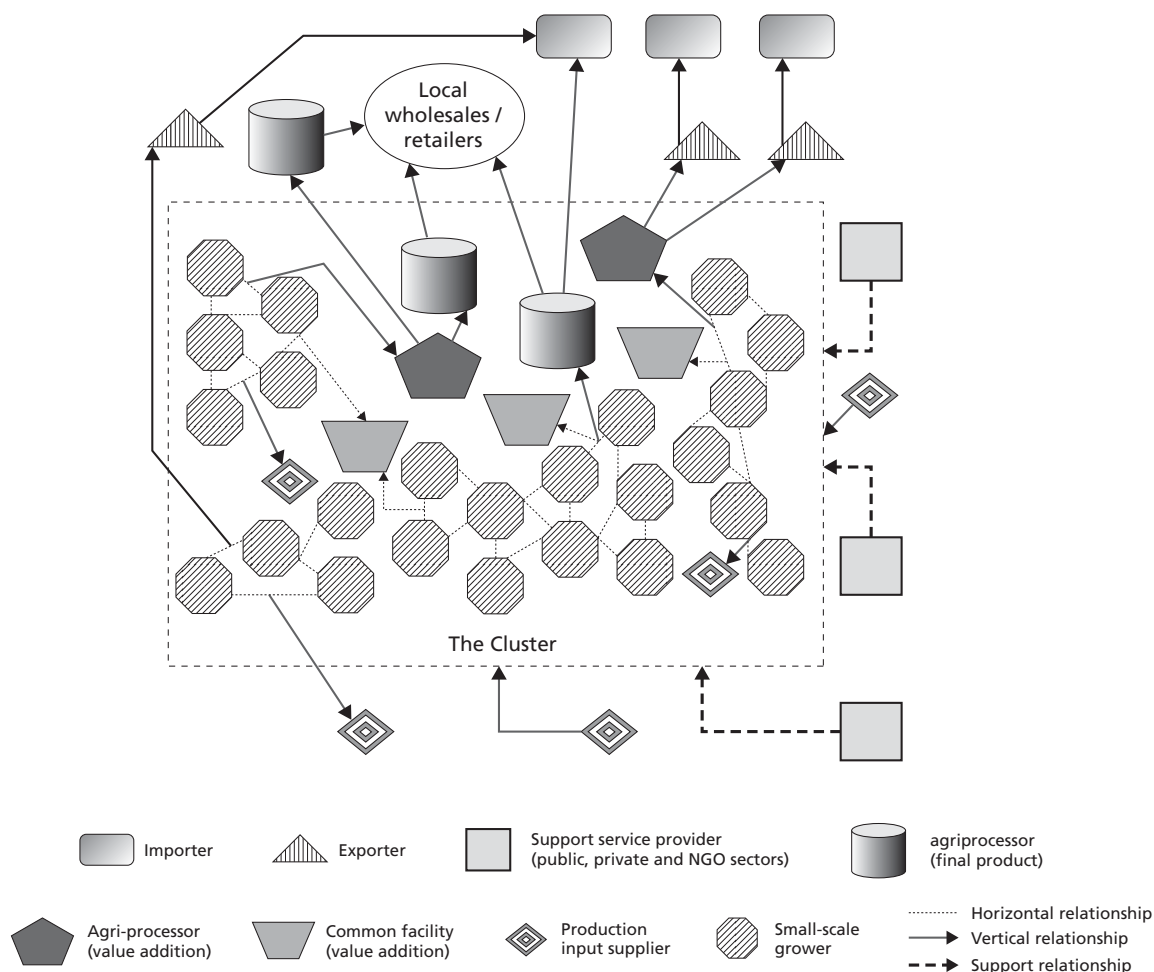
Value networks have, nevertheless, been slow to evolve in the agricultural sector. For the vast majority of farmers and small-scale agro-industries, business is conducted on a traditional “transaction relationship” within which they produce and sell an undifferentiated product as “price-takers”. In such a relationship, producers are fully exposed to swings in the market and have little or no opportunity for creating, or capturing, greater value or for generating deeper commercial and developmental spin-off.

There are, of course, exceptions. Greater integration of the value chain is being achieved through vertical relationships that improve product flow (contract farming and outgrower schemes), coordinate financing and payments (ITC, 2006c), and reinforce communication⁴. And undoubtedly cooperatives, export production villages, joint export marketing and similar efforts to foster horizontal relationships, are having an impact on rural competitiveness and well-being.

But even these examples of “higher return relationships” fall short of the ideal value network where there is close and continuous coordination and collaboration horizontally, vertically and along the support axis of the value chain and where such relationships not only create efficiencies, synergies and opportunities (both commercial and developmental), but also stimulate value addition, innovation and product diversification at the level of small-scale producers and agribusiness, and ensure that maximum returns are retained in the local economy.

⁴ The case of ITC Ltd of India (formerly Imperial Tobacco Company) is a good example of such vertical integration. With the objective of minimizing the impact of traders in the value chain, ITC India established computer facilities in farming villages under what is known as the “e-Choupal” (gathering place) initiative. The ITC computer kiosk provides the farmer with up-to-date information on weather conditions, daily market prices at local markets (mandis), global price trends and technical and production information in the local language at no cost. The ITC’s Choupal Saagor also functions as a hub, providing warehouse facilities and a rural hypermarket for seeds, fertilizers and other production inputs, and is managed by an ITC-trained agent who works on a transaction-based commission basis. There is, however, no obligation for the farmer to sell to ITC. There are currently 6 300 e-Choupals in operation, serving 36 000 villages and 4 million small-scale farmers.

Figure 1. Conceptual illustration of the ideal agriculture value network



Source: FAO Datastream

Only an AC with strong market connections would seem to represent this ideal, or ultimate, value network (or aggregation of individual value networks). An AC is simply a concentration of producers and institutions that are engaged in the food and agricultural sector and that inter-connect and build value networks, either formally or informally, when addressing common challenges and pursuing common opportunities.

An AC is collectively empowered. In other words, the distinguishing feature of ACs compared to “concentrations of producers” is what happens between the “boxes”, not inside them⁵ (Figure 1).

5 “Innovations in Export Strategy: Competitiveness through Export Clustering”, International Trade Centre, 2005 (ITC/P191.E/OED//05-VIII).

A number of the more celebrated examples of successful ACs do not conform to the definition of a cluster used in this paper. While they may reflect effective “value networks” comprising horizontal, vertical and/or support relationships, they tend to involve static relationships and, in many instances, are based on rigid and hierarchical arrangements. They represent a structured response to an identified market opportunity, but do not encourage a level of “co-opetition” that will generate innovation and promote evolution of the business model: two of the essential features of a sustainable cluster.

An AC can be defined very broadly to include crop production and services, livestock, food processing, agricultural machinery and equipment, as well as agricultural-related transportation and distribution.

2.3 RELATED CONCEPTS

An AC could be considered the “ideal” value network, as it encompasses vertical, horizontal and support linkages. However, other forms of value network can emerge in the agricultural sector. These are briefly considered below.

Global value chains: the importance of territorial development in a globalized economy. An agricultural value chain encompasses the full range of activities to bring an agricultural product from the farm to its end use and beyond. A “global agricultural value chain” is divided among multiple firms and spread across wide swaths of geographic space, hence the term global. (Duke University, www.globalvaluechains.org/concepts.html; Vorley and Fox, 2004). The driving forces behind this globalization trend are well known: the increasing scale and international consolidation of market; the growing role of global corporations; the liberalization of markets; the growing dominance of large food retailers in distribution channels; and the increasingly stringent demands for food quality and safety. The globalization of agribusiness activities implies a focus on similarities, standardization, homogenization, concentration and coordination on a worldwide basis.

In this context, talking about local agricultural development and clusters would, at first glance, seem out of place. However, precisely because of the globalization forces and increased competition, it is more important than ever to strengthen the local link of the global chain: A network of agribusinesses (cluster) needs to be supported at a local or domestic level in order to be strong enough to compete and operate in a global value chain. Accordingly, clustering has been rediscovered as a local response to globalization, a “Think globally, act locally” approach to increase agricultural sector competitiveness that combines:

- a local strategy that recognizes the necessity to consider locally related issues in the performance of business activities in the marketplace (Svensson, 2001);
- a global strategy that links the AC to the global value chain in a more efficient manner.

Agribusiness complexes. In many ways the idea of an AC builds on the earlier idea of agribusiness complexes. The term “complex” refers to all the interrelated activities necessary to produce and market a particular agricultural product, and it also highlights how companies within these complexes are often dependent upon one another (Simons *et al.*, 1992). However, the term “agribusiness complex” differs from that of ACs in that clusters have a more explicit geographical dimension. The term cluster is also a broader term, including actors, such as universities and research institutes, which are not directly involved in the production of a particular product.

Agro-industrial parks, also called agroproduction or (agri) food parks, are shared facilities and services (e.g. transport, storage and packaging) built explicitly for the processing of agricultural products. The idea behind such initiatives, common in India, is that it is often difficult for small- and medium-sized enterprises (SMEs) to invest in capital-intensive activities. The building of food parks therefore allows the provision of common infrastructure facilities to be economically assisted, while also helping the enterprises there to gain from other benefits of clustering (FAO, 2006c).

Agri-export zones represent one initiative to explicitly use the idea of a cluster in the hope that this will enhance the export of agricultural products. Such initiatives were introduced to India in 2001⁶, and the country provides a good example of what these zones entail. State governments identify a specific agricultural product whose export is to be promoted. The production of this good or set of related goods would have to be based in a particular area (ranging in size from a single block to a group of districts) that would become the Agri-Export Zone. The export of the good would then be promoted in a comprehensive fashion by looking at and assisting all the different processes within the value chain, as well as the links between them. Assistance to different elements of the cluster can include fiscal incentives as well as financial assistance for activities such as training, research and development (R&D) and infrastructure development.

Export consortia of food and agricultural products are usually made up of SMEs and can be defined as “a voluntary alliance of firms with the objective of promoting the goods and services of its members abroad and facilitating the export of agricultural products through joint actions” (adapted from UNIDO, 2003). Members of the consortia retain their financial, legal, managerial and commercial autonomy but cooperate to promote their exports through schemes such as joint marketing, R&D and, in some cases, sales. They are formal institutions and the firms involved in them are not necessarily geographically proximate.

One-village-one-product. The one-village-one-product campaign is an initiative that originated in Japan for promoting regional development. Villages or local areas are encouraged to concentrate on one value-added and local product, with product development and marketing assistance being provided. The products are then sold nationally and internationally. Initially the campaign was internal to Japan, but it is now part of Japan’s foreign assistance

6 Agricultural and Processed Food Products Export Development Authority, India (APEDA); http://www.apeda.com/apedawebsite/trade_promotion/About_AEZ.pdf

programme⁷. It is also being used by other countries. Thailand, for example, now has a “One-Tumbon-One-Product” scheme (FAO, 2004b). Spice export villages in Sri Lanka are another example of agglomeration and facilities provision in specific locations.

Subnational Innovation System (SIS). The main differences between SIS and clusters relate to their boundaries and their focus. Although centred in a particular region, a cluster has no fixed borders. By contrast, a SIS is based upon public administrative boundaries (Yim, 2007). Cluster analysis looks at multiple benefits of co-locating; not just accelerated spread of innovation but also other benefits, such as external economies of scale. By contrast, the focus of an SIS is solely upon innovation potential. Otherwise the two concepts are largely similar. They both concentrate on the region as the relevant spatial scale and they both involve a variety of actors together with the links between those actors.

⁷ Ministry of Economy, Trade and Industry of Japan (METI);
http://www.meti.go.jp/english/policy/external_economy/trade/OVOP/index1.html

3. Literature review on cluster theory and practice

*Nearly two decades have elapsed since Porter stressed the importance of clusters in his *Competitive Advantage of Nations* (1990), but a virtual explosion of activities and initiatives echoing his ideas is still happening in our day. Van der Linde (2003) notes the ever-growing importance attributed to clusters in the media (409 articles containing the term “industry cluster” in 2001 versus 27 articles in 1993) and in the economic development literature, which has been flooded with studies of cluster initiatives taking place in at least 39 countries. The present paper does not review this entire body of literature, but focuses on the most relevant to gain insight into the different models used to analyse clusters as well as to promote ACs in developing countries. It lists the major research efforts on cluster characteristics and cluster initiatives undertaken since 2000, differentiating between those addressed to developed, transition or developing economies.*

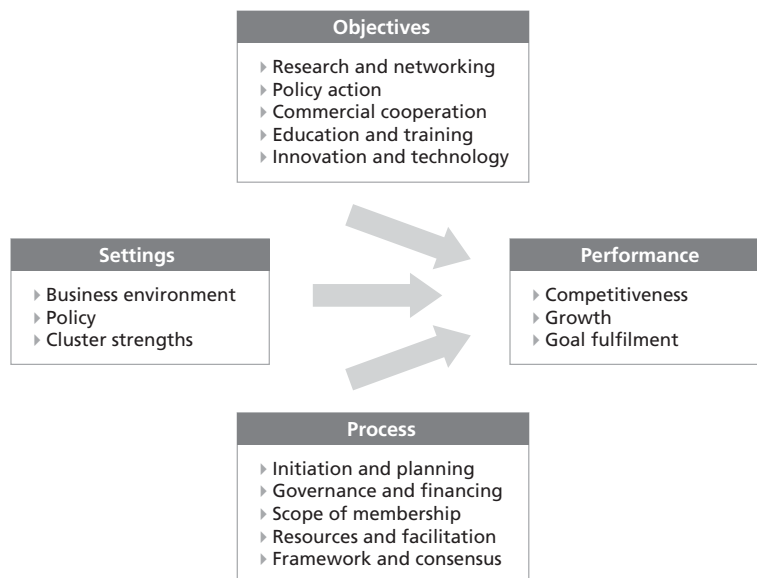
3.1 GLOBAL INVENTORIES OF CLUSTERS

Many efforts have been made to compile the wealth of information on clusters. One of the most important is the inventory of clusters by the Institute for Strategy and Competitiveness at Harvard Business School, known as the *Cluster Meta-Study*⁸. This study has compiled information on 833 clusters from 49 nations, of which 24 are developing countries. It examines several features of clusters, the reasons behind their competitiveness or their lack of it, and patterns of evolution over time.

Another major effort is the *Cluster Initiative Greenbook* (Sölvell *et al.*, 2003), which gathers information from more than 250 cluster initiatives around the globe. Based on the analysis of the extensive data collected, the Greenbook has developed a useful tool to analyse clusters: the Cluster Initiative Performance Model (CIPM), which evaluates four components of cluster initiatives: settings, objectives, performance and process of development (Figure 2).

Another inventory initiative is *The Global Competitiveness Report*, which presents comparative data on overall cluster strength for 75 countries including some developing countries (Porter and Schwab, 2002).

In addition, some developed countries, such as the United States, the United Kingdom and Sweden, have conducted mapping exercises of clusters across their entire territory. For instance, the *Cluster Competitiveness Study* by Harvard Business School has assembled a

Figure 2. The Cluster Initiative Performance Model (CIPM)

Source: *The Cluster Initiative Greenbook (2003)*.

detailed picture of clusters of industries in the United States⁹. Likewise, the Swedish study has identified 38 industry cluster categories in Sweden, which are described with regard to employment and growth in recent years (Sölvell *et al.*, 2008), and the United Kingdom study has drawn up a detailed inventory of clusters across all sectors of the country (Porter and Ketels, 2003). On top of this, the European Commission convened in 2002 an expert group on enterprise clusters and networks, which reviewed national cluster mapping exercises undertaken in 13 European countries and gathered data on cluster-specific characteristics from 84 clusters from 20 countries¹⁰ (European Commission, 2002a).

3.2 GAPS IDENTIFIED IN GLOBAL CLUSTER STUDIES

Remarkably, little attention has been paid to clusters in developing countries and even less information is available on ACs. Out of the 833 clusters analysed in the *Cluster Meta-Study*, only 20 percent are from developing countries, of which less than 1 percent are agricultural clusters. Likewise, very few of the 250 cluster initiatives surveyed in the Greenbook make reference to agricultural clusters in developing nations. The agrifood sector represents a minimal percentage of the cluster initiatives surveyed: 13 respondents out of over 600 belong to the processed food category. Of the total number of replies, 93 percent were received from high-income countries, 6 percent from upper-middle-income economies – mainly from

⁹ Additional information may be found at: www.isc.hbs.edu

¹⁰ Additional information may be found at *The MAP Project 2002*:

http://ec.europa.eu/enterprise/entrepreneurship/support_measures/cluster/map_project.htm

Table 1. Characteristics of clusters in developing countries

Structure	Market focus
<p>Smaller firm size: The majority of clusters from developing countries are dominated by SMEs, whereas in developed countries larger firms predominate.</p> <p>Lacking a critical mass of firms: Clusters from developing countries usually encounter difficulties to achieve the critical mass of firms needed to create sizeable learning externalities to enable the further development of the cluster. This is especially applicable to most African countries, according to Bennell (1998).</p> <p>Informally organized: In developing countries clusters tend to have an informal organizational structure, which becomes more formal only if and when infrastructure improvements or other initiatives involving large investments are envisaged.</p> <p>Comparatively weak internal linkages: The linkages between cluster actors (firms, government, academia, finance and institutions for collaboration) are generally less developed in non-industrialized countries. Therefore, greater flexibility regarding the level of linkage development is necessary when analysing clusters from less-developed economies, where emerging and developing clusters are predominant. The more pronounced weaknesses of SMEs and the less frequent interactions between cluster agents in developing countries – in comparison with developed ones – represent severe obstacles to cluster development. (Anderson <i>et al.</i>, 2005).</p>	<p>Shift from low- to high-value products and services: Saegaert <i>et al.</i> (2004) stated that developing country clusters usually specialize in lower-value niches. On the contrary, clusters from industrialized economies appear mainly on the higher end of the market. This is, however, a changing reality, at least in the agricultural sector. According to the World Development Report 2008, exports of high-value products (horticulture, livestock, cut flowers and organic products) now make up almost half of all developing country exports, far more than the 21% for traditional tropical commodities such as coffee, cacao, tea or cotton (World Bank, 2007).</p> <p>Increasingly connected with the global market: The long-term involvement of large buyers with extensive global connections in SME-dominated clusters from developing countries has often proven to be beneficial. These buyers can improve the ability of SMEs to compete in the global marketplace by “communicating clear-market requirements, providing support on logistical issues and participating in quality improvement programmes” (ITC, 2005).</p>

Source: Author's elaboration.

Europe and Central Asia – and only 1 percent from low-income countries (according to World Bank definitions: World Bank list of economies¹¹).

However, there are some ongoing initiatives in the agricultural sector. Alterra¹² and ARCADIS¹³ are currently leading an initiative to document the development of agribusiness complexes worldwide, supported by the Dutch Ministry of Agriculture. Some of the agribusiness complexes analysed by this initiative are located in developing countries¹⁴. The Agricultural and Food Engineering Technologies Service of FAO has published a study on agro-industrial parks with a focus on developing countries (FAO, 2006c). Again, the Institute for Strategy and Competitiveness of Harvard has recently published several case

11 <http://siteresources.worldbank.org/DATASTATISTICS/Resources/CLASS.XLS>

12 Alterra is part of the Wageningen University and Research Centre.

13 ARCADIS is a knowledge-driven service provider, worldwide active in the fields of infrastructure, buildings, environment and communications.

14 Further information on this project is available at: <http://www.agrocomplex.nl/home.htm>

studies regarding various agricultural clusters in developing and transition economies, some of which are discussed in this paper¹⁵.

This paper attempts to overcome the knowledge gap on ACs by drawing lessons from any type of clusters in developing countries in general and by reviewing the information available on ACs in developing countries in particular. However, caution is required when drawing lessons from other sectors/countries: Sectoral specificities as well as differences because of diverse levels of economic development should be taken into account.

3.3 THE INCREASING IMPORTANCE OF CLUSTERS IN DEVELOPING COUNTRIES

The existing literature shows that clusters in developing countries (including those in the agricultural sector) are usually more dominated by smaller-scale firms, are organized in a more informal manner, have weaker linkages among actors, face more difficulties in achieving a critical mass of firms and tend to be specialized in lower-value niches, although they are now increasingly entering higher-value markets. These characteristics of clusters in developing countries are further explained in Table 1, with an emphasis on their internal structure and market focus.

Understandably, given all the above, it is far more difficult to promote clusters in developing countries than in developed ones. Another way to read this is that support to clusters in developing economies is certainly more needed. This is why various institutions have become involved in supporting developing country clusters, including ACs. The United States Agency for International Development's (USAID) portfolio of cluster initiatives as of January 2003 was in the region of US\$60 million in 26 countries and has strongly increased since then; and IDB's portfolio exceeds US\$380 million. Several other institutions have developed programmes to support competitiveness in developing and transition economies through clustering. The Andean Development Corporation (ADC) implements the "Support competitiveness programme", which includes nine cluster projects in Andean countries. The United Nations Industrial Development Organization (UNIDO) launched in 2001 a programme called "Development of Clusters and Networks of SMEs Program" to foster inter-enterprise linkages and collaborative relations with local support institutions. To date, UNIDO has worked with SME industrial clusters in India, Indonesia, Malaysia, Mexico, Nicaragua, Honduras, Jamaica, Bolivia, Madagascar, Morocco and Tunisia. The International Trade Centre UNCTAD/WTO (ITC) is currently developing and implementing export-led poverty reduction projects (EPRP) focused on sectors/clusters showing high potential to contribute to poverty reduction through exports, such as agricultural products (fresh and processed); community-based tourism; and textiles (fibres and clothing). The EPRP approach has been implemented in Bolivia, Brazil, Cambodia, El Salvador, Ethiopia, Kenya, Mongolia, South Africa and Viet Nam.

The approaches of these international institutions to cluster development have some common and distinct features, which are presented in Table 2.

15 http://www.isc.hbs.edu/econ-student_projects.htm

Table 2. Commonalities and differences of approaches to support clusters in developing countries

Similarities	Differences
<p>Similar methodology, including participatory processes: The diverse clustering approaches follow a similar methodology, namely, conduct diagnostic studies, identify priorities and design, and implement an action plan. Moreover, the latest cluster initiatives share an emphasis on participatory strategic planning processes to develop policies and strategies for strengthening national competitiveness.</p> <p>Scope beyond providing support to a single cluster or single economic sectors: The cluster interventions of donors and international organizations have often evolved from providing support to individual clusters to launching national country programmes involving various clusters and industry sectors. As an example, until 2002 IDB provided grants of about US\$100 000 through its Multilateral Investment Fund to foster the development of specific clusters. Since that year, IDB has approved major cluster initiatives for several million dollars in Panama, Bolivia, Honduras, Colombia, Brazil, Argentina and Guyana (See Annex 1). UNIDO has also started to concentrate cluster initiatives in a number of countries and has assumed a more integrated national perspective.</p>	<p>Preferred implementing partners (public and/or the private sector): The World Bank and the IDB have, as their counterparts, the host country governments, while USAID, UNIDO and the United Kingdom's Department for International Development (DFID) work mostly with the private sector. Private or public-sector counterparts leave different marks on the design and implementation of cluster projects. Nevertheless, these institutional arrangements are becoming increasingly flexible in order to recognize the importance of the private sector in cluster development. IDB has recently started to select private not-for-profit organizations to act as their national counterparts for cluster programmes (USAID 2003).</p> <p>Focus on different sectors and/or target groups: Each organization places the focus of its cluster programmes on different issues: IDB on SME clusters in the tourism, agro-industrial, ICT and other sectors; UNIDO on SME industrial clusters in developing countries; ITC on the importance of clusters for national export strategies; DFID on making business services meet the needs of firms owned by or a source of employment for the poor; and USAID on promoting competitiveness in various economic sectors through clustering, with a special interest in programmes in transition economies and post-war recovery.</p> <p>Cluster-driven policy reform efforts or as part of a broader reform puzzle: While for the World Bank cluster initiatives are just a small piece of a broader policy reform puzzle, for UNIDO, USAID and other organizations clusters are the centrepiece of their projects and, consequently, their policy reform efforts are cluster-driven (USAID 2003).</p>

Source: Author's elaboration.

3.4 AN INTRODUCTION TO AGRO-BASED CLUSTERS FROM DEVELOPING COUNTRIES

The promotion, and inducement, of industrial clusters has become a key feature of industrial policy in many developing countries. And, while the track record on a global basis may have been mixed, clustering has, in a significant number of countries, lent substantial momentum to the national drive towards greater international competitiveness and improved business performance. Why then, when the argument in favour of replicating such value networks in the agricultural sector appears so compelling, have small-scale producers and agribusiness in developing countries not engaged before and more vigorously in clustering activity?

Nowadays, AC initiatives are starting to be seen as a key approach to help promote the agricultural sector of developing countries. The promotion or inducement of such clusters has

various advantages relative to other approaches. In particular, cluster approaches recognize that all the actors in the agricultural value chain are often more innovative and successful when they interact with supporting institutions and other actors in the supply chain. By promoting vertical and horizontal links between local agricultural enterprises, as well as supporting relationships between them and facilitating organizations (e.g. local governments, research institutes and NGOs), cluster policies promote the diffusion of innovation, as well as the use and generation of important local externalities. ACs can also enhance access to markets and information. Cluster policies are argued to be crucial, especially for small-scale farmers and agribusiness, as they enable them to engage in higher productivity, more market-oriented and higher value-added production. Accordingly, central and local governments have discovered that cluster promotion is a valuable tool to support agricultural enterprises in their territory and help them link to global agricultural value chains in a more efficient and sustainable manner.

In the following chapters, all these issues regarding ACs in developing clusters will be further analysed. Various examples of clusters are presented from Latin America, Asia and Africa. These deal mainly with high-value, export-oriented agricultural products such as cut flowers, fish, fresh fruit and vegetables, and wine. Special attention will be given to the development and upgrading of these clusters, and to the role played by collective action and the support of government and other facilitating institutions in each case.

4. Agro-based clusters in Latin America

4.1 INTRODUCTION TO LATIN AMERICAN AGRO-BASED CLUSTERS

Researchers are far from reaching a consensus on the degree of development and competitiveness of Latin American ACs. According to Bisang and Gutman (2005) several agrifood product lines in Mercosur countries have expanded and attained higher level of competitiveness thanks to the organization of these product lines in clusters or networks. Thus, they have become “focal points (axes) of accumulation and economic growth”. Amighini (2003) says that Latin America enjoys a comparative advantage for developing industries based on natural resources, including agro-industrial activities (e.g. fruit, sugar, wine, salmon, milk) and some mining industries. Dirven’s work on dairy clusters in Central America (ECLAC, 2001) shows a more pessimistic view about the development of these clusters. She states that clusters tend to be “moderately competitive, increasingly in foreign hands, with core decision-making in the capital city or abroad, shallow as to local supply chains, embryonic as to their stage of development, users and not generators of technology, and with low innovative capacity”. Guaipatín (2003) limits himself to saying that the more interesting fact about Latin American ACs is simply that they exist, in spite of “their agricultural structure based on small producers with difficult access to credit, information and knowledge [...] and the current absence of public support”.

The present report tries to shed some light on this subject. It focuses on clusters of high-value agricultural products that have been documented in the region, namely: wine, fruits and vegetables, fish, cut flowers and coffee.

4.2 WINE CLUSTERS

The Latin American wine clusters (illustrated in Figure 3) have been extensively studied in the past years, coinciding with the “wine revolution” of the 1990s. Such a revolution has been led mainly by southern hemisphere countries, such as Chile, Argentina, Australia and South Africa.

The Chilean wine cluster has captured attention far and wide because of its meteoric rise in international markets (Figueroa and González, 1998; Giuliani, 2003b; Giuliani and Bell, 2004; CORFO, 2004; Visser, 2004). Other Latin American wine clusters studied, though to a lesser degree, are the Cuyo wine cluster (in particular, Mendoza and San Juan provinces) in Argentina (McDermott, 2005), the Bolivian wine and *singani* (brandy) cluster (USAID, 2002; Paniagua Requena, 2002) and the wine cluster of southern Brazil (Vargas, 2001; Oliveira, 2003; Zylbersztajn and Miele, 2005).

Figure 3. Map of Latin American wine clusters

4.2.1 Latin American wine clusters: some figures

Some key characteristics of the South American wine clusters in terms of production, market orientation, number and size of firms, governance and investments can be found in Table 3 and Annex 2.

The favourable soil and climate conditions for winemaking in various *terroirs* in Latin America's countries have led to the establishment of several wine clusters over many decades. These clusters, dominated by a large number of vertically integrated small- and medium-size firms, have traditionally produced low-quality bulk wine mainly oriented to the domestic and regional markets. This panorama changed quickly and profoundly in the 1990s, when

Table 3. Wine production and marketing in Latin America

Country	Wine production (MT)	Domestic market (MT)	Exports (MT)	Domestic market (%)	Exports (%)
Argentina	1 332 500	1 139 450	193 050	86	14
Bolivia	2 048	2 019	29	99	1
Brazil	262 000	260 416	1 584	99	1
Chile	668 100	277 100	391 000	41	59
Uruguay	81 814	80 052	1 762	98	2

Source: FAOSTAT, year 2003 | © FAO Statistics Division 2006 | 30 August 2006.

these wine clusters underwent a major technological overhaul, experienced an increase in firm concentration and went from mass production to the production of small quantities of high-quality wines.

Annex 2 also shows the magnitude of foreign direct investment (FDI) flows into the region's wine clusters since the 1990s, when the global wine industry cast its eyes on the New World wine clusters and started to establish their own vineyards or to buy or work together with local wineries in Latin America.

4.2.2 Wine clusters' evolution over time

Latin American wine clusters were traditionally formed by a myriad of small wine growers and family-run wineries that used to produce and sell bulk wine in the domestic market. Throughout the 1970s and into the 1980s, exports accounted for very little of the production – most of it remained on the domestic market – and Latin American wines were largely unknown overseas.

A drastic turnaround happened in the 1990s when a “quality over quantity” approach was adopted, resulting in a shift from bulk wine for the domestic market to premium wines for demanding export markets. As a result, nowadays in Argentina only 2.4 percent of the volumes are sold in bulk, in comparison with 80 percent before 1995; and 85 percent of the export revenues of the Argentinian wine industry come from fine wines. Chile has also decreased its exports of bulk wine to a quarter of total wine exports (Miremont, 2000).

The causes of this strategic move were multiple: excess production regionally and globally; high worldwide demand for premium wine; creation of brands from Latin America and the establishment of Controlled Denomination of Origin (CDO) in Chile and Argentina; ban on bulk wine exports within Mercosur; industry's globalization of production, distribution and marketing; and consistent advancements in product quality and innovation at the regional level (Miremont, 2000; Sawyer, 2004).

Significant investments on the production side made this jump in quality possible. Between 1998 and 2000, direct investments in wine production in the clusters studied amounted to about US\$500–600 million (Miremont, 2000). Much of this capital came from foreign companies that invested in the creation of vineyards or in buying or setting up joint ventures with national companies. The arrival of foreign investors energized Latin American wine clusters not only from a financial point of view, but also because of the innovations and vision that these investors brought along with them. Sawyer (2004) enumerates some innovations introduced both at the vineyard level (e.g. use of cover crops, increased vine density planting, introduction/rediscovery of new varieties, drip irrigation) and the cellar level, where French, Californian and Australian winemaking techniques were put in practice. New management and marketing styles were also adopted: state-of-the-art product development (from varieties to blending) and quality control, co-design and co-benchmarking processes (development of new systems to document practices and products, share the information and evaluate the results over time and space), and emphasis on regional identity and branding, and launching of collective communication campaigns, among others (McDermott, 2005).

Table 4. Wine export values from 1995 to 2004

Country	1995 (1 000 \$)	2004 (1 000 \$)	Δ (%)
Argentina	73 825	221 438	+200
Bolivia	27	61	+126
Brazil	12 609	1 828	-86
Chile	181 763	835 486	+360
Uruguay	403	3 160	+684

Source: FAOSTAT | © FAO Statistics Division 2008 | 4 November 2008.

Latin American wine clusters have consolidated their presence in the international wine business (Paniagua Requena, 2002; Giuliani and Bell, 2004; Langman, 2002; McDermott, 2005; Penn, 2001; Sawyer, 2004; USAID, 2002) both in terms of quantity and quality. In only ten years Chile's wine exports exploded from US\$182 million in 1995 to US\$835 million in 2004. Likewise, Argentina's wine exports surged to US\$221 million from US\$74 million in the same period. Bolivia and Uruguay also experienced a significant increase in wine exports. Brazil was the exception in the region (Table 4).

Regarding quality recognition, Visser (2004) states that Chilean wineries are increasingly penetrating ultra-premium market segments (Chile won 8 percent of awards and 7 percent of all medals at the London International Wine Challenge Rewards 2003). Chile's Colchagua Valley was awarded Wine Enthusiast's "Wine Region of the Year" for 2005, and a recent article in a wine magazine described the *cabernet sauvignon* of the largest Chilean winemaking company as "the best-value *cabernet sauvignon* on the planet" (Hojman, 2006a; *Decanter* magazine, May 2006). Likewise, McDermott (2005) shows that major trade magazines now rate an increasing broad base of high quality Argentinian wines of many different varieties and distinctive blends. Uruguay is also achieving increasing success with its Tannat grape variety, grown only in France and Uruguay. Another country determined to find its niche market in Europe and elsewhere overseas is Bolivia, which has concentrated on fine wines and is holding onto the concept of the "highest wine in the world" or "high-altitude vineyards"¹⁶.

4.2.3 The upgrading of the Latin American wine clusters

Latin American wine clusters have embarked upon this upgrading path mainly because of:

- the attractive environment for investment in this sector, favoured by the improved macro-economic conditions, including trade and fiscal policies;

¹⁶ Apparently, the high altitude contributes to a higher concentration of flavour and bouquet that increase the quality of wine (Lobato and Prudencio, 2002).

- the arrival of foreign investors who introduced modern winemaking, marketing and management techniques;
- the emergence of collective actions undertaken by cluster stakeholders;
- the institutional support to wine clusters by public agencies, universities, R&D institutions, etc.

The two latter factors are considered crucial by many authors. In this regard, Visser (2004) suggests that conscious collective action by local stakeholders to solve common problems of the industry in Chile has created a shared basis for upgrading. McDermott (2005) also refers to voluntary networking and government support, which follow the principles of inclusion of a wide variety of relevant stakeholder groups and deliberative governance that promote collective problem-solving, as main contributors to institutional change and upgrading in Argentinian wine clusters. Giuliani (2003) shows empirical evidence that the accumulation of knowledge by individual firms and the development of knowledge linkages among cluster members (firms tend to exchange knowledge quite extensively across the cluster) and with supporting institutions are the main drivers for upgrading and knowledge acquisition in the Colchagua Valley cluster.

Emergence of collective actions: Such actions are of a double nature: collective learning, and marketing and promotion initiatives.

Collective learning: In various clusters, winemakers have joined efforts to bring in international consultants. For instance, in the early 1980s, a group of Uruguayan wineries jointly hired French wine experts to advise them on the development of a common strategy to improve their wines. Benavente (2004) also mentions that a group of local firms in Chile invited a foreign oenologist to work with them in order to absorb the latest foreign technology. McDermott (2005) mentions that elite firms from Mendoza organized two main forms of collective learning based on past professional and local ties. First, elite firms created learning groups formed by 8–10 firms that shared the cost of a consultant and met regularly to share tacit knowledge and help solve common problems of upgrading vineyards. Second, annual wine and label evaluation competitions were launched.

Collective marketing and promotion: McDermott (2005) cites two examples of collective marketing in Argentina. The first example refers to Fecovita, the federation of cooperatives from Mendoza, which has improved its members' access to markets through combined bargaining power and alliances with domestic and international distributors. The second case makes reference to wine cellars of Argentina, the association of the largest and most refined wineries, which has created its own foundation (Wines of Argentina) to launch international marketing campaigns to promote Argentinian wine, often in collaboration with ProMendoza (public agency in charge of the international promotion of Argentinian wines) in order to build up the country image "Origen Argentina".

Vargas (2001) quotes the example of the Associação dos Produtores de Vinhos Finos do Vale dos Vinhedos (APROVALE), an association of Brazilian wine cellars of fine wines that aims at making possible the creation of a regional brand. Similarly, Penn (2001) cites the Wines of Uruguay Exporters' Association, a commercial group created in 1999 that nowadays

congregates 24 member organizations working together to compete in international markets. Benavente (2004) and Visser (2004) mention that business/sectoral associations from Chile, such as the Chilean Wine Association (CCV – Association of grape producers, wineries and suppliers) and ChileVid (Association of producers of export fine wines) contribute significantly to the marketing, promotion and the internationalization regimes. Another association is “Viñas de Chile”, which provides marketing support (including wine tasting, market research, promotion strategies, research studies on the health benefits of moderate wine consumption and trade shows and technical conferences) to its 45 member wineries.

Institutional support to clusters: Several studies show that different types of institutions support the region’s wine clusters, the most important being governments (at local, regional and national levels), and universities and research institutions.

Government support: In Chile and Argentina, government support has been decisive for the development of the wine clusters. Chile has provided institutional support in three ways: a) through the liberalization of grape and wine production and exports; b) the promotion of technological learning for exports, especially biased towards small producers; and c) support to export promotion activities and collective marketing initiatives by SMEs. The government’s role in the grape and wine sector has been mostly to address market failures, especially those related with information generation and coordination between SMEs in order to exploit economies of scale and of scope (Benavente, 2004). The central Government of Argentina has followed an approach similar to that of Chile, but some differences can be found at the provincial level. McDermott (2005) praised in particular the strategy adopted by the province of Mendoza based on the promotion of public-private partnerships (PPPs) and the combination of rules of inclusion and participatory governance, which helped to solve collective problems and pushed mutual monitoring.

In Uruguay, government support to the wine cluster has been mainly channelled through the Uruguayan National Institute of Viticulture (INAVI) that initially facilitated industry rationalization and is gradually taking on new responsibilities, such as quality control and international promotion of fine wines (Unikowsky, 2005). In Brazil, a similar function is fulfilled by the Brazilian Institute of Wine (IBRAVIN), created in the 1990s with the aim of managing and executing a series of projects approved through the Fund for Support to the Wine Sector (Fundovitis). IBRAVIN’s key areas of work are: a) to provide market information; b) to improve winegrape quality and viticulture practices; c) to enhance cooperation between growers and wineries; d) to accomplish a viticulture directory in the region; e) to promote the region geographical indicators; f) to promote a new proposal of legislation for the cluster/sector. Both INAVI and IBRAVIN are seen as a potential body of regulation and control of the sector.

Conversely, the Government of Bolivia has not developed a specific institutional framework to support the wine cluster, except for the national research institute, National Centre of Viticulture (CENAVIT) (Paniagua Requena, 2002).

Other supporting institutions: Developing linkages with educational and research institutes is critical to the success of wine clusters, as the wine industry is particularly knowledge-driven. In spite of this, in Latin America and the Caribbean (LAC), the above-mentioned linkages

are fairly underdeveloped in wine clusters in comparison with those of the Californian¹⁷ or the Australian wine clusters. In this sense, Benavente (2004) adds that: “Chilean firm-university linkages are very weak compared to countries such as Australia and the United States, where governments invest the equivalent of 1 percent of total sales in applied research executed by the university” – a statement that is applicable to the whole region.

Fortunately, positive changes are currently underway in this area. In Chile, two technological research and innovation consortia: Vinnova and CCDV (Technological-Entrepreneurial Consortium) have been created with government support. Vinnova is a limited-liability company formed by the promotional body Viñas de Chile (55 percent), the Pontificia Universidad Católica de Chile (39 percent) and the Universidad de Concepción (6 percent), supported by Innova Chile, a CORFO’s programme that funds 60 percent of the total budget, i.e. about US\$3 millions. Vinnova is currently working on 12 research projects with topics ranging from consumers’ preferences, red wine quality, and technological transfer policies to fungus and mycotoxins, among others (www.corfo.cl). Before the creation of Vinnova in 2006, Viñas de Chile and the Universidad Católica de Chile were already collaborating in the implementation of a three-year project with a total budget of US\$1.5 million with the purpose of solving wine industry production problems (Benavente, 2004). Similarly, CCDV is formed by ChileVid, the Universidad de Talca, the Universidad de Chile, the Universidad Federico Santa María, CCV and the firm Tonelería Nacional. (www.corfo.cl), and receives the financial support of the Chilean Government (about US\$3 million).

In the late 1990s, the two major universities of Mendoza, Argentina – the National University of Cuyo (UNCuyo) and the Universidad Maza – created new degree programmes in oenology and viticulture or expanded their existing ones. Additionally, the UNCuyo started to undertake applied agronomy research directly with firms or through joint research projects with public agencies. Moreover, two public-private teaching institutions were created: the Technological Institute of Mendoza (ITU) and the Industrial and Technological Development Institute (IDIT), to satisfy the demands of the Mendoza wine cluster in the areas of management, and applied operations research in engineering and manufacturing, respectively (McDermott, 2005).

In Brazil, two institutions carry out research and training programs for the wine cluster. The National Centre for Research on Grape and Wine (CNPUV) of the Agricultural Research Corporation (EMBRAPA) performs most viticulture R&D activities for the cluster. The JK Agrotechnical Federal School is the only educational institution in the country offering training for oenology technicians at the intermediate degree level. The Agrotechnical School has established collaboration with other universities with expertise in this field, such as the French National School for Agronomic Formation in Toulouse and the Federal University of Rio Grande do Sul (Vargas, 2001; IDB, 2005b).

All the above shows the role played by industry associations, public agencies and research and academic institutes in upgrading wine clusters, but the list of institutions that support

17 Porter and Bond (1999) studied the linkages developed between the Californian wine industry, the Wine Institute, the University of California at Davis and culinary institutes.

and influence agricultural clusters may be endless. Below, Table 5, serves as an example of the different types of institutions that contribute to the development of the Chilean wine clusters, and what kind of support they provide.

Table 5. Supporting and related institutions: the case of the Chilean wine cluster

Type of support	Supporting institutions
Wine associations	Corporación Chilena del Vino: www.ccv.cl Chilevid: www.chilevid.cl
Industry-supporting institutions	Consultores Vitivinícolas: www.consultoresvitivnicolas.cl Servicio Nacional de Agricultura: www.sna.cl Corporación de Fomento de la Producción (CORFO): www.corfo.cl Servicio Para la Innovación Agraria (FIA): www.fia.cl Servicio Agrícola Ganadero (SAG): www.sag.cl Oficinas de Estudios y Políticas Agrarias: www.odepa.cl Dirección de Promoción de Exportaciones: www.prochile.cl Agroeconómico: www.agroeconomico.cl Agronomía y Forestal UC: www.faif.puc.cl
International promotion	Wines of Chile: www.winesofchile.org Asociación Viñas de Chile: www.vinasdechile.com
Training	Otic: www.vinasdechile.com
Research and development	Programa Ciencia, Vino y Salud: www.bio.puc.cl/vinsalud Programa Alimentario Mediterráneo en Chile: www.pam-chile.cl Research and Development consortium: www.vinnova.cl
Wine routes	Casablanca: www.casablancavalley.cl Valle del Maule: www.valledelmaule.cl Valle del Cachapoal: www.cachapoalwineroute.cl
National specialized press	Chile Vinos: www.chilevinos.com Toro Rojo: www.tororojo.cl Vendimia: www.vendimia.cl Revista la Cav: www.lacav.cl Revista Vitivinicultura: www.vitivinicultura.cl Revista Platos y Copas: www.platosycopas.cl Planeta Vino: www.planetavino.com Revista De Novios: www.denovios.com La Vinoteca: www.lavinoteca.cl Andes Wines: www.andeswines.com Todovinos: www.todovinos.cl

Source: Viñas de Chile (www.vinasdechile.com).

4.3 FRUIT CLUSTERS

A few fruit clusters in LAC have received considerable attention, namely: in Brazil, the mango and grape clusters of Petrolina Juazeiro (Guaipatín, 2004; Damiani, 1999 and 2001; Locke, 2001; Gomes, 2000), the apple cluster in Santa Catarina (Guaipatín, 2004; Gomes, 2000), and the melon cluster in Rio Grande do Norte (Gomes, 2000); in Chile, the raspberry cluster (Guaipatín, 2004); and in Mexico, the pineapple, avocado and lemon clusters (Guaipatín, 2004; Dussel, 2002; Merchand, 2005). Other clusters studied, though less thoroughly, are: the fruit cluster in the north of Minas Gerais, Brazil (Gonçalves, 2001); the Antioquia's horticultural cluster (CID, 2003) in Colombia; the Maule raspberry cluster in Chile (Katz and Sánchez-Douglas, 2004) and the fruit cluster in Argentina and Chile (Casaburi, 1999) Figure 4.

All the clusters analysed produce fresh and/or processed fruits for the domestic and the export markets.

4.3.1 Latin American fruit clusters: some figures

Some key characteristics of these clusters in terms of production, market orientation and size of firms are shown in Table 6. Large growers have a strong presence in the fruit clusters

Figure 4. Map of Latin American fruit clusters



Source: Author's elaboration.

studied, but medium and small producers have also managed to remain successful in business, accounting for 30 to 60 percent of total production.

Table 6. Quantitative description of fruit clusters in Latin America

Location	Product	Area planted (ha)	Share of national production (%) ^{a)}	Share of output that is exported (%) ^{b)}	Share of total exports (%) ^{c)}	Producer size (%) ^{d)}		
						Large	Medium	Small
Brazil, Rio Grande do N.	Melon	4 545	38	50	70	65	30	5
Brazil, Santa Catarina	Apple	13 046	51	7	96	65	25	10
Brazil, Petrolina Juazeiro	Mango	10 432	26	35	90		40	
Brazil, Petrolina Juazeiro	Grape	5 683	8	11	30		60	
Brazil, Minas Gerais	Tropical fruits							
Chile, Maule	Raspberry	8 330	80	80	-			78
Chile, Valparaíso	Avocado	12 000	70	-	-	73		
Mexico, Michoacán	Avocado	83 055	88	17	-	1.5	5	92.5
Mexico, Colima	Lemon		35	18	18			
Mexico, Veracruz	Pineapple	7 221	64	5	5			

Source: Brazil: Gomes, 2000. Mexico, lemon and pineapple: Guaipatín, 2004; avocado: Aguirre and Medina, 2006. Chile, raspberry: Katz and Sánchez-Douglas, 2004; Secretaría Regional Ministerial de Agricultura de la Región de Maule, 2005; Chile, avocado: Alfaro, 2006.

a) Refers to share in the total production of each crop in a given country.

b) Refers to share of total output in each case that is exported.

c) Refers to share of exports from each case in total country exports of that crop.

d) These data reflect the percentage of production of each crop that is produced by medium growers. The definition of "medium-size" grower varies in each case, depending on the financial, management, production and post-harvest requirements for cultivating each crop. For example, a grower cultivating 50 ha of grapes may be considered large, whereas a grower cultivating the same surface of melons may be considered small, because the requirements per hectare are much greater for grapes than for melons.

4.3.2 Evolution over time of the Latin American fruit clusters

The development of the Latin American fruit clusters has followed different paths:

- Some clusters were the result of centralized government planning, such as the mango and grape clusters in Petrolina Juazeiro.
- Other clusters were the consequence of the collaboration between pioneer entrepreneurs and the public sector, such as the apple cluster in Santa Catarina.
- In other cases, clusters were generated by the initiative of large entrepreneurs alone, as in the case of melon production in Rio Grande do Norte.

Today, fruit clusters in LAC are under a strong pressure to upgrade exerted by the tighter profit margins and the increasing demands from buyers. This is a consequence of various factors that are transforming the global market for fresh fruits, including the rise of supermarkets in the region that account for as much as 50–60 percent of national food retail, and the stringent food safety measures imposed by industrialized countries on food imports.

4.3.3 Factors contributing to the success of Latin American fruit clusters

The small and medium growers that populate the LAC fruit clusters have found different ways to meet market pressures. First, some growers have engaged in contractual arrangements with grower-exporters or with dedicated wholesalers who contract out for supermarkets. A good example of this is the case of about 2 000 smallholder raspberry producers (less than 2 ha) from the Maule and Bío-Bío regions in Chile who have established long-term supply agreements with larger firms that produce, pack/process and export raspberries (Katz and Sánchez-Douglas, 2004). Second, small- and medium-scale producers have established direct sourcing arrangements with small supermarkets or, to a lesser extent, participate in ethical production and marketing networks. And third, and more importantly, they have taken joint action to meet threats and challenges collectively.

Collective actions: There are abundant examples of how collective action has proven to be crucial to the development of fruit clusters in the region. For instance, the Brazilian Apple Producer Association (ABPM) located in Fraiburgo, Santa Catarina¹⁸, has fostered the development of a so-called apple integrated production system, has introduced a quality and grading system, and has contributed to the establishment of a public competitive grant programme to finance training and laboratory equipment for research on Brazilian fruit exports.

Another example from Brazil is the case of VALEXPOR, an association that represents the fruit and vegetable growers and exporters of Petrolina-Juazeiro. VALEXPOR has

18 ABPM defends the interests of apple growers and exporters from Rio Grande do Sul, Santa Catarina, Paraná and São Paulo. Its 35 members, including two provincial associations and four cooperatives, produce 85 percent of the apples sold in the domestic market and 95 percent of the apples exported.

greatly contributed to increasing the cluster export performance. The association has signed technical and trade agreements with entities, public and private enterprises, nationally and internationally related to the production, handling, shipping, warehouse services, trading, exports and promotion of vegetables and fruits. It has also been actively involved in organizing the cluster participation in fairs and expositions.

Chilealimentos (Asociación de Empresas de Alimentos de Chile, ex-FEPACH), a privately-owned association that includes all major agroprocessors and exporters of frozen and other processed fruits and vegetables, has played a pivotal role in mobilizing collective action in the Maule's raspberry cluster. Among other things, Chilealimentos has helped the raspberry cluster to comply with quality standards and to achieve economies of scale in export logistics and in the purchase of inputs. It has also been instrumental in supporting the international promotion of raspberries and in promoting collective action to defend the cluster's interests, for instance, against the accusation of dumping made by raspberry producers in the United States.

One case that deserves a special mention is the Michoacán avocado cluster, Mexico, where the Mexican Ministry of Agriculture has empowered producers organized in regional committees and local phytosanitary boards¹⁹ to implement and monitor their own phytosanitary policies and programmes. The fact that these boards composed mainly by small farmers are competent to issue phytosanitary certificates to export avocado, gives them control over the marketing of their produce. According to Aguirre and Medina (2006) this has been possible thanks to the high degree of organization of avocado producers and their willingness to comply with export quality and safety standards, and the support of the public authorities.

Institutional support to fruit clusters: The Brazilian cluster policy has favoured the participation of small- and medium-size fruit growers in the clusters, and has tried to ensure that they benefit from the cluster development and upgrading. This pro-small grower public support has taken many shapes and forms over the years. For instance the Government of Santa Catarina has provided extension services to smallholder producers of apples and other temperate fruits and has facilitated their access to credit, marketing, research and training. Gomes (2000) points out that the structure of Santa Catarina's agricultural research and extension system benefited particularly small and medium growers because it provided at least one extensionist for every 20 growers, and one of the two state's research experimental stations maintained very strong ties with small growers, while the other focused more on the needs of large growers.

In the Petrolina-Juazeiro mango and grape clusters, the San Francisco River Valley Development Agency (CODEVASF) – a public institution that was actually responsible for the creation of the cluster – allocated lots of irrigated land to smallholders with the idea of achieving a critical mass of small and medium growers to produce irrigated fruits, and supported the creation of a grower association.

In both of the previous examples, public-sector research agencies have explicitly included small growers in their research projects as a means of making the technology and research relevant to the small grower and to disseminate findings to small-scale producers.

¹⁹ Called "Comités Regionales and Juntas Locales de Sanidad Vegetal".

The consistency and continuity of public support varies from case to case, with the subsequent impact on effectiveness. The Santa Catarina apple cluster is an example of how a sustained public support is able to boost public-private collaboration and other factors determining cluster competitiveness and growth. In contrast, other clusters have received rather discontinuous public support. Katz and Sánchez-Douglas (2004) believe this is the case of the Maule raspberry cluster. During the 1980s and 1990s only isolated initiatives to support the cluster were undertaken by several public agencies, such as research (modified atmosphere packaging, molecular markers for varietal identification), technical assistance and technology transfer to producer groups, and credit lines to ensure compliance with international standards. It was not until 2003 that a concerted action to support the raspberry cluster finally emerged. A cluster association (Mesa Regional de Berries) bringing together several public-sector organizations was created to collectively address production and marketing issues hampering the development of the cluster.

Bearing in mind the need for concerted public support to ACs, Chile has launched a new tool called Integrated Territorial Programmes (ITP). This tool aims at aligning the actions of businesses and regional governments to develop projects that raise the productivity and competitiveness of a given productive sector as well as develop the productive potential of a given territory (Cox, 2008). Examples of these ITPs in the agricultural sector are:

- the “Frutas de Chile 2010” programme²⁰ that supports the development of the Maule fruit cluster (apples, kiwis and cherries);
- the Valparaiso ITP that aims at fostering the development of the avocado cluster;
- the O’Higgins ITP that supports the development of the fresh and processed fruit cluster (apples, table grapes and plums) in the O’Higgins region;
- the Coquimbo ITP (table grape, avocado and citrus fruits).

These ITPs have many goals in common, such as to: a) increase production areas; b) improve and develop qualified labour force; c) enhance public-private cooperation; d) ensure the compliance of quality and environmental standards; and e) improve research and technology transfer and dissemination.

4.4 THE SALMON CLUSTER IN CHILE

One of the most outstanding clusters in the region is the Chilean salmon industry, which has captured the attention of many authors, including Achurra (1995); Maggi (2002); Iizuka (2004); Montero (2004); IDB (2005b); Bañados and Alvial (2006); and Ulloa (2005).

20 www.frutasdechile2010.cl

Table 7. Quantitative description of the Chilean salmon and trout cluster

Location	Product	Volume (1000 round tonnes) ^{a)}	Share of national production (%) ^{b)}	Value of exports (millions of US\$ FOB) ^{c)}	Number of firms		
					Producers and suppliers	Service providers	Input providers
X region (Región de los Lagos), Chile	Cultivated salmon & trout	628	87	2 207	70–80	350	150

Source: a) and c) *SalmonChile, 2007 for year 2006*; b) *Montero, 2004*.

4.4.1 Chilean salmon cluster: some figures

In little more than two decades, this cluster has achieved a leading position in the global salmon industry. Nowadays, Chile is competing with Norway for the number-one position in production of cultivated salmon and trout, with a global market share of 38.2 and 39.7 percent respectively in 2006²¹. Chilean exports of these products have experienced a giant leap from US\$668 million in 1997 to US\$2 207 million in 2006, more than a threefold increase in 10 years.

This cluster first developed in the lakes of the X region (Los Lagos), which in 2005 concentrated 87 percent of the national salmon industry, and it is currently expanding southwards to the XI region (Aisén). See Table 7 for more information.

4.4.2 Chilean salmon clusters' evolution over time

The Chilean salmon cluster is the rare case of an industry that has gone from zero to second worldwide producer in just a few years. According to ECLAC, all the phases of the productive process and related services were developed in the arc of 10 years. Bañados and Alvial (2006) mention various phases of development, starting with a testing and learning phase (1960–1973), a formation and maturation phase (1974–1995), an internalization phase (1996–2002) and the current consolidation phase (2002–present), as shown in Table 8.

4.4.3 The upgrading of the Chilean salmon clusters

The Chilean salmon cluster benefited from the beginning from steady government support and a high degree of associativity. This latter was crucial to defend the cluster against international accusations of illegal dumping.

Table 8. Evolution of the Chilean salmon cluster

Life cycle	Initial learning	Formation and maturation	Internalization	Consolidation
Years	1960–1973	1974–1995	1996–2002	2002–present
Production (round tonnes)	900	1 350–143 000	150 000–300 000	487 900
Milestones	Technology adaptation and transfer	Scale-up to a commercial level	Asian crisis; dumping accusations; merging and vertical integration; establishment of forward linkages; salmon's cycle control; new rules and regulations	Integrated management system for producers and suppliers (SIGES); Industry monitoring systems; Clean production agreement (APL); Integrated Territorial Programme (PTI); Salmon Cluster
Main challenge	Initial push and survival	Associativity and specialization; Creation of a technical institution, INTESAL	Market and product penetration and diversification; Public-private cooperation;	Increase value-adding in the supply chain; Establishment of alliances with key suppliers;
Business competitiveness	Production	Quality standardization; Backward linkages; R&D investments	Efficiency: cost reduction	Technological innovation and R&D in breeding, logistics and vaccine development;
Human capital	Entrepreneurs and non-skilled workers	Industrial engineers, managers and semi-skilled workers	System engineers, skilled workers, technicians, researchers and experts;	Process and labour-competency certification specialists
Social capital	International public-private cooperation	Associativity among producers	Productive system connected to the global supply and marketing chain	Local public-private cooperation. Social capital strengthening

Source: Bañados and Alvial, 2006.

Emergence of collective actions: Very early in its development the Chilean salmon industry tried to promote associative approaches in order to face upstream and downstream challenges. No wonder, thus, that today there is a plethora of associations in the cluster. The Chilean

salmon farming association (SalmonChile) that groups the main producers and suppliers of the cluster and its technological branch of the association, the “Instituto Tecnológico del Salmón” (INTESAL) are the most influential associations, but there are others in diverse fields of specialization such as: the Ship-owners and Maritime Services, the Association of Diving Companies, the Association of Veterinarian Laboratories and the Nets Companies Association.

Bañados and Alvial (2006) suggest that the multiplication of associative efforts in the cluster may have its origin in the physical proximity among the cluster agents and the high degree of vertical integration that characterized pioneer firms, where many technicians and professionals were trained and then left to set up their own service-provision companies.

Among the most outstanding collective initiatives carried out by cluster agents are:

- The development of a pioneer quality seal to face stringent quality market requirements.
- The launching of a phytoplankton vigilance programme.
- The monitoring of a series of environment, market and regulation variables.
- The establishment of geographic and good management practices tools.
- The development of a labour-competency certification system for various subsectors of the salmon cluster by SalmonChile, INTESAL and the Chile Califica programme²².
- The implementation of a “Clean Production Agreement” for the salmon industry (APL) and a Vigilance and Management Model that serves the principal producers and suppliers in the industry, both coordinated by SalmonChile and INTESAL.

Institutional support to the Chilean salmon cluster: The Chilean Government has played an important role as a facilitator and catalytic element promoting joint actions and building trust among the cluster agents. Along these lines, various public agencies have collaborated among each other and with INTESAL to solve key issues for the upgrading of the salmon cluster such as: registration procedures concerning vaccines; the use of the coastal zones; enforcement of regulations; and the mitigation of environmental impacts.

Recently in order to strengthen the-above mentioned associative efforts, a significant cluster reinforcement programme, an ITP for the salmon cluster, has been established under the INTESAL umbrella. This programme actively promotes R&D and innovation initiatives by emphasizing producer-supplier cooperation. This programme has three action lines:

- The creation of an innovation and knowledge platform to coordinate public and private efforts on areas such as fish health, genetics, animal feeding, environment and clean production, development of new technologies, production management, supplier management and certification. These initiatives represent so far a total

²² A permanent education and training programme implemented by the Ministries of Economy, Education and Labour and Social Security of Chile.

investment of more than US\$14 million, with contributions from both the public (48 percent) and the private (52 percent) sectors.

- The establishment of public-private coordination *fora* dealing with four themes: enhanced sea transport; improved animal health; creation of a registry for fishing nets; and the expansion of the cluster to the XI region.
- The promotion of alliances and networks to coordinate initiatives linked to the development of suppliers. Such initiatives include the creation of a registry of suppliers, the development of a training programme on business management for suppliers, and an integrated management system for producers and suppliers (SIGES-proveedores).

With the implementation of this ITP, the salmon cluster has achieved the highest ratio ever of investment in R&D to total industry sales.

Another important initiative in support of the salmon cluster is the Directive Skills Diploma under the Universidad de Chile and SalmonChile that seeks to build qualified human resources by opening new strategic avenues for the industry.

4.5 CUT-FLOWER CLUSTERS

4.5.1 Cut-flower clusters: some figures

Ecuador and Colombia have relatively cheap labour, fertile land available and optimal sunlight for flower cultivation because of their privileged location straddling the equator. National entrepreneurs and multinational corporations decided to avail of such comparative advantages and developed a whole new flower industry in the late 1960s in Colombia and 20 years later in Ecuador.

The area cultivated in Colombia with fresh cut flowers for export nearly reaches 7 300 ha, of which 79 percent are located in the savannah of Bogotá. The Ecuadorian cut-flower cluster is concentrated in the northcentral highlands, especially in the neighbouring provinces of Pichincha (66 percent of total surface) and Cotopaxi (12, 1 percent). Nowadays, Colombia (16 percent) and Ecuador (6 percent) are respectively the second and third world exporters

Table 9. Latin American flower clusters: some figures

Country	Location	Cultivated surface (ha)	No. of firms		Jobs	
			Domestic	Export-oriented	Direct	Indirect
Colombia	Bogotá (79%)*	7 266			182 000	83 500
Ecuador	Pichincha (70%)**	2 250	1 398	525	76 800	38 500

Source: Asocolflores, 2005, 2006; Expoflores, 2007; * percent of national cultivated surface; ** percent of national production, (US\$).

Table 10. Latin American flower clusters' growth

Cut flower exports from	Ecuador			Colombia		
	1996	2006	Δ (%)	1996	2006	Δ (%)
Hectares	1 485	2 250	52	4 500	7 266	61
Exports (MT)	65 225	104 164	60		231 943	n.a.
Exports ('000 US\$ FOB)	104 650	435 842	316	99 083	966 000	875

Source: *Expoflores, 2007; Asocolflores, 2007.*

of cut flowers²³ (Hornberger *et al.*, 2007), after having experienced a remarkable surge in their export revenues: tenfold increase in Colombia and fourfold in Ecuador from 1996 to 2006 (Table 10).

4.5.2 Cut-flower clusters' evolution over time

The Colombian flower cluster has known periods of growth and retraction since its beginnings in the 1960s:

- 1962–1974. Flower growing started in Colombia in the early 1960s driven by just a few pioneers. In the 1970s growth rates averaged 75 percent fuelled by some government incentives for non-traditional exports, namely: (a) export credits provided by Proexpo; (b) duty exemptions for imports of raw materials and other inputs used in creating goods for export; (c) export bonds (Export Tax Credits) that exporters could use to pay taxes or sell them in the financial market; and (d) a devaluation policy that aided the local currency against the dollar. (Arbeláez *et al.*, 2007).
- 1975–1983: In 1974 export benefits were discontinued because of the dumping claims made by the United States. As a result, from 1975 until 1983, exports increased at lower rates.
- 1984–1989: In 1984 the Colombian Government established again export incentives (e.g. cuts in import restrictions and currency devaluation), which resulted in a surge of flower exports (20 percent of average increase in the 1980s).
- 1990–present: This period is marked by the establishment of two preferential trade agreements, both enacted in 1991, which provided duty-free access to the markets of the United States (Andean Trade Preference Act) and the European Union (Andean Generalized System of Preferences). During the 1990s flower exports continued to increase with an average growth of 10 percent, with fluctuations in response to real exchange rate movements.

23 The US\$5.7 billion cut flowers world market is dominated by the Netherlands, which accounted for 54 percent of exports in 2005, followed by Colombia (16 percent), Ecuador (6 percent) and Kenya (6 percent).

Ecuador is a relatively latecomer in the flower industry: Its first modern flower growing initiative dates back from 1982. Two years later, flower growers decided to come together and organize themselves, forming the Association of Flower Producers and Exporters of Ecuador (EXPOFLORES, www.expoflores.com). Since 1984 to our days, the flower cluster has gone through three distinctive periods:

- The cluster formation period (1984–90) when the numbers of firms grew to 20 and critical transportation issues were solved.
- The massive growth period (1990–98) that ended with more than 150 firms enduring a price war and cost increases in land and skilled labour force.
- The restructuring period (1998–present) with several firms going out of business, while the remaining ones started to collaborate among each other and with the public sector to develop joint initiatives.

4.5.3 The upgrading of cut-flower clusters

Emergence of collective actions: The Colombian flower cluster was favoured by export promotion policies, but it owes much of its development to the collective action promoted by Asocolflores: the Colombian growers and exporters associations created in 1973 (Asociación Colombiana de Exportadores de Flores, www.asocolflores.org). Asocolflores groups 215 firms, 308 farms, representing 66 percent of the total cultivated area and 75 percent of Colombian floral exports (Asocolflores, Fact Sheet 2005).

Asocolflores has efficiently promoted coordination and cooperation among cluster participants on key issues of common interest, such as scientific research, marketing, transportation, environmental sustainability and workers' welfare. For instance, the association has worked to increase the cluster bargain power with suppliers; negotiate air freight fees; provide advice to the government for the negotiation of trade agreements; represent the cluster in international disputes; and to improve logistics and distribution in foreign markets. Other key interventions of Asocolflores have been:

- The creation in 1996 of a voluntary socio-environment standard called “Florverde” to ensure continuous improvement of members companies, through a dynamic system that measures social and environment performance. In June 2008 almost half the surface of fresh cut flowers was cultivated following this standard, which covers worker health, social issues, pesticide/chemical usage and environmental conservation, and is benchmarked to Global Partnership for Good Agricultural Practices (GLOBALGAP).
- The creation of an association of floriculture experts called ACOPAFLOR in 1992.
- The undertaking of joint marketing activities, including: a) the organization of the flower show Proflora (www.proflora.org.co), with nearly 300 exhibitors, and more than 4 000 visitors; b) the participation in international fairs with a stand called “Colombia, Land of Flowers”; c) joint marketing campaigns in different countries (e.g. “Viva”

Campaign in the United Kingdom); and d) the creation of the Colombian Flower Council to promote the consumption of Colombian flowers in the United States.

- The creation of the Colombian Center for Innovation in Floriculture (Ceniflores, www.ceniflores.org) in 2004, to support research, promote technological development and enhance the competitiveness of Colombian floriculture. This centre looks into issues such as promoting organic production, creating a weather monitoring system in the Bogotá savannah, promoting native flower species, innovative practices in soil and water management.

As described above, Ecuador has a similar organization that promotes the cluster collective action, which is called EXPOFLORES and groups flower growers, exporters and plant dissemination companies. It develops training and technical assistance programmes, enters into agreement with public and private institutions, compiles and disseminates statistics and information on markets and social and environmental issues. The first collective actions of the Ecuadorian flower cluster aimed at solving basic common issues, such as problems with airline shipments²⁴, input provision (e.g. seeds, fertilizers, cardboard boxes²⁵), and foreign currency remittances by the Central Bank. EXPOFLORES also provided advice for the negotiation of trade agreements above mentioned.

Institutional support: For many the most significant role that the public sector has played in support of the Colombian and Ecuadorian flower clusters was the negotiation and maintenance of preferential market access. As mentioned above, the export promotion policies adopted by the Colombian Government played as well an important role in the development of the flower cluster.

More recent public interventions are targeted at improving the competitiveness of the flower cluster by enhancing infrastructure; upgrading regulation and ensuring its compliance; co-investing in R&D, among other initiatives, all of them carried out in close collaboration with the private sector. Colombia has institutionalized this public-private sector cooperation through the signature of a Competitiveness Agreement that comprises all public and private bodies related to the flower cluster. For the first time, the Agreement includes a set of principles intended to guide the relationships between the members of the cluster and encourage joint activities to achieve the objectives of the Agreement. The activities are grouped into four main strategic areas: a) air transport and logistics; b) R&D; c) environmental standards; and d) territorial planning. In particular, research on native species has been identified as essential to overcome the dependency on the global flower industry: Nowadays, half of all the operational inputs required are imported, and the cost of seeds, bulbs and cuttings (mostly royalties) can represent up to 85 percent of the total production cost (Alvarado, 2002).

24 EXPOFLORES negotiated with the Government the provision of the required number of flights, crucial to assure exports, through the State airline, Ecuatoriana de Aviación.

25 Cardboard companies were owned by banana exporters and supplied the flower cluster with boxes only after having met the demand from banana packers.

4.6 COFFEE CLUSTER IN NICARAGUA

4.6.1 Some figures

During the first half of the twentieth century, coffee was Nicaragua's principle crop. It was hit especially hard by the civil war in the 1970s and the policies of the Sandinista Government. In 1990 coffee production was only 27 600 tonnes/year. This is a dramatic reduction compared to the 73 600 tonnes produced in 1978.

Subsequent policies to promote the cluster have been undermined by banking and financial crises; hurricanes (Hurricane Mitch destroyed 15 percent of the country's coffee plantations in 1998); and sharp declines in world market prices. On a positive note, the country experienced the highest yield increase of all Central American coffee producing countries during 1995–2001.

Production is divided between: large, productive farms that are responsible for 1 percent of workers but 36 percent of production; and small farms that account for most of the work force. In the value chain, power is concentrated among the top five buyers, who purchase 45 percent of all export coffee. The value chain itself is relatively complex. Most goes from producers to intermediaries (responsible for drying, milling, etc.) to exporters, traders and foreign exporters. Less than 2 percent goes directly from producers to foreign importers.

4.6.2 The evolution of the coffee cluster over time

In some respects, the coffee cluster still remains relatively underdeveloped. This can be seen in terms of links to related industries. For instance, within the agrochemical product market, the coffee industry is served only by a very few large-scale importers. As a result, fertilizer costs are high. Additionally, within the cluster there are very few firms towards the more value-added end of the value chain and a large portion of the roasting is carried out abroad. Meanwhile, there is little coordination between producers and buyers in upgrading coffee quality. Small-scale farmers also lack links between them.

This coffee cluster has evolved to a limited extent though in recent years. This can be seen particularly in government attempts to promote the cluster.

Institutional support to the cluster: Government support: In 2002 the country adopted a new economic strategy explicitly based upon clusters. This strategy included a Presidential Coffee Commission, as a public-private collaboration to develop the coffee cluster. Although initially this scheme produced only modest proposals, efforts soon intensified. The exact policy was detailed in a 2004 publication (Nicaragua, 2004). Various methods are to be used to position the cluster towards the higher value end of the market. Included in this drive was the creation of the Specialty Coffee Association of Nicaragua. The latter has helped define grades for coffee thus aiding exports to higher value markets. In addition, government agencies work with the private sector to coordinate R&D, market information and technical education. It is too soon to judge the success of these policies.

Other institutions: A number of trade associations have emerged and developed over time. However, there still remain large gaps in terms of consolidating small producers, raising environmental standards, and equalizing the power and knowledge imbalances between producers and intermediaries.