

Characteristics and swot analysis of the primary production within the wine chain in Argentina

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1. Introduction

This study is focused on the main wine productive district, Cuyo Region, which comprises the provinces of Mendoza and San Juan, near the Andes in the centre of the country, and represents the major place of grape production and winemaking in the country. The major winemaking capacity is located in Mendoza province (around 80%) being most of the facilities small and medium cellars (1309 registered in the National Institute of Viticulture, INV, Nimo 2001). Other regions are Salta Province and La Rioja in the north of the country and Tulum Valley in San Juan and Río Negro Upper Valley in Patagonia, but growth is limited by the hot climate in the north, the higher humidity in the East and the cold temperatures in Patagonia (Vinos & Viñas, 1999). Cuyo District has a semi-desertic climate, with a dry mild winter season, low relative humidity (mean 60% R.H.) which prevents fungal attack to grapes. Temperatures range from 5°C in winter to 42°C in summer, with a high thermal amplitude during vegetative growth. Heliophany is high, and cloudy days are ra-

Abstract

The paper highlights the primary production of grapes for winemaking in Argentina, with the aim of describing the main features that identify Argentinian wines as unique in the world market. Productive areas of the most important province of Cuyo District, Mendoza, are described with reference to its agro-climatic conditions and varieties. Argentina's grape production indicators are presented, and global placement is briefly described considering its importance (the country ranks sixth as grape producer for winemaking, 21.100.000 qq, 5% of the world total). Technological models for varietals and Premium/Ultrapremium grapes for winemaking are shown, detailing for each model the productive sites, utilized varieties, vineyard yields, processing techniques and productive scales. A description of vineyard reconversion in Argentina is presented, highlighting the latest trends for renovation and fine vine planting.

The introduction of modern technologies for plant and water management systems, irrigation, fertigation, frost and hailstone protection, harvest mechanization, health control are briefly mentioned. An analysis of strengths, weaknesses, opportunities and threats (SWOT) is shown, in order to depict a general overview of this chain. Finally, potential future strategies are suggested for improving primary production performance in the wine chain as a whole.

Résumé

Ce travail vise à caractériser la production de raisins de qualité destinés à la vinification en Argentine, en vue de faire ressortir les traits distinctifs qui identifient les vins argentins, dans leur unicité, sur le marché mondial. Les principales régions viticoles de la province du District de Cuyo, Mendoza, sont passées en revue, en mettant l'accent sur les conditions agro-climatiques et les variétés cultivées. Par ailleurs, sont présentés les indicateurs de la production de raisins en Argentine, en soulignant que ce pays occupe la sixième place parmi les producteurs mondiaux de raisin de cuve (avec une production de 21.000.000 q, soit 5% du total mondial). De plus, les modèles technologiques utilisés pour la production de "varietales" et de raisins Premium/Ultrapremium pour la vinification sont présentés, en détaillant les sites de production, les variétés employées, les rendements des vignobles, les techniques d'élaboration et les échelles de production. On décrit également le processus de reconversion des vignobles, compte tenu des tendances actuelles en faveur du renouvellement et de l'introduction de vignes de qualité.

On mentionne aussi les technologies modernes adoptées pour l'établissement des vignes, l'adduction de l'eau, l'irrigation, la fertigation, la protection du gel et de la grêle, la mécanisation de la récolte, le contrôle de l'état sanitaire. En dernière instance, une analyse du type "SWOT" est réalisée pour illustrer les grandes lignes de cette partie de la filière vin. Finalement, on suggère les stratégies potentielles pour l'avenir, afin d'améliorer la production de qualité de toute la filière.

re. The extension on latitude of the District and hilly landscape with valleys allow the growth of most of the world planted varieties. Soils are alkali (mean pH 8), rich in calcium and potassium and poor in organic matter, nitrogen and phosphorus. This combination is good for vine vigorous growth and for the enhancement of the principles that identify each varietal.

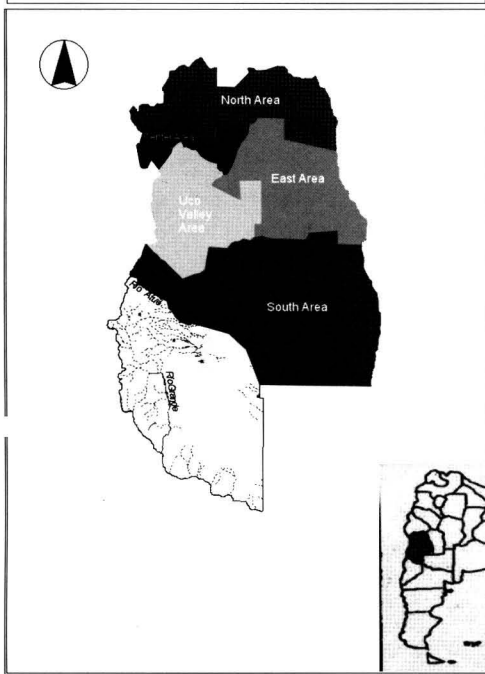
Winemaking in Cuyo dates back to four centuries ago, however the real start of this art was at the end of the nineteenth century (approximately 1880-1890) with the immigration of Europeans (mainly from Italy, France and Spain, but also from other countries as Switzerland) who brought with them ancient and traditional procedures for grape and wine production.

Primary production is well established in Argentina, being the techniques and procedures of vine growing widely known among small producers. Vine growers are

continuously advised by professionals from the big cellars with respect to the best varietals, health techniques and general management of the vineyard. Big cellars promote links among and with producers, through technology supply and organizing social and information events. Vineyards are small (63% are between 0 and 5 ha) and the total planted area is 211.000 hectares, 2.6% of the total world area (Instituto de Desarrollo Rural, 1999). The

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Figure 1. *Mendoza Province in Cuyo Region depicting Productive Areas*



mean vineyard size was 6.2 ha in 1991, and the number of vineyards was 33.000 with yields fluctuating around 10000 kg/ha (Catania and Avagnina del Monte, 1991). In 2000 these parameters did not change, except a little reduction in the number of vineyards to 31.500 (data INV) but when comparing with 1990 data (36.400) it is seen as a decreasing trend.

Heights are around 850 meters, and Malbec, in Luján de Cuyo, is the star wine. This is probably the Argentinean representative fine wine, being this vine expressed in a remarkable manner. From the enological perspective, this vine responds with success to the characteristics of the climate and soil, and to the subsequent stages of vineyard operation and winemaking. Malbec makes excellent wines with increasing consumer acceptance. Other vines of very good quality are Cabernet-Sauvignon, Chenin, Merlot, Chardonnay, Syrah, Ugni Blanc and Tocai Friulano. The East Area produces white wines, such as Pedro Gimenez and Cereza, and red wines as well (Bonarda). It has a wide range of temperatures between day and night (mean 18°C span) which exalt wine qualities. The Uco Valley Area is a relatively small valley with a unique microclimate and soil characteristics, the most representative vineyards being placed in Tupungato. This valley is higher than the other areas (up to 1200 meters above sea level). One drawback is the high incidence of frost in the night hours. Finally, the South Area (San Rafael, General Alvear) is the lower one (450-800 meters), and it is the least favored by Nature for vine growing (lower yields and vine strength). Other regions that have vineyards are Río Negro (Patagonia) and Salta province in the north of the country, however representing a smaller fraction of the gross national grape production and of total winemaking.

Daily irradiances range from 1400 to 2222 degree/day, depending on the region or valley. This multitude of microclimates enables the production of unique varieties and fine wines, which are starting to be recognized in the world, through their presentation in international fairs and events.

2. Description of productive areas

Argentina's district of Cuyo (comprising the provinces of Mendoza, San Juan and San Luis) concentrates the majority of the grape production and winemaking industry. The region is naturally favored for viniculture. Mendoza is the main province with regard to vine production (nearly 70% of the planted vineyards) and winemaking (around 80% of the wines produced in the country). The climate is dry and hot, and man intervention for 400 years have transformed the former desert in a range of oases and fertile valleys between the high Andes Mountains and the low Pampa plains. These oases are close to the mountain rivers that provide the needed water for irrigation. Mendoza province can be divided into five regions: North, Centre, East, South and Uco Valley.

The North Area comprises the lowlands, with heights from 600 to 700 meters above sea level. Soils are saline and shallow, microclimate is mild and relatively free of frost, which allows gentle grape maturation. The vines produced are of the rosé type: Cereza, Criolla Grande, Moscatel Rosado; among the whites prevails Pedro Gimenez vine. The Central Area has outstanding conditions for the establishment of vineyards. The soils are loamy, with good permeability, without salinity problems albeit poor in organic matter content. These features limit vine vegetative growth, rendering then wines of excellent quality. Irrigation is channeled from Mendoza river.

Table 1. *Agroclimate conditions of Productive Areas from Cuyo's Mendoza Province*

Zone	mean temperature amplitude	height (meters above sea)	soil type	hectares planted	Varieties of fine wines
North	18	600-700	thin soil layer, rocky subsoil	15000	Chenin-Pedro Giménez-UgniBlanc-Torrontés
Centre	15	650-1100	thin soil layer, rocky subsoil	23500	Malbec típico. Otros: C-Sauvignon, Merlot, Syrah
East	18	640-750	thin soil layer, rocky subsoil	71000	Pedro Jiménez, Cereza Tintos: Bonarda
Uco Valley	14	900-1200	thin soil layer, rocky subsoil	8100	Malbec (Tupungato)
South	19	450-800	mixed loamy and rocky	26200	Chenin y Bonarda

As said, health control is not a critical issue, with a low use of pesticides, although pathogen control must be done to a certain extent. The most critical pathogens are downy mildew (treated with copper compounds), powdery mildew (treated with sulfur compounds) and bunch grape rot (accounting in some cases for 30 to 70% losses) and the so called "hoja de malvón" (eliminated with 40% carboxin). Damage caused by crown gall, anthracnosis and black rot are of lower consideration. Other pathogens in order of importance are: *Botrytis*, *Aspergillus*, *Penicillium*, *Rhizopus*, *Alternaria* and *Cladosporium*. The most used agrochemicals are Benomyl, Carbendazim, Ipridione, Vindozolin and Procimidone.

Urea is dosed as nitrogen-source fertilizer (200-400 kg/ha), then nitrate (NO₃-) concentration should be monitored in subsoil waters due to its toxicity and water salinization. However, environmental impact of primary production is not yet a matter of immediate concern, although salinization has to be closely controlled, as water wells are an important source for irrigation.

3. Materials and methods

Primary source data were obtained from technical and predated visits to cellars and cellar cooperatives in Mendoza, interviewing cellar owners, technical and export managers, public authorities using an ad-hoc pre-designed research poll. Secondary information was got mainly from several cited sources and from previous reviews of the National Viniculture Institute (INV), Rural Development Institute (IDR) Foundation from Mendoza's Government and a survey from the Cooperative Program for South Cone Agro-technological Development together with the Inter-American Development Bank (ProciSUR-BID) on wine and grapes. These amounts of data gave the background for making the SWOT analysis and delineating future strategies.

4. Outline of argentinian primary production and global placement

Argentinean grape production for wine making is 21.100.000 q, occupying the 6th place in the world ranking, and representing 5% of the world production of 590.000.000 q (Nimo 2001; ProciSUR BID, 2000). The country assigns 97% of the total grape production to winemaking, and the rest to direct consumption (Instituto de Desarrollo Rural 1999). The first place in the world ranking belongs to Italy (16.5%), followed by France (14.8%), United States (8.7%), Spain (8.2%) and Turkey (4.8%). Chile increased its grape production almost three-fold (7.200.000 to 17.000.000 q from 1992 to 1996) in spite of reducing by nearly 14% the grapes for wine making (10th place, 1.3%). This is explained having in mind that 55% of production is for direct consumption.

5. Technological models for production of varieties and premium/ultrapremium wines

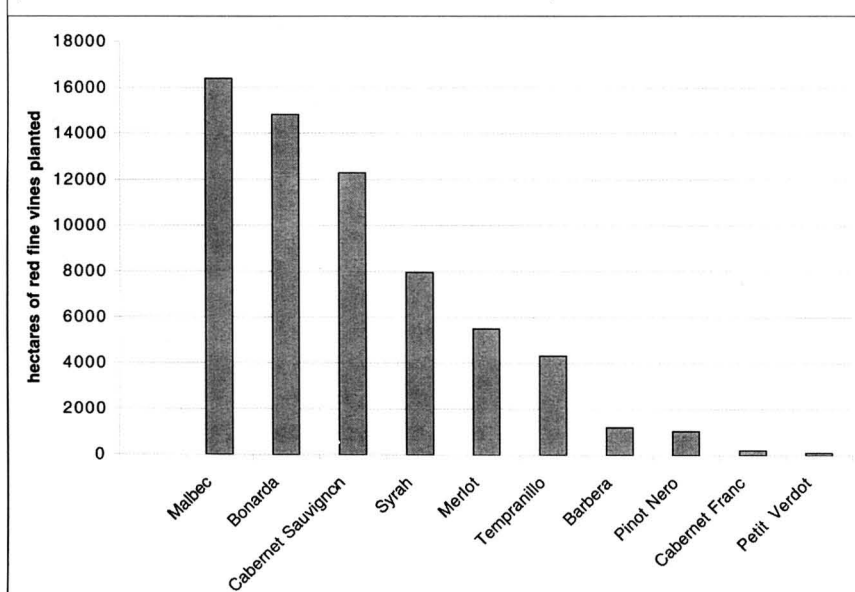
We refer to a technological model as the group of technical components, procedures and facilities that allows the production and commercialization of a specific quality of wine. In Argentina, the technological models are for 1) low-cost fine wines (varietals) 2) premium and ultrapremium wines.

The yields obtained in each technological model are controlled in order to maintain the characteristics that typify a varietal. As yields increase, the quality of the wines produced decrease. For this reason, yields should be limited when fine varietals are grown (as in the cases of premium and ultrapremium technological model). Equilibrium must be achieved between vegetative biomass and fruit. In Argentina, for years producers have obtained yields around 30000 kg/hectare, when yields higher than 6000 kg/hectare are not recommended in order to obtain good quality wines (Rolland, 2001). Vines are trained vertically ("espaldera") or horizontally ("parral"); historically the horizontal technique has been adopted due to the higher yields obtained. However the vertical scaffold system is increasingly utilized because the quality of grapes is the best (Tizio Mayer, 1991).

The technological model comprises data from site of origin, used varieties, vineyard yields, elaboration techniques and productive scales.

For varieties production, Mendoza offers many areas fit for varieties such as Cabernet Sauvignon, Merlot, Malbec, Syrah, Sangiovese, Bonarda and Tempranillo. The most important places are the North Oases, Uco Valley and San Rafael. White varieties are in general less adapted due to the high mean temperatures, however Chardonnay has a good performance. Yields should not exceed 15000-20000 kg/hectare if tannin content, color, flavor and other attributes are to be preserved. Varietals are wines of high quality, and are placed between low-price wines and premium wines. They show personal shades or tints which talk about its site of origin and fermentation techniques, being very popular due to its attractive quality /price ratio. Argentina, Chile, Australia and the United States adopted this model, and European countries such as Hungary and France (the South Region) do the same as well. Vineyard irrigation is in general complementary as rainfall is sufficient (500-800 mm), although it permits the application of fertilizers through drip fertigation. This technique is increasingly utilized, as it represents a way to save water (drip irrigation requires 600 mm annually while traditional irrigation demands 1000 mm per year) and is of relatively low cost (Zelenay, 2000). In the South Area (San Rafael) average annual rainfall is lower than in the other regions, then irrigation is mandatory. Irrigation is performed by channels taking waters from the rivers that flow from the Andes mountains. Water wells also contri-

Figure 2. Hectares of fine vines planted in Argentina (data 2001, National Viniculture Institute web site)



bute to vineyard irrigation. The productive scale is reduced when compared to table wines, and varieties (medium and high quality) represent 43% of the planted area (Gallardo, 2001).

Premium and Ultrapremium technological models are the foremost categories in fine wines. With respect to the productive zones, they are of low temperature, and shelter varieties such as Sauvignon, Merlot and Chardonnay. Varieties used for varieties are adapted as well. Drip irrigation is mandatory regarding rainfall, and productive level is to be limited in order to raise flavor and color of grapes. The yields need to be lower than 10,000 kg/ha. Plant growth technology is basically similar to varieties. The differences are in the lower working scales, lower yields and higher investments required as for example in hailstone protection systems in the productive stage (which can cost as much as US\$ 6000/ha) and aging in well-established conditions (using Nancy oak barrels) in the wine-making process in cellars. The care involved in these models is justified by the very high prices obtained for these wines: up to US\$ 40 per bottle in the Argentinean market.

6. Reconversion of vineyards

During the sixties and seventies, vines were massively sown with standard varieties, being this practice fostered by a policy of tax reduction, without considering the quality of the wines obtained. In 1977 a record of 350,000 ha of planted vines was reached (Ministry of Economics of Mendoza Government, 1998). On the other hand, 40,000 ha of Malbec vines were pulled out in the years '60 and '70. This resulted in the supply of low quality wines to the internal market, leading to an overproduction, which reduced prices. Lack of quality hampered the sector to

achieve a good penetration in the international market (Siso, 1996). Thus, vineyards had to be reconverted with new selected varieties, in order to uproot old vines. Between 1978 and 1991 54,000 hectares of old vines were eliminated, while around 37,000 hectares of new fine vines were planted. From 1990 to 1997 there was an increase in new-planted vines, mostly Chardonnay (150% increase, 2,200 ha) and Cabernet Sauvignon (80% increase, 4,200 ha in 1997) (data from Ministry of Economics of Mendoza Government, 1998). In the last five years, more than 35,000 ha of new vines were sown, most of them with fine vines (Gallardo, 2001). Mainly big cellars, because of the high investments involved, are carrying out this reconversion. The main varieties planted are Cabernet Sauvignon, Malbec, Merlot, Pinot Noir, Syrah and Barbera for red wines, and Chardonnay, Chenin, Riesling, Sauvignon, Tocai and Ugni Blanc for white wines.

These vines are from Europe (mainly France) and are well adapted to the agroecological conditions of Cuyo District. Around 85,000 ha correspond to fine vines, this is approximately 40% of the total planted area of 200,000 ha in the year 2000. Cuyo has recovered 17,000 ha of Malbec vines, which is the Argentinean representative varietal. This is the most planted vine (16,383 ha, 26% of red vines planted), as shown in Figure 2:

When white varieties are analyzed, the total planted area is 21,433 ha, the most important being Torrontés Riojano (38%), Chardonnay (22%), Chenin (17%) and Ugni Blanc (13%). As for the recently planted vines, most of them correspond to Chardonnay among whites and Malbec, Cabernet Sauvignon, Syrah and Bonarda among reds, in that order.

Regarding the age of vines, from the total planted area of 200,000 ha, 73% is older than 20 years and 13% is from 15 to 20 years old. Younger vineyards are only 3% of the total. As an example, vineyards in the South Area have an average age of 24 years (data from the National Institute of Viniculture, 1995). This area applies also old elaboration techniques, and producers receive little technical supply and advice by cellars; thus they have low yields (mean 5,100 kg/ha) with a standard quality (Montero de Balbi, 1988).

7. Introduction of modern technologies

Regarding vine production, a big development in technology was seen in the last decade, mainly in plant and water management systems, irrigation, fertigation, frost and hailstone protection, harvest mechanization, health control and environmental protection.

For hailstone protection, there are alternatives, according to the vineyard budget. The utilization of plastic or

wire mesh is one of the most expensive solutions, being the cost up to U\$S 6000/ha. Mainly big cellars afford this cost. Cheaper alternatives are to separate vineyards by more than 5 kilometers to reduce the chance of hail damage, to subscribe insurance and occasionally to seed clouds with silver iodide or sonic cannons.

The advantages of harvest mechanization are its efficiency and speed, and the possibility of harvesting at night. This procedure can reduce the risk of biological damage and the need of cooling until reaching the cellar. Around 10% of the vines are mechanically harvested, because of the cost of the machinery (although for pruning and mechanical harvest they can be rented), grape damage and the necessity for solid plant scaffolding.

As stated above, health control is not a matter of great concern as the low-humidity microclimate enables to minimize agrochemical applications. Agrochemical treatments are reduced to one treatment per year (Salvia, 2000).

8. Competitiveness analysis of primary production in Argentina

An analysis of strengths, weaknesses, opportunities and threats (SWOT analysis) has been performed for this first link of the wine chain, with the methodology described in Materials and Methods.

The Table 2 summarizes the main items comprised in the analysis:

With respect to the strengths, the agroclimatic conditions of Cuyo District favor the growth of many types of high quality vines. This is a fixed advantage when comparing with other countries, and provides a solid base for sustaining the next steps of the chain. These conditions lead to the possibility of obtaining practically organic wines, which represent a potential advantage if the world market for organic wines increases from its current small size.

The low relative humidity allows reducing significantly agrochemical usage, permitting a low health cost. This is an advantage because of the world consumer trend toward naturally grown products. Regarding the domestic mar-

ket, its size absorbs a great part of the production (around 85% of the total volume produced). This helps production developing in a stable and non-fluctuating market. An additional advantage is that the market has been increasingly deregulated since the early nineties, with a liberalization of external commerce and local financial market. Public regulations are mainly focused on controlling quality and safety matters, while commercial aspects are left to private (as negotiations among customers and suppliers, contracts, competence of substitute drinks, rivalry between companies and incorporation of new ones). The rising of fine vines plantation is a response to final consumers' preferences both in domestic and foreign markets. As stated above, nearly 40% of the planted vines are fine vines. This places the country with a relative advantage over other emerging countries (such as Australia, South Africa), which have a certain lower availability for high quality vines. The country has highly trained human resources with profound knowledge of viticulture, belonging to public Institutes (National Institute for Agricultural Technology - INTA), Cuyo University, Rural Development Institute from Mendoza's government, National Institute of Viticulture (INV) among others. There is also the availability of virgin land for plantation and at a low cost, which is not seen in, for example, European countries, as they have rules that limit vineyard expansion. This can attract investments from those countries, which are facing difficulties for increasing their domestic production. Last, high-tech productive systems have been incorporated through machinery and supply. This does not represent a particular advantage, as modern technology is originated by central countries and additionally its offer is worldwide distributed.

Referring to weaknesses, the lack of promotion policies is a serious drawback. Training programs for producers and rural workers, strategic planning of the sector, tax reduction, and credits from public banks at low interest rates (currently at high percentages, from 12 to 18%) are needed to enhance the whole chain competitiveness. A deficient technology transfer from cellars to vineyards is shown in many cases. However, as cellars need the supply of raw grape material in standardized conditions, they are

improving this technology transfer, so as to set quality parameters. Today this is a disadvantage with respect to competitors, but the gap with other countries could be reduced as growing investments foster these trends. In spite the reconversion of old vines is being held since the last decade, the solution of this weakness depends on investments from cellars as well, due to the high costs involved. An increased formality of contracts between producers and cellars must be encouraged by the public sector. There is a great variability with regard to the characteristics of contracts, ranging

Table 2. SWOT analysis for wine primary production in Argentina

Strengths	Agroclimatic conditions (allowing almost organic production) - Low sanitary cost - Low land cost- Big and deregulated domestic market - rising of fine vines plantation - unutilized land- highly trained human resources -high productive technology
Weaknesses	Lack of promotion policies - deficient knowledge transfer from cellars to vineyards - old vines - informal contracts - uncoordinated human resources - small mean area of vineyards - low concentration of producers - reduction of local consumption
Opportunities	High and rising world demand for fine vines - cellar advising - high-tech irrigation - Agritourism growth - reduction of world productive area
Threats	Cellar vertical integration - demand concentration

from completely informal ones to others which specify in detail technical and commercial conditions. Terms specification creates a legal commitment that guarantees grape price for the vine grower and a satisfactory grape supply for the cellar. Written contracts were 26% for Mendoza Province (2000) (datos Comité de Información Vitivinícola, from Nimo 2001) most of the contracts formalizing red grape transactions.

Although there is a critical mass of well-trained and specialized professionals and technicians, a certain failure of coordination in some areas is seen, probably due to a lack of a hierarchical structure which might assume a national coordination of competent institutes like the National Institute of Agricultural Technology (INTA), the Rural Development Institute (IDR) from Mendoza or the National Viniculture Institute (INV).

With respect to the vineyard size, the majority of them are quite small (63% lower than 5 ha and 19% between 5 and 10 ha), which is not advisable in economic terms. A minimal size of 11 ha is recommended. There is a low concentration of producers that is not beneficial to primary production, as the industry tends to aggregate and gain strength that could threaten its weaker counterparts. Smaller vineyards then will be forced to associate into co-operatives as to survive. Horizontal integration will help them to face cellar monopolist behavior, having clearer market information and contributing to evaluate its raw material supply.

One of the major opportunities that the sector has is the rising world demand for fine wines as a result of the reduction in table wine consumption. On the other hand, when cellar advice and technology transfer to vine growers are properly implemented, vertical integration may be fostered. The introduction of new irrigation technologies has been very important for sector reconversion. Irrigation is increasingly critical to maintain high levels of productivity and quality. Drip irrigation is a new technology that is being adopted as it allows significant water saving, and improves the performance of dry areas (i.e. South Area of San Rafael and General Alvear). Agrotourism is growing faster; a Wine Route for tourists is operational particularly in Mendoza city outskirts, where many cellars are located, and includes visits to cellars, historic wine-related sites, museums and tasting sessions of the star wines. To a lesser extent this is seen in the southern area (San Rafael). Last, world reduction of planted area (20% decrease from the early eighties to 1997, data from National Institute of Viniculture web page, www.inv.gov.ar) gives the chance of gaining ground in the world market by sowing fine vines from which increasingly costly wines are obtained.

The main threats that primary production faces are cellar vertical integration and concentration of demand. Cellar vertical integration represents a risk of displacement of producers, as cellars try to increase their own supply of grapes for winemaking (almost 35% of the grapes used co-

mes from cellar-owned vineyards). Winemaking cellars buy around a half of their grape needs to producers, while the other half comes from their own vineyards. This is a clear case of vertical or upstream coordination, in which industry absorbs a great part of the production or even the entire supply of raw material. This coordination is beneficial to the whole process, centralizes decisions and optimizes the management of resources (for example, supplies like agrochemicals, fertilizers and for irrigation could be bought by producers' cooperatives from wholesalers with the aim of reducing costs).

The concentration of demand is another drawback for producers, and a consequence of the growing investments from foreign capitals, and from merging of joint ventures of local actors.

9. Strategies for improving primary production performance

From the competitive analysis it emerges that the primary production is subjected in Argentina to many inequalities that the sector has to deal with. From this diagnosis, the strategies must tend to identify mechanisms to balance benefit distribution among the chain actors, to compensate the unfavorable situation that producers face, mostly those non-integrated with cellars. In this sense, although vertical integration processes exist, particularly for fine wines, a big part of production is made by tacit mechanisms of vertical coordination by the winemaking industry, and without explicit controls that could assure commercialization and price of the primary production. This lack of controls in many cases affects income sharing out within the chain and long-term competitiveness (Cetrángolo, 1996).

As fine wine consumption is steadily increasing, forecasts for raw material demand must be done, in order to contrast these data with the existing vineyard capability to cope with these requirements. This would allow producers to adjust supply of grapes to the demand needs, avoiding waste of production.

On the other side, the public sector must create conditions for facilitating reconversion and renovation of vineyards (credits, technical assistance, knowledge spreading, facilitating the provision of fine vines). Associations should be fostered, negotiation power increased with respect to industries in order to obtain better contract conditions. Having in mind the implications that the decrease in wine consumption could have over primary production (regardless of the increase in fine wine consumption) industry should make an effort to produce promotion, to investigate the evolution of substitute drinks (beer, juices and soft drinks) (Cetrángolo, 2001). This effort will encourage wine drinking among young people, leading this to an increase in the consumption.

Maintaining and increasing promotion of the unique agroecological features of Cuyo District is very important

to continue attracting investments from developed countries (mostly European) that do not have this combination of natural characteristics, cannot expand their growing surface and have problems related to the assignment of denominations of origin. Production in Patagonia is timidly attempted by some innovators such as Humberto Canale's vineyards and cellars and Viñas Patagonia S.A. Patagonia is now almost a trademark that must be exploited in Europe and United States since it is associated with Nature and with virgin, ignored and non-polluted lands. In the scenario of wines, where the key issue that attracts consumers is the diversity and innovation, highlighting the unique characteristics of a region is basic to generate relative competitive advantages. Additionally, another advantage can come from the unparalleled adaptation of Malbec varietal in Argentina (Brascó, 2001) that can become the representative Argentinean wine (as Syrah is for Australia). Another fact to be exploited is the proved higher content of antioxidants in Argentinean wines, when compared to other important wine producers (France, Spain, Italy and Chile). This study was performed in 2001 comparing 100 types of Argentinean wines with others from the aforementioned countries by a team formed by INTA, the University of Cuyo, and Buenos Aires and Glasgow Universities. Polyphenols and flavonoids proved to be significantly higher in Argentinean wines.

Agrotourism should be encouraged among grape producers. The adaptation of their vineyards to host visitors is a possible alternative of diversification, even with a reduced budget, and may contribute to supplement income through small sales (wines, souvenirs, books) and offering tours with cultural and historic content as well.

10. Conclusions

Primary production for winemaking has known improvements since the early nineties in Argentina, mainly in vineyard reconversion, by means of new planted fine varieties, technology updating (plant training systems, irrigation, fertilization, harvest mechanization, hail and frost protection) and through an increased horizontal integration of producers in cooperatives to face the threatening concentration of demand in medium and large cellars. The country should take greater advantage of its unique agroecological conditions for a better positioning of its best varieties (Malbec, Bonarda, Cabernet Sauvignon, Torrontes Riojano, Chardonnay) in the world.

This has been done to a certain extent through the increased recognition of Malbec as the typical Argentinean varietal.

A strategic plan is still lacking for the whole chain. However some strategies could be attempted regarding consumption promotion and demand projections for different varieties to optimize vineyard management, increase public support to producers, to promote and diversify agrotourism in the District as a novel and attractive site

for production, so as to maintain the current flow of investments from foreign capitals.

Last but not least, the improvement of vertical chain coordination, in the sense of gaining equity from the producer-cellar relation, would increase the competitiveness of the whole chain in the long term.

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