

SWITZERLAND

I OUTLINE

The total vineyard area in Switzerland is 15,000 ha of which 11,190 ha is in the French speaking zone (Suisse-Romande) in the west, 2,590 ha in the German speaking zone in the east and 1,070 ha in the Italian speaking zone in the south. In 2006 the total grape production was 126,400t and the total wine production was 1,011,000 hl. More red wine is produced than white wine. (Red wine production accounts for 58% of all wine and the red wine varieties account 51% of the total vineyard area.) Accordingly, red wine production is larger than white in the German speaking eastern region and the Italian speaking southern region while white wine production is slightly larger than red in the French speaking area. The cantons of Valais and Vaud in particular produce a significant quantity of white wines from Chasselas variety.

Wine consumption of Switzerland is largely dependent on imported wines from France, Italy and Germany. Switzerland imports double of its total wine production while only 1.45% of Swiss wine is exported.

Grapes are grown in the highlands at 1,100m above sea level where the vines growing on sunny slopes originally excavated by glaciers. Vines are planted in a high density in most of terraced vineyards.

II HISTORY, CLIMATE AND SOIL

History of winemaking in Switzerland dates back to the time prior to the invasion by the Roman troops. In Neuchâtel, the grape seeds assumed to be from B.C.3,000 to 1,800 have been discovered. The Roman troops led by Caesar brought their vineyard engineers to the northern Alps area circa 100 A.D. to start wine production. Although the wine production had diminished after the decline of the Roman Empire, grape growing was revived by many of the land owners during the Middle Age. This was due to the efforts of the Cistercian monks to rejuvenate the vineyards.

Wine trading was commenced in the 16th to 17th century and wine became one of the important products for international trading. In the 19th century, the vineyard area decreased to the current level of 15,000 ha due to damage by pests and molds such as phylloxera, powdery mildew and downy mildew.

There are various types of soil by region including sandstone, limestone, schist, sandy gravel and clay. Chasselas grape is well adapted to any soil and produces wines of different characters reflecting each soil type. Geographically, the location of the vineyards at the latitude of 45 to 47 degrees north with the altitude of 470 to 500m is not generally an ideal condition for growing vines. However, microclimates formed by the unique geographical conditions are overcoming the disadvantageous conditions. For example, many lakes and rivers reflect sunshine and send it to the vineyards, heats absorbed by the water during daytime is released at night and prevent the temperature to drop greatly. The topography also protects vineyards from the north winds and the vineyard locations on steep slopes have a good exposure to the sun. Furthermore, the large temperature difference between day and night in autumn slows down the maturation of grapes, encourages development of aromas and lifts quality of final wines.

III MAJOR GRAPE VARIETIES

[White Grapes]

Chasselas (4,152)	= Gutedel / Chasselas is the most important wine grape variety in Switzerland and 80% total Chasselas grapes are produced in the country. Chasselas shares 65% of the total acreage of white grapes.
Johannisberg (235)	= Sylvaner / Growing season of this grape is longer than Chasselas and obtains higher sugar and acidity level which gives rich taste and bouquet to the wines.
Müller-Thurgau (502)	
Pinot Gris (208)	= Malvoisie = Grauer Burgunder
Pinot Blanc (102)	
Chardonnay (314)	
Sauvignon Blanc (119)	
Riesling	
Petite Arvine (145)	Valais
Amigne	Valais
Humagne Blanc	Valais
Rèze	Valais
Ermitage	= Marsanne / Valais
Räuschling	
Heida	= Païen = Traminer = Gewürztraminer / Valais

[Black Grapes]

Pinot Noir (4,449)	= Blauburgunder = Spätburgunder = Clevner / This variety is grown in entire area of Switzerland. The vineyards account for 52% of the total black grape vineyards.
Gamay (1,584)	
Merlot (1,006)	Mainly in Ticino.
Humagne Rouge (121)	Valais
Cornalin (106)	Valais
Duriz	Valais
Syrah (177)	
Cabernet Sauvignon	
Gamaret (351)	= Gamay × Reichensteiner B28
Garanoir (189)	= Gamay × Pinot Noir
Diolinoir (102)	= Rouge de Diolly × Pinot Noir Mainly in Valais

Numbers in () indicate acreage (ha) in 2007. Only major varieties are listed above.

Source: Office fédéral de l'agriculture [L'année viticole 2007]

IV WINE LAWS AND QUALITY CLASSIFICATIONS

In Switzerland, wine production is under the strict control of the federal government who holds the rights to establish the overall wine regulations and oversees them. The actual conduct of the regulations are entrusted to the local administrative unit called "canton" (= state). The federal government established a series of regulations regarding wine production, namely the federal agriculture laws of October 3, 1951, the federal grape growing laws of June 22, 1992, the regulations on viticulture and vinification enforced on December 23, 1971 and the regulations on alimentation (ODA = Ordonnance sur les Denrées Alimentaires). These laws and regulations are supplemented by the ordinances constituted by the federal council represented by the regulation on grape varieties enforced on April 28, 1993.

The federal agriculture laws define the rules on production control, registration of growing area and conditions for wine exportation and importation. The federal grape growing laws define regulations on plantings, grape vines, quality control of grapes and juice, yield, quality classification of three levels by sugar level and definitions of AOC and AO. The wine laws define the details in order to make above two laws effective.

ODA is the regulations on production, storage, labeling, marketing and publicity of alimentation, and concerning wine, it refers to blending, additives and labeling.

The wine laws in Switzerland conform with international laws and are based on the EU's appellation system concerning following seven criteria; wine production area, yield, approved grape varieties, vinification method, vine growing method, analytical sensory testing and minimum sugar level.

Swiss wines are classified into three categories as following. On wine labels, it is required to state name of producer, trade mark, name of importer and name of distributor as well as the wine category.

1. Vins d'Appellation d'Origine Contrôlée (AOC = DOC in the Italian speaking area of Ticino)

Maximum yield is 1.4 kg/m² (112hl/ha) for white grapes and 1.2 kg/m² (96hl/ha) for black grapes. However, many cantons have the stricter regulations than this federal regulation.

2. Vins de Pays

These are wines with a geographical indication covering a larger area than one canton.

The following traditional geographical names are included in this category:

Dôle (Valais), Dorin (Vaud), Fendant (Valais), Goron (Valais), Nostrano (Ticino), Salvagnin (Vaud)

3. Vins de table

AOC is accredited in following cantons:

Genève (Geneva) since 1988

Valais since 1991

Neuchâtel since 1993

Vaud since 1995

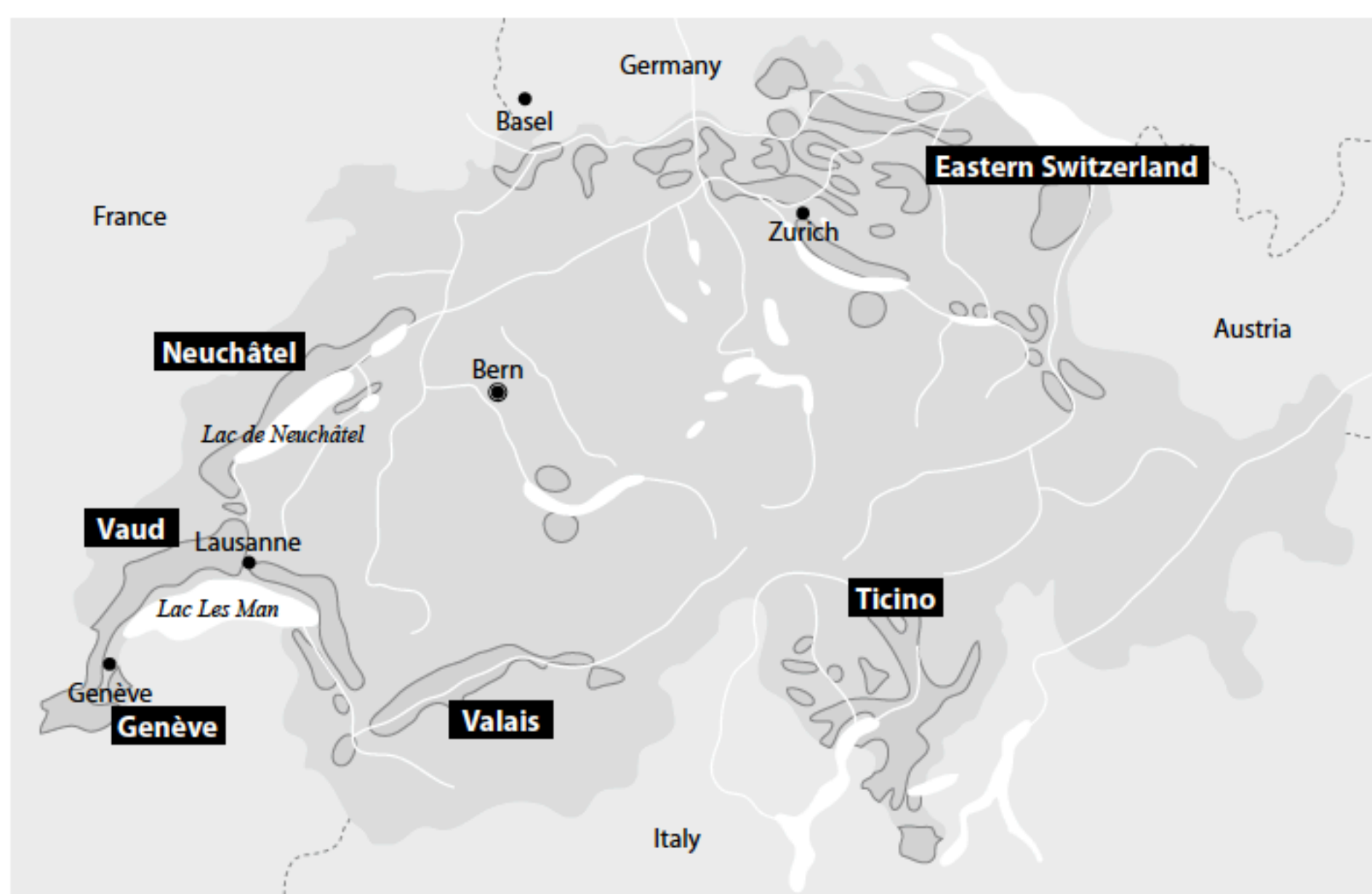
Some cantons have regulations on Grand Cru and the wines should be produced from a single vineyard of one AOC area registered by the canton. Prominent Grand Cru vineyards are Salgesch, Saint-Léonard and Vétroz in Valais and Dézaley and Calaman in Vaud.

This category is called Premier Cru in Genève canton and should satisfy the regulations such as sugar level, the maximum yield of 1.2 kg/m², 70hl/ha for white grapes and the maximum chaptalization of 40g/l. There is no such regulation in the Neuchâtel canton. However, if the region or grape variety is stated on the label, 100% of the wine should come from the stated region or variety.

If label of Merlot del Ticino has the statement "VITI", it indicates that the material grapes of Merlot are entirely produced in Ticino and the wine has passed the official test.

Rosé wine called Oeil de Perdrix (Eye of Partridge) must be made from 100% Pinot Noir.

Wine Regions in Switzerland



Vineyard Acreage by Region 2007

(ha)

	Region	Total	White Grape	Black Grape
1	Valais	5,113	1,940	3,173
2	Vaud	3,838	2,561	1,277
3	Genève	1,297	535	762
4	Three Lakes Region (including Neuchâtel)	941	480	461
5	Ticino	1,065	78	987
6	German speaking eastern Switzerland	2,593	708	1,885
	Total	14,847	6,302	8,545

Source: Office fédéral de l'agriculture [L'année viticole 2007]

V WINE REGIONS IN SWITZERLAND

1. Suisse Romande

This region is the largest wine producing zone in Switzerland accounting for approximately 82% of the country's total wine production. There are the following cantons in this zone.

(1) Valais

Lying in the valley of Rhône, Valais is the largest wine producing canton with 50% of the total wine production. Annual rainfall is 600 mm. Eighty percent of the vineyards are on terraces at the altitude of 650 to 800m. Some vineyards including Visperterminen are located on the highland at 1,100m above sea level. The right bank is south-facing and enjoys abundant sunshine. Soils consist of gravel, clay and limestone on which Chasselas and Johannisberg are largely planted.

The flagship wine here is Fendant which is a dry white wine made from Chasselas. The second prominent wine is Johannisberg which is a medium sweet wine with rich taste made from Sylvaner (= Johannisberg). This wine is also called

Gros Rhin. Dôle is made from Pinot Noir and Gamay whose total should be 85% or more of the wine with at least 51% Pinot Noir. If wines of Pinot Noir or Gamay do not have required minimum sugar level, they are sold under the name of Goron. Dôle Blanche is a vin gris (white wine) made from the same grapes as Dôle. These wines are required to satisfy the strict standards set by the Valais canton.

Other traditional varieties recently restoring their reputation include white grapes of Amigne, Petite Arvine, Marsanne Blanche and Heida and black grapes of Humagne Rouge and Cornalin.

Major AOCs are Salgesch Grand Cru, Sierre Saint-Léonard Grand Cru, Sion, Vétroz Grand Cru, Chamoson and Fully.

(2) Vaud

Vaud, located at the altitude of 375 to 500 m, has the Alps Mountains in the east, the Jura Mountains in the west, both standing like ramparts, and its south and north are surrounded by lakes. The vineyards are mostly facing Lake Léman whereby vines can receive sunshine reflected by the lake.

Vaud is the second in the wine production volume and produces some of the best wines of the country.

Wines are mostly white made from Chasselas. There are two classified quality wines, one of which is Salvagnin made from Gamay or Pinot Noir, or the blend of the two. For this designation, the wine has to score at least 17 out of 20 points at the tasting commission appointed by the council. Another classified wine is Terravin which needs to score at least 18 out of 20 points at the tasting commission.

Vaud has following six wine regions:

Region	Canton
Suisse Romande	Valais Vaud Genève Neuchâtel Fribourg Jura
The Eastern Switzerland (Deutsch-Schweiz) Western District	Aargau Bern Bielersee Bern Thunersee Basel-Landschaft Basel-Stadt Luzern Solothurn Zug Unterwalden Uri
Central District	Zürich Schaffhausen Thurgau Schwyz Glarus
Eastern District	Graubünden St-Gallen Appenzell Innerrhoden Appenzell Ausserrhoden
Ticino	Ticino

1) La Côte

This region covers the mild slopes between Lausanne located in the north of Lake Léman and Nyon in the west, producing over 50% of the total wine production of Vaud. The soil consists of clay, sands and limestone. Light and lively white wines with floral and fruity characters are produced from Chasselas.

This region is sub-divided into three districts of La Côte, Nyon-Begnins and La Côte Morges.

There are AOCs of Nyon, Begnins, Luins, Bursinel, Vinzel, Tartegnin, Coteau de Vincy, Mont-sur-Rolle, Féchy, Aubonne, Perroy and Morges.

2) Lavaux

This region is located between the east side of Lausanne and Montreux producing white wines high in mineral from soils of marl and limestone. This is the most well known region in the canton for its beautiful terraces on the steep slopes facing Lake Léman.

There is a saying that there are three suns in this region, namely the sun, reflected sunlight from the lake and the soil which accumulates heat during day and release it at night.

Maximum yield is 75hl/ha.

This is the most prominent wine region in Vaud and produces high quality wines from the AOC regions such as Lutry, Villette, Calamin Grand Cru, Epresses, Dézaley Grand Cru with flinty flavor, Saint-Saphorin, Chardonne and Vevey-Montreux and also in Grandvaux.

3) Chablais

This area is located close to Valais and goes up the Rhone River from Lake Léman reaching Villeneuve and Bex. Wines produced here are relatively solid with flinty aromas due to the influences of the foehn phenomenon caused by the hot dry winds blowing down from the high mountain with rocky surface sticking in the sky. Well known wine regions are Villeneuve, Yverne, Aigle, Ollon and Bex.

Following three regions are located in the north of the canton at the altitude of 450 to 500m close to the canton of Neuchâtel thus, the wines are also similar to the Neuchâtel wines with light, delicate and soft characters. Chasselas grapes make wines with apple aromas and some wines are slightly effervescent.

4) Côtes de l'Orbe

This wine region is located in the south of Lake of Neuchâtel and its soil consists of soft sandstone and limestone. Chasselas and Pinot Noir are major grape varieties.

5) Bonvillars

This region is located in the west of Lake of Neuchâtel. Annual rainfall is 900 mm. Wines are mostly made from Pinot Noir on the eroded soil of clay-limestone. The right bank of the Arnon River running out of the Jura is an alluvium containing clay.

6) Vully

This region is located in the west of Lake of Morat producing wines of Chasselas and Pinot Noir with unique mineral characters on the soft sandstone soil.

(3) Genève

This canton with the city of Genève (Geneva) was the first canton to introduce the AOC system. In contrast with the other regions, the vineyards are located on relatively flat land. Soils are mostly clay and with some limestone and gravel.

Major grape varieties are Chasselas accounting for 39% and Gamay for 24% of the total. It is said that the soil of this region is most suitable for Gamay in Switzerland. The leading wine of this region is Perlan which is a wine of Chasselas with light fruits and floral aromas and Gamay de Genève.

Wines of Chardonnay and Pino Noir made in a small quantity have good quality.

This canton is classified into following three regions.

- Mandement

This region has Satigny, the largest commune of Switzerland with 488ha and Peissy, Russin and Dardagny. Soils are moraine and clay.

- The region between the Arve and the Rhone.

There are Bernex with the soils of moraine, gravel and limestone, Lully and Bardonnex.

- The region between the Arve and Lake Léman has soils of gravel and sand.

The wines with light effervescence are made in the communes of Genève, Cologny and Jussy.

(4) Neuchâtel (Three Lakes Region)

This region is surrounded by Lakes Neuchâtel, Lake Bienne (= Bielersee) and the Jura Mountains.

The history of winemaking in Neuchâtel dates back to 1,000 years ago. Annual sunshine hours are as long as 1,680 hours and the climate is favorable with the annual average temperature being relatively high at 9.2°C. Annual total rainfall is 980mm. The soil is generally chalk and it is gravelly marl in the east and the center while it is alluvium in the south.

If the wine label indicates Vin de Neuchâtel for both red and white, the material grapes are entirely produced in the 18 wine regions in this canton. Since the AOC system has been launched in 1993, the wine region can be stated on the label if minimum 85% of the wine comes from one commune. A half of the wines are wines of Chasselas which are fresh, soft and slightly effervescent. Other major white grapes are Pinot Gris, Chardonnay and Müller-Thurgau. Only approved black grape is Pinot Noir which produces wines with a good quality. To note is that Oeil de Perdrix, a good quality rosé wine made from 100% Pinot Noir is the first wine produced in Neuchâtel. Sparkling wine by the bottle fermentation method is also produced.

The grape growers' association of Neuchâtel founded in 1985 awards the quality guarantee label of "La Gerle" to the wines of Chasselas and Oeil de Perdrix which scored 18 of 20 points at the sensory evaluation by the tasting commission.

Major producing regions are Cressier, Neuchâtel, Auvernier, Cortaillod, Boudry and La Béroche.

There are AOCs of Neuchâtel and Lac de Bienne.

(5) Fribourg (Three Lakes Region)

This region is located in the north of Lake Mora and contains Vully which is between Lake Neuchâtel and Lake Mora, and Cheyres which is on the right (southeast) bank of Lake Neuchâtel. The soils are different in the two areas. Vully has soft sandstone with limestone mixed with sand and clay while Cheyres has sandstone and clay-sandstone soils. Chasselas is dominating the vineyards in Vully where it is also suitable to grow Pinot Noir. Black grapes account for almost half of the vineyards in Cheyres.

Vully is divided into two regions as follows:

Haut-Vully: Môtier, Lugnorre, Mur, Joressens

Bas-Vully: Praz, Nant, Sugiez

Cheyres has the wine regions of Font and Châbles.

Name of appellations generally consists of Vully or Cheyres followed by a grape variety. Vully may appear on the label in its German name, Wistenlach.

Wines of Chasselas are delicate and fruity and some have a light effervescence. Rich wines of Pinot Noir are also consumed young. Rosé wine and Oeil de Perdrix are elegant. Wines produced in Les Faverges and Ogoz both of which are the communes of Saint-Saphorin in Vaud, historically belong to Fribourg.

(6) Jura (Three Lakes Region)

Jura used to be the only canton without wine production among the six French speaking cantons until the two hectare vineyard was purchased in 1986. Its first wine was produced in 1990.

The vineyards are located on the slopes with an inclination of 22 to 55 degrees at the altitude of 390 to 430 m. The soil is dark and rocky. The minimum sugar level for white grapes is 14.8% Brix (60.2 oe) and 16.2% Brix (66.3 oe) for black grapes. Wines produced in Buix include fresh and floral wines from Müller-Thurgau, soft wines of Pinot Gris with aromas of honey and candied fruits, slightly tannic Pinot Noir and deep colored Gamaret for early consumption.

2. The Eastern Switzerland

The Eastern Switzerland consists of 17 cantons with 19 districts. Its area accounts for two thirds of the country though there are only 2,500 ha of vineyards. The wine production volume shares 13% of the country's total. Grapes had been planted widely in the 19th century but the vineyards were decreased largely due to phylloxera, industrialization and increase of beer consumption. For example, the vineyards in Basel decreased by half compared with the acreage in 1593 and in Thurgau, it became 10% of 150 years ago and it decreased to 1% of 100 years ago in Solothurn. However, the situation improved in the last 10 to 20 years and both the quality and volume are elevated to be called the "renaissance".

The institute and the school of viticulture founded in Wädenswil on the south bank of Lake Zurich is contributing to precious researches in areas of clone selection, acidity control, etc.

This region contains areas of the northern limit of grape growing. The severe conditions are mitigated by the elements such as lake, river, the foehn phenomenon and sunshine.

The vineyards are located at the altitude of 320 to 600m with an average annual temperature of 9°C and the average annual rainfall reaches 815 to 1,300 mm. There are diverse soils from the Jura to the Alps. The western area close to the Jura has limestone soil and the central area has limestone soil mixed with sand and clay. Limestone is also found on the banks of Lake Zurich. The eastern area has moraine and schist. Red wine is dominant accounting for 68.7%.

Grape growing commissioners in each canton are connecting the producers and the canton government. Wine names are indicated by grape variety or production origin. The cantons of Basel-Landschaft, Aargau, Bern, Zürich, Schaffhausen, Thurgau, St. Gallen, Appenzell and Graubünden have the mark of Winzer-Wy (Vintner's Wine) which guarantees wine quality. In order to obtain the mark, the wines need to have the characteristics of each grape variety unique to the region and need to score 18 out of 20 points at the sensory evaluation.

The eastern Switzerland is divided into following three regions:

(1) Western District

1) Aargau

Müller-Thurgau and excellent Pinot Noir are produced on the limestone soil. Elbling with good acidity is the grape variety of this region.

2) Bern

• Bern Bielersee

This region belongs to the French speaking area and its wines are similar to the wines of neighboring Neuchâtel. The left bank of Lake Biene (Bielersee = Lac de Biene) has abundant sunshine with limestone soil. The right bank is south-facing with limestone soil with soil and clay.

Major wines are the slightly effervescent Chasselas and Pinot Noir.

• Bern Thunersee

Spiez and Oberhofen are the vineyard area on the both banks of Lake Thun in the German speaking zone where vines are grown on the south-facing slopes at the altitude of 600m. With the thin rock like soil and influences of the foehn phenomenon, produced are wines of Müller-Thurgau in light and fruity style and also light and fresh Pinot Noir wines.

3) Basel-Landschaft

Major wine of this region is made from Pinot Noir grown on gravelly limestone soil. This is the only German speaking region which grows Chasselas grape.

4) Uri

Wines of this region are produced from well ripen Pinot Noir thanks to its micro-climate and the foehn phenomenon.

(2) Central District

1) Zürich

Grape varieties grown in this region include white grapes of Müller-Thurgau, Räuschling and Pinot Gris and black grapes of Pinot Noir known as Clevner, Malbec, Blaufränkisch, Zweigelt and Garanoir.

This region is further divided into four districts of the Zürichsee banks, Limat River area, Unterland and Weinland.

2) Schaffhausen

From this region, white wines of Müller-Thurgau and Pinot Gris were previously well known but red wines already account for 86.7% of all wines with Pinot Noir as a major variety. Perle von Alzey is an indigenous grape of this region which is a cross of Gewürtztraminer and Müller-Thurgau.

This region is further divided into five districts of Klettgau, Oberklettgau, Schaffhausen, Buchberg, Rüdlingen and Stein am Rhein.

3) Thurgau

The grape variety Müller-Thurgau was named after Professor Muller from Thurgau region who produced the variety and it is called the most successful crossing variety produced in the 19th century. In this region, delicate Müller-Thurgau, a small amount of Pinot Gris, Gewürtztraminer and light and fruity Pinot Noir are grown.

This region is further divided into six districts of Lauchetal' s slope, Oberthurtal, Unterthurtal, the Seebach area, the Rhein area and Untersee.

4) Schwyz

The major vineyard area is Leutschen on the bank of Lake Zürich and other areas include Altendorf, Ufenau near Lake Zurich and Lake Zug area. Major grape varieties are Müller-Thurgau and Pinot Noir and also Sauvignon Blanc, Chardonnay, Räuschling Pinot Gris, Freisamer Cabernet Sauvignon and Diolinoir are grown.

5) Glarus

Wines of Bacchus, Müller-Thurgau, Chardonnay and Pinot Noir are produced in Burgweg and Niederurnen.

(3) Eastern District

1) Graubünden

This region with alluvium soil is divided into three districts of Churer Rheintal, Mesolcina (= Misox) and Poschiavo. Churer Rheintal accounting for 80% of the canton area receives the maximum effects of the foehn phenomenon. Pinot Noir is the major grape variety and Thurgau and Completer are also grown.

Well known wines are Federweisser which is a white wine made from black grapes and its rosé version called Süssdruck and Schiller.

Mesolcina is called Misox in German which is a region close to Ticino where Merlot and a small amount of black hybrid grapes are produced. Poschiavo is a small vineyard producing wines for local consumption.

2) St. Gallen

On the steep slopes of clay soil, Müller-Thurgau, Pinot Gris, Chardonnay, Pinot Blanc, Bacchus, Kerner, Gewürtztraminer, Freisamer and Pinot Noir are grown. This region is largely affected by the foehn phenomenon and is further divided into four districts of Rheintal, Oberland, Rapperswil/Jona and Bronschhofen/Wil.

3) Appenzell

Müller-Thurgau is the major variety in Innerrhoden, and s Pinot Noir in Ausserrhoden.

3. Ticino

Ticino is the southernmost area in Switzerland bordering with Italy. Vineyards were grown on overhead trellis until the beginning of this century and most of them are currently trained low on wires.

The vineyard area has decreased to the current 1,000ha from 7,000ha in 1900. The region's wine production accounts for only 5% of the country's total production.

The decrease of vineyard area was caused by damages of phylloxera and downy mildew, and as a result, grafting Merlot on American rootstocks turned out to be the success in the later period.

Re-planting to Merlot continued and the variety now shares over 80% of all vineyards in Ticino.

Merlot wines of Ticino have brilliant garnet color, aromas of black cherry and small red berries with moderate

tannin and acidity. They are smooth and slightly spicy. Grappa is produced from hybrid grapes.

Ticino is belonging to the Mediterranean climate zone with annual 2,100 sunshine hours and total rainfall of 1,800 mm per year. Monte Ceneri divides this region to north and south. The north has granite soil with almost no limestone. The south has alkaline alluvial soil of limestone with clay in some places.

There is an appellation of Ticino or Merlot del Ticino, which is labeled as Denominazione di Origine Controllata since it belongs to the Italian speaking zone. The quality guarantee label of VITI for wine and grappa is accredited by the Canton Tasting Commission consisting of seven commissioners appointed by the federal council where the wines need to score 61 out of 85 points.

Mesolcina of Graubünden in the Eastern Region mentioned above officially belongs to Graubünden but as a wine region, it belongs to Ticino. Ticino is divided into following two regions.

1) Sopraceneri

This region is located in Mountain Ceneri and Lake Maggiore with the vineyards along Ticino River.

Nostrano Ticinese (= Nostrano del Ticino) producing traditional and rustic wine from 80% of the indigenous grape Bondola blended with European varieties such as Freisa, Bonarda and Malbec.

2) Sottoceneri

This district including towns of Lugano and Mendrisio is located around Lake Lugano in the south of Mount Ceneri. From Merlot grapes, red wines are made as well as Merlot Bianco and Merlot Rosato which are casual wines to be enjoyed as an aperitif or in summer season. Wines of Sauvignon Blanc and Chardonnay are also produced.