Climate Change Adaptation: Under the Tuscan Sun

Jim O'Donnell @ VRAI Magazine

"We have always trusted in nature to take care of us," said Andrea Meini, the agronomist for the Cantine Leonardo da Vinci, a wine-growers cooperative in Italy's Tuscany region.

"We've really only begun to notice the extremes in the last ten years," Meini continued. "It's not that any one year has been terrible but year on year we see that there are changes and that there is less water. For example 2012 was a really bad year. This year, 2013 has been better but not by much."

Meini is short, gray-haired and intense. When pushed, he would talk. But, unlike the other garrulous Italians with us who couldn't seem to stop talking, Meini had to warm to it. He preferred to look and listen and think long before he answered any of my questions.

In October 2013, Meini, myself and several others were standing in a sloped vineyard of Sangiovese grapes just below the Casale di Valle, a refurbished 16th Century hill-top hunting lodge west of Florence. The vines were tall and leafy and stuffed with grapes so tightly packed they cradled tiny sun-catching pools and drips of rain from the night before.

Everyone in the vineyard wore an apron and rubber gloves against the inevitable splatter of grape juice. We each

carried clippers and a bucket. Uphill sat a tractor. The driver collected what had been harvested and dumped it into the large container on the back of the machine. We moved steadily up the rows of vines, one person on each side.

Agronomist Andrea Meini. Photo courtesy Kristina Laurendi Havens (Krystyna81.etsy.com)

The ground was sticky and mud splattered on our ankles. Meini and I were keeping our eyes on a thunderhead growing east over the mountains towards Lucca. I pointed to the clouds and he smiled. "So far," he said "2014 looks like it might be a good year. Rain now is just what we need."

"Growers here in Tuscany are worried because they don't know what climate change means," said Meini."They get it. They see it happening. Some are even alarmed. But what to do about it that is the question."

Winners and Losers

-
-

Antonio Busalacchi is head of the World Climate Research Program where he coordinates the international science research on climate change. He is also an advanced sommelier and certified wine educator.

In his recently presented paper *The Impact of Climate Change on Global Viticulture* Busalacchi's research team looked at the impacts of climate change on twenty-four areas around the world; half in the "new world" and half in the "old world". His team found that when it comes to wine there would be winners and losers across the globe.

"Those in the higher latitudes, the ones higher in altitude and the ones with easy access to water will either be immune from the effects of climate change or will actually benefit," Busalacchi says. "Think of places like Germany, Argentina, New Zealand, Washington and Oregon in North America and southern England. They will all see a benefit from climate change. In fact, you see many of the champagne houses in France buying up land in southern England as we speak."

According to Busalacchi's research the climate change losers will be the growers in Spain, southern Australia, South Africa and Napa Valley in California. Tuscany will struggle.

"Extreme events matter", Busalacchi says. "For example, extremes in temperature cause vines to go dormant," he explains. Once temperatures reach the 30° Celsius mark (85° Fahrenheit) vine leaves close to conserve water. With the leaf closed photosynthesis stops and so does the work on the grape. If temperatures go any higher than that the plant goes into a thermal shock and is essentially just trying to survive."

"Several days of 30° in a growing season means that the quality of the grape is impacted," says Busalacchi. "That affects the quality and taste of the wine."

It is not just the heat that impacts the grapes. Other extreme weather events such as the incredibly destructive hail storms that hit the French wine growing regions in 2013 likewise impact the grapes. While climate models are not yet able to come up with details about how each area might be impacted by these extreme events it is clear that hard to predict late freezes, early springs, fierce rainfall and longer droughts could drive some wine producing regions out of business.

Wine growers are faced more with "global weirding" than "global warming. It is simply impossible to predict future weather patterns based on the past. The growers can no longer simply trust in nature to take care of them.

Tuscan Weirding

"What our growers tell us is that over the last ten years we get much more frequent and hotter high pressure systems coming up from Africa. They are very stable and very wet but they don't produce any rain. The old pattern were high pressure systems from the Atlantic and western Mediterranean. These brought cooler nights and more frequent rains," Meini told me.

The University of Milan made a study of Sangiovese varietals in 1999. They found one-hundred and seventy Sangiovese clones in Tuscany. In the Vinci area alone there were fifteen types which is quite a range for such a small area. The study found that of all those types only three were of the quality desired by the DaVinci wine makers. The thought now is that it may be possible to breed those varieties for long-term drought resistance.

Tuscany was one of the regions considered in Busalacchi's study. They found that by 2050 average temperatures in Tuscany will increase by about 2.5° Celsius (4.5° F) and up to 4° (7.2° F) by 2100.

Busalacchi said, "What Tuscany will see with those kinds of temperature increases is many more days in the summer where the daytime temperature tops that key 30° mark. We expect the number of those extreme heat days to double by 2050. And mind you, that doesn't even include the increase in drought stress."

Take a map of Italy and spread it out on the table. Find Tuscany. Then imagine. To retain the current climate conditions in the face of change Tuscany growers would have to move north. The year 2050 would see them near Parma 160 kilometers (100 miles) north. 2100 would find them at the base of the Italian Alps 400 kilometers (250 miles) north.

While a solution to some of this may seem easy to solve with increased irrigation many European wine regions are simply not allowed to irrigate because of the appellation laws that defines a type of wine by the geographic location where the grapes are produced. These laws also delineate the types of grapes used, yields, methods and alcohol content. Irrigation is often prohibited in these laws.

So-called "new world" wine regions are not burdened by such restrictions and are therefore more able to adapt by employing irrigation techniques.

Meini hinted at changes however. "There has been some talk about amending the appellation law to allow for more water," he said. "But we're not there yet. Even if we were, how do you store water? Not many places around here have that ability so it would have to be developed."

Tuscan growers are going to have to look at other options.

Where Next for the Great Wines of Tuscany?

"Our nurseries are testing alternatives. We're looking for a more drought-resistant root crop but we're not sure yet that is the answer," Meini told me over lunch the next day. We were hosted by one of the Da Vinci growers, sitting

under a shade against the intense sun.

A spread of tomato-topped crostini, thick soppressata sausages and paper thin prosciutto were spread before us. We were sipping on the Pinot Grigio made by Da Vinci growers.

“Would such a root stock be the same quality?” Meini continued. “Or does it make more sense to stick with the varietals we have now and just start to irrigate? How do you keep the same quality while yet attempting to a new reality. ” he shrugged. Then he laughed. “I have just as many questions as you do.”

Tuscan growers won’t be moving north to the base of the Alps. They have no choice but to adapt. Improved root stock to relieve water stress, plants with deeper roots is one option. Breeding more drought resistant hybrids and possibly developing varietals that can endure temperatures above that 30° **mark** without going dormant is another option.

Tuscan growers might also move the vineyards up in altitude as growers in Spain’s Rioja region are doing. The vineyards could also be reoriented to north-facing slopes as Greeks growers have done for centuries. Canopy management is another option, the grapes could actually be shaded.

“Each option has its price,” Meini said.

> *Wine is not like producing shampoo. You can’t just change your source of root stock over night. You can’t just suddenly start irrigating. You can’t just throw up shades over the grapes all over the Tuscan hills. We’re talking about dealing with huge challenges.Andrea Meini*

Time and Experience

A few days later we visited one of the Da Vinci growers further south in the Montalcino region, famous for the Sangiovesi Grosso, the varietal that produces the famous Brunello wine. We climbed up from the Abbey Sant-Antimo. The ancient village of Montalcino towered above us to the south. The day was windy and dry. On the hill across the valley were thousand year old terraces planted in moody olives.

DaVinci grower Artibano owns a small vineyard just above the Abbey Sant-Antimo. All DaVinci growers follow strict appellation laws. In Europe the oldest surviving appellation is in fact the Chianti label in Tuscany, dating to 1716.

The grower, a gruff man named Artibano was waiting for us next to his jeep. He had a hooked nose and a baseball cap pulled low over his eyes. His dog stood uphill near a pile of bricks that were melting into the ground. The animal barked incessantly, not liking the look of me, but he kept his distance.

“He doesn’t have a lot of land,” Meini said of Artibano. “But he is the perfect example of the strengths we do have in adapting to climate change. Most of our growers run small operations. Artibano is like a gardener more than anything. He can keep an eye on every part of his vineyard. Small producers are very valuable to the cooperative.

Often times they are the ones who find the solutions.”

We followed Artibano past the dog and up to where his vines met his olive groves. He wasn’t terribly interested in talking but he didn’t mind us poking around.

Some researchers think that the Sangiovesi grosso grape may date back to Etruscan times. Giovanvettorio Soderini wrote about it in 1590, noting that the grape is delicate and that the wine maker can make a mess of it very easily. It wasn’t for another three hundred years before the Sangiovese grosso was grown more widely in Tuscany and it wasn’t until the 1970s that wine makers began using it in larger productions, particularly the chiantis and now the Brunello.

“We need more rain,” was the one thing I could get out of him.

“Really, I see some positives here,” Busalacchi told me later over the phone. “Increasingly, vineyards all over the world are going organic. On an international footprint basis, vineyards are getting more and more sustainable. They use fewer chemicals. This is better for the land and better for people. Climate change may in fact hurry those improvements along.”

Andrea Meini was clear that it is the long view that will have to prevail. “Wine is not like producing shampoo. You can’t just change your source of root stock over night. You can’t just suddenly start irrigating. You can’t just throw up shades over the grapes all over the Tuscan hills. We’re talking about dealing with huge challenges. That will take time and experience.”

##

Jim was chosen as a DaVinci Wine Storyteller of the Year for 2013 and spent two weeks studying wine in Tuscany as a guest of the Cantine Leonardo DaVinci.