

# The essence of agriculture

*Global markets  
started with spice*

**B**rick red, flecked with green, black, and white, a world of spices flows into one of an endless line of jars on the packaging line of Old World Spices and Seasonings in Concordia, Mo. As it makes its short journey to the bottle capper, each jar of spice rub represents a trip from all corners of the globe, a meeting point for black pepper from India, chile powder from Mexico, cumin from Turkey, and other precious spices that followed routes paved more than 2,000 years ago.

In fact, spices were the first global commodities. Before the spice trade, farming was local—a matter of survival. Spices took agriculture global, adding creativity to both cook-

► **Large photo:** Though the legendary Spice Road ran mostly East to West, chile peppers brought the flavors of the Americas across the globe. Hungary's paprika and the Sichuan of China have their roots in Latin America.

► **Below:** A blend of spices is a mingling of world cultures.



ing and trade. In the BC era, spice merchants blazed the Spice Road, a highway that ran from Xian, China, through Persia and India to supply eager buyers in Egypt, Greece and Rome. Nearly a thousand years ago, Viking Ingvar the Far Traveler journeyed from Scandinavia's windblown fjords to spice markets in modern-day Georgia, intersecting the Spice Road as it swung north out of what is today Iran. (Swedes still love exotic spices, including cinnamon and saffron.)



Just about every step in today's process of moving a bushel of corn or a ton of fruit to an export market has its roots in the spice trade. For instance, modern ship-to-truck multi-modal transportation systems are just scaled-up mimics of the ship/camel handovers along the Spice Road. Some historians believe canals connecting the Red Sea to the Nile preceded the Suez Canal by over two thousand years.

Global finance is rooted in spice, too. The merchants of Venice developed a bond market to allow investors a way into the spice trade that the city-state dominated for centuries.

► **Above:** Nutmeg from the Molucca Islands in what is now Indonesia was coveted by medieval Europeans. ► **Below:** This Iranian saffron was displayed at International Green Week in Berlin, Germany, the modern equivalent of traditional fairs that introduced exotic spices to Europe's buyers.





Spain and Portugal raced for direct connections with spice suppliers in the East. Christopher Columbus and Vasco de Gama were dispatched to find connections between their royal sponsors and the spice growers of India and Indonesia. In Europe and on the high seas, growing naval powers spent the Renaissance battling for control not just of castles and port cities on the Continent, but also of spice-growing colonies in the East.

**Spice capital.** By the time the unified Spanish/Portuguese navy was vanquished in the 16th century, Europe's spice capital was in The Netherlands. There, the world's first limited liability corporations and tradable stock issues funded the spice ships and colonial outposts of the Dutch East India Company. Within a few years, investors were trading futures, gambling on big profits when ships came in.

Spices were the perfect commodity to drive waves of revolutions in trade. They're portable, rare, and relatively non-perishable. Many can only be grown in tropical conditions, or strongly reflect where they were produced, which is why good chefs can quickly tell Mexican-grown oregano from Greek. ◊

►**Left:** A great location, well-connected population, deft diplomats, and innovative financial markets made Venice a hub of the spice trade for centuries, building vast wealth for local merchants. ►**Below:** Scott Plummer of The Spice and Tea Exchange in Ashland, Ore., blends a batch of spices.





►Above: Kanelbullar, the signature cinnamon buns of Sweden, hint at a spice trade begun by the Vikings nearly 1,000 years ago.

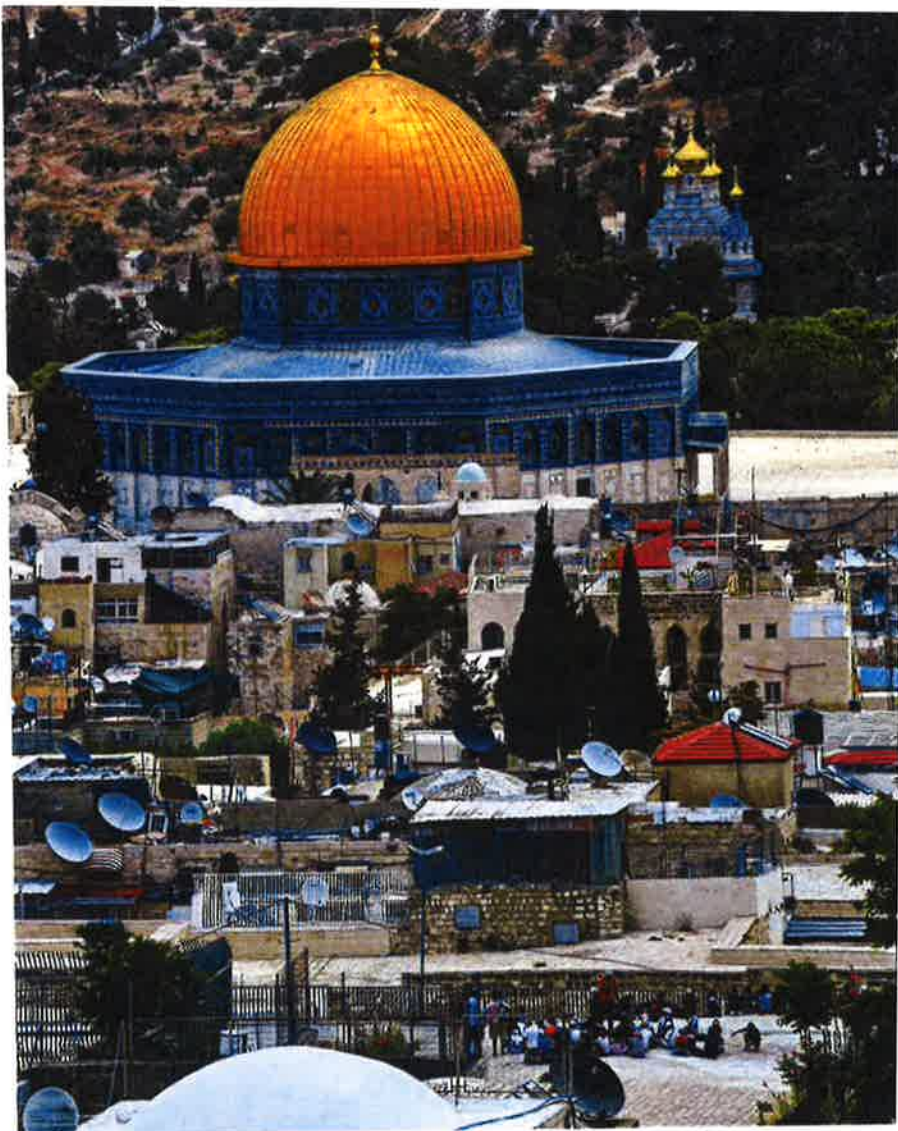


*"Oil is what you smell; resin is what you taste."*  
—Jere Bahner





►**Above:** A Sudanese seller shows off gum arabic, used to thicken foods and soft drinks. Like frankincense and myrrh, gum arabic is hardened tree sap. It's a key export for Sudan, the world's top producer. ►**Left:** Indian wholesalers display an array of spices in a stall in Delhi's busy Gadodia Market.



Take chile peppers, for example. Paul Bosland, chile pepper breeder at New Mexico State University and head of the Chile Pepper Institute, notes that peppers are strongly influenced by terroir, the impact of local soils and climate.

"If you take the same variety and grow it here and in San Diego, then put them side by side in a taste test, people will tell you it's two different varieties," Bosland points out.

That's one reason spices are such evocative foods, he notes—either because they taste so exotic or because they remind people of home.

"When we walk through our test plots with people, they're so thrilled to see chiles from their culture—'their chiles,'" Bosland says. "Their faces light up when they see chiles from their home. You just don't see that with turnips."

Some chiles attack the taste buds quickly and fade away just as fast, while others build the heat slowly and linger on the palate, he adds. That hints at the huge chemical complexity behind the flavors of chiles and other spices.

"We know there are 22 different alkaloids that cause chiles' heat sensation and more than 1,000 different chemical compounds that give the aroma and flavor characteristics," he says.

Understanding that chemistry is key to using spices well, notes Jere Bahner, director of research and innovation for Old World Spices.

**Oil business.** "Oil is what you smell; resin is what you taste," Bahner explains. "Bakeries with cinnamon products use cinnamon with a high oil content so they get that nice aroma. When you have something like black pepper, volatile oils are involved, so we have to spec a certain percentage of oil. Once that percentage changes, the whole blend changes."

Sourcing reliable supplies of spices that meet Bahner's specifications often still starts—as it did hundreds and even thousands of



►**Top:** After conquests of Jerusalem, Crusaders hauled spices back home to Europe. ►**Above:** Whole spices retain flavors longer than ground spices do.



►**Top:** Thyme, hyssop, and sesame seeds flavor these Arabic flatbreads. ►**Above:** John Jungk launched Old World Spices and Seasonings in his garage, blending for Pizza Hut's first stores.

years ago—on small fields and in places like the Gadodia Market in Delhi, India. The jam-packed maze of tiny merchant stalls is the heart of the Khari Baoli, which is the largest wholesale spice market in Asia.

The market's narrow lanes teem with people. Traders dodge porters striding purposefully with huge burlap sacks of spices on their heads. Workers careen down the cobblestone alleys, pushing overloaded handcarts. The market operates in perpetual twilight, the sun barely slipping through the narrow gap between balconies. Despite the crowds, it's strangely quiet. Wheels rattle, men negotiate, and there's the constant sound of coughing from the tickle of spice dust in the air.

There are about 500 stalls in the Gadodia Market, says vendor Vijay Satni. Wares range from Iraqi dates to California almonds and a vast range of India-grown spices and medicinal plants.

**Small stalls.** The average stall in Gadodia Market is about the size of an urban newsstand in America, the sort of tiny shop usually wedged between buildings or tucked into a train station. But even the stacks of sacks crammed into the back of each shop only hint at the volume of trade conducted in these alleys. The stalls are just fronts for huge warehouses on cheaper real estate, so the modest nooks are worth a fortune.

India still accounts for about 44 percent of the world's spice production and one-third of the global trade in spices. Delhi's wholesalers may display spice in enameled pans or loosely tied sacks, but they sell them by the truckload.

Despite its timeless feel, markets like these

►**Above:** A global blend of flavors meet in Missouri on Old World Spices and Seasonings' packaging line. ►**Below:** Suited for large-scale, mechanized production, peppermint offers some U.S. farmers a toehold in the spice market. Most spices rely on hand labor for harvest and processing.

reflect modern buyers' demands. Third-party certifiers have inspected many spice farms, and by the time Delhi's wares have traveled to buyers like Old World Spices, they'll have been subject to a battery of tests for oils, resins, heavy metals, and pathogens to ensure unprecedented levels of safety and quality.

In fact, the Indian government recently established eight spice parks with processing and grading centers to improve quality and launched electronic spice auctions.

It's all part of the country's effort to maintain its hold on the spice trade it's dominated since the Bronze Age.

It's an ongoing fight. Farmers in Guatemala have begun growing cardamom, and growers in Oregon and Idaho have been battling India for decades for a share of the global peppermint oil trade.

**More machines?** North America's mint and mustard harvests are mechanized, and Bosland is breeding machine-pickable chile peppers to help keep American growers in the game. But much of the spice business, from harvesting delicate seed pods to slender stigmas of saffron, still relies on intensive hand labor. And as long as it does, the Spice Road will continue to follow its well-worn path from the old world to the new. ■



## Chile spice of life in New Mexico

By Valerie Ryan | GLOBE CORRESPONDENT NOVEMBER 05, 2013



VALERIE RYAN FOR THE BOSTON GLOBE

### Fresh chiles in Albuquerque.

ALBUQUERQUE — Long, hot summer days are over, but the heat of the season endures in the local harvest. Green chiles, which turn red when ripe, are the foundation of the Southwestern state's spicy cuisine, the signature of the stark, striking desert landscape, and the unassuming emblem of multicultural identity.

Food here, based on Native American, Spanish,



and Mexican cooking traditions, is history made tangible. Historian and author Dave DeWitt says chile seeds were brought from Mexico by the Spanish who founded Santa Fe in 1598. Local Pueblo peoples and Spanish farmers began to incorporate the peppers into staple foods: corn, beans, and squash. “Chile peppers completely influenced the cuisine, even more so than in Mexico.”



VALERIE RYAN FOR THE BOSTON GLOBE

Today, New Mexican food is distinct from that of other Southwestern states. A typical dish might be enchiladas, but order them in New Mexico, and they are different than those in Texas or Arizona. That’s all because of the type of chile and how it’s used, says DeWitt. What differentiates New Mexican cuisine is that chiles are eaten as food, not just as flavor enhancers. Chile relleno, or stuffed chile, is a dish of whole chiles filled with cheese, then battered, fried, and topped with an almost pure chile sauce. In other states, chile sauce is thickened and more like gravy, or cooks use different types of peppers, DeWitt says.

New Mexicans’ enchantment with their chile crop is apparent in the bustle at roadside stands and produce markets this time of year. To enhance the fruity pungency of green chiles and make the skins easy to remove, vendors roast them while customers wait, turning the pods over flames in large, hand-cranked steel mesh barrels. The smoky aroma filling the autumn air is not just pleasant, it’s expected. Chiles ripened to bright red hues are dried in long decorative ristras, preserving the piquant, sweet flavor for year-round use.

Locals stockpile both types. Freezers brim with bags of roasted green chiles, and welcoming ristras of fresh red hang in kitchens and on front porches. Restaurants also stock up. Waiters and waitresses everywhere join in the collective chorus, “Red or green?” This, in fact, is the state’s official query, which comes when you order a traditional dish like stacked enchiladas or stuffed sopapillas. Indecisive diners-in-the-know reply, “Christmas,” and get both.

To make the most of the uncompromising desert climate and soil, chile farmers work with local academics to tackle issues like low yields and





cofounder of New Mexico State University's Chile Pepper Institute, works with growers, even asking them to taste new varieties in the field. Bosland says that chiles are still grown on family farms passed down through generations. "Chile saved the family farm in New Mexico," he says.

In his lab, Bosland finds remarkable correlations between farmers' top picks and peppers grown from seeds of historic varieties. Selection for higher-yield, disease-resistant peppers that maintain the flavor of the past has paid off. Chile is now a major player in the state's economy.

Bosland likens chiles to wine. "Once you taste good wine, you won't like the cheap stuff any more. Once you taste great chile, you won't want anything else."

*Valerie Ryan can be reached at [valerie.ryan.j@gmail.com](mailto:valerie.ryan.j@gmail.com).*