

# DREAMING NEW MEXICO

AN AGE OF  
LOCAL FOODSHEDS AND A FAIR TRADE STATE





# THE DREAMING NEW MEXICO MAP

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Our poster map depicts today's agriculture: its major agro-ecoregions, water sources, range-land grasses and livestock. It shows the major forms of irrigation and the farmers markets that have become the icon of the local food economy movement. The back side of the poster shows thirteen more technical and detailed maps covering climate change to crops and livestock to New Mexico's trade. They are reproduced throughout this pamphlet. This 25" X 38" poster map is available for single and group purchases from [www.dreamingnewmexico.org](http://www.dreamingnewmexico.org).





# An age of local foodsheds and a fair trade state

*Communities everywhere were once intensely focused in their agriculture: It was the source of livelihood for a majority of residents, either directly as producers, or as provisionary of supplies, livestock, distributors, brokers and shipments. We have now raised a generation or two of children many of whom have no idea where their food comes from and who have never visited a producing farm or livestock operation. Ignorance of the basic activity essential to all civilization seems supremely dangerous.*

— STANLEY CRAWFORD, FARMER, FORMER DIRECTOR OF THE SANTA FE FARMERS MARKET, AUTHOR.

DREAMING NEW MEXICO began as a refuge — a place to step back and consider the limits we have placed on our sense of possibility. A refuge to ask: What is it we really desire? What would satisfy our sense of success? What are our dreams — our shared dreams? At the heart of all daily desires is the stomach — the need to find nourishment from the food produced by soil, water and sunlight. We asked: What is New Mexico's dream relationship to food and the food system that feeds us? Imagine the year is 2025 and we've done everything right. What might New Mexico's food system look like?

Dreaming New Mexico engaged with many involved citizen-experts, held a Food Summit and asked them to share the food dreams that stoke their passions — to put away for a moment the daily difficulties of passing a piece of legislation, trying to move a bureaucracy from inside or outside, or simply making ends meet on the farm or ranch. We gathered dreams and data, and researched neglected topics. We conjured the poster map as a celebratory understanding of contemporary agrarian life, then custom-designed a Big Picture of "Food in the Land of Enchantment" and distilled a complex tangle of topics into this mouthful of a two-sentence dream.



**DREAM** Food that nourishes all New Mexican citizens, especially the food insecure, with affordable, safe, culturally appropriate, fresh and nutritious food; food that is seasonally grown and raised with eco-friendly, humane and climate-friendly methods; and food processed and distributed as close to home as possible, benefiting both rural and urban communities and revitalizing agrarian communities with legacy-defining crops and cuisine.

**DREAM** A future food system that imports food from an alternative trade pattern (fair trade); exports healthy foods to help farmer and rancher incomes yet gives preference to local sustenance; preserves long-term agrarian life by protecting arable lands, waters and intergenerational sales of farms; and is supported by new government policies, rules, laws and payments that help transform the food system, create new jobs, sustain profits and ensure equitable working conditions at every step of the value chain.

## THE FIVE DREAM THEMES

New Mexicans have a heartfelt love and deep respect for place as a permanent home — a strong

Henry Gomez with native squash (Taos Pueblo)

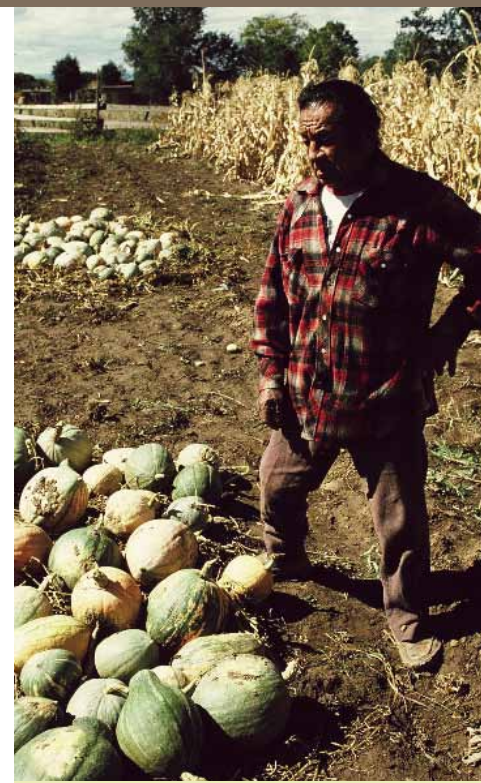


PHOTO: SETH ROFFMAN

# Farm facts

- Number of farms: 20,930, a growth of over 35% since 2002. The large increase is, in part, adding Native American farmers to census. Land in farms: 43.2 million acres (about 60% of State). About 87% of the farmland is range and pasture. Number of acres in farms decreased by 4% since 2002.
- Average size of farm: 2,066 ac. Median size: 40 ac.
- Full owners: 15,850 (39% of all acres). Part owners and renters: 4,007 (54% of all acres). Tenants: 1,073 (7% of all acres). Total operators; 32,109.
- Agriculture is primary occupation: 10,040 (48% of operators).
- Farm is place of residence for operators (76%).
- Operators who worked zero days on farm in past year (36%); who worked 200 or more days (35%).
- Farmers younger than 35: 818. Percent of total farmers (4%). Farmers above 60 years of age: 9,140 (45%).
- Farms with less than \$2,500 worth of sales: 10,496 or 50%. Farms with over \$100,000 in sales: 1,689 or 8%.

desire to listen to the land and waters — what they tell us about how to behave. This deep conscience lives on in New Mexico's Indo-Hispanic teachers who remind us that creation is to be treated with care — that soil is the flesh and water the blood of the foods that sustain us — that all life is interdependent — that there is enduring value in honoring the seasons with ceremonies and prayers of thanks. Five themes emerged in the dreaming process.

**AGRO-ECOREGIONS.** The State of New Mexico is an arbitrary geometry of straight lines defining a very beautiful and diverse quilt of deserts, mountains, rivers and grasslands. Each has been harvested and cultivated for thousands of years. Each has a specific local mix of hours of daylight; days of rain, snow, dust storms, hail; photosynthetic growth; varieties of grass, trees and game; soil fertility; freezing nights; and seasonal rhythms that frame the hard work and lives of farmers and ranchers. Agroecoregions nourish regional belonging — identity through agrifoods. Chiles and apples. Sheep and the Three Sisters (corn, beans, squash). Wheat and cattle. Pecans and onions. Foods (traditional and contemporary) engender respect for home as a productive place. Although every acre of New Mexico can claim a unique microclimate, we broadly outline six agro-ecoregions (page 6) that encourage eaters to ask: Where does my food come from? How did it arrive on my plate? Who grew it and how? What does it need to prosper?

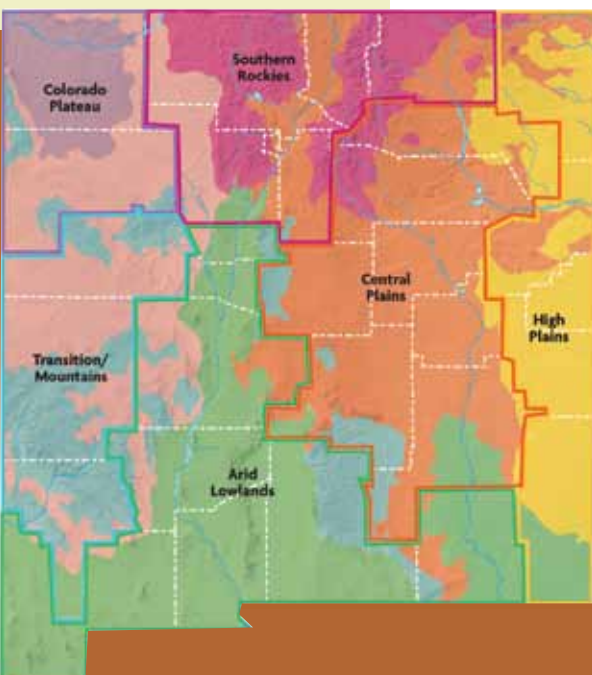
**LOCAL FOODSHEDS AND LOCAL VALUE CHAINS** are the two central organizing frameworks of New Mexico's food dream. Each geographic area that can feed a region also gives eaters more reliable, tasty and trusted food from local farms — the sense that purchasing food is more than a cash transaction — and the hope that local farms are less likely to abandon NM for cheaper-labor nations. Value chains trace food from farmer to plate. Local foodsheds and value chains bring not only wealth but a connected sense of community pride in local food among farmers, ranchers, buy-

ers, shippers, processors, wholesalers, retailers and consumers.

**FAIR TRADE.** While our State can produce some foods better than other locales, other regions produce certain desirable foods (chocolate, tea, coffee, rice, mangos) that New Mexico can't. Fair trade simply says: "Receive from others as you would give unto them," i.e. with biosafety, eco-friendly farming, good working conditions, living wages, gender equity and no out-of-family child labor. We envision an alternative trade system among "sister" local foodsheds.

**FOOD SECURITY: CLIMATE CHANGE, WATER, HUNGER, FARM PRESERVATION AND ECO-FRIENDLY FARMING.** First and foremost, New Mexico needs to aid its hungry, end hunger and provide fresh, nutritious food to the food insecure and those with nutrition-related diseases. Long-term food security means preserving farm and ranch landscapes as well as farmers and ranchers. It means enabling new, young farmers to purchase land, while preserving or regenerating the soils and water that support crops, orchards, grasslands and the food web. It means ensuring traceability of all foods to prevent food-borne illness and bioterrorism. It means preparing assiduously for climate change impacts.

**GOVERNANCE.** To attain a "restorative" food economy, new arrangements within existing governments are essential by towns, cities, counties, irrigation districts, acequias, tribes, Pueblos and by State, federal and international administrations. Confusion about participation and authority has helped push food systems out of balance. Who gets to sit at the decision-making table? Who holds the authority to make the rules, laws and legislation? Who implements the rules? Do citizens and customers "rule," or binding international compacts? Though it's a daunting task, New Mexico can become a leading state in the Jeffersonian ideal of viable, small farms and local economics.



## Data

After asking "what we desire," we asked: "What do we know?" It is not easy to find and decipher the data necessary for the new agrarian movement. We used USDA Census of Agriculture (2007) and New Mexico Agricultural Statistics (mostly 2006) which differ for sometimes obscure reasons. Some data have been suppressed to protect privacy. The Shuman model (page 13) is based largely on

national statistics which, at times, do not apply (see web site). In addition, no government agency tallies consumer food expenditures at a local (zip code or county) level.

The map (left) shows how county and agro-ecoregion boundaries do not overlap. However, most data are reported by county. We have had to compromise (see web site).



## FOOD SYSTEMS OUT OF BALANCE

Today's food systems are out of balance. No matter how large or small, local or global, all food systems are under intense pressures to change. Two trends run side by side. One is the hundred-year-old trend in which: prices of food continue to fall as technology continues to reduce per-unit costs; farmers lose more and more of the final retail dollar to the mid-steps of the food chain; global food trade burgeons with a mass-market system that is capital-intensive, land-intensive, fossil-fuel-intensive and highly mechanized; Americans eat more and more imported food; and mid-size farms disappear into a future divide of only small and giant farms.

The other path — currently a small but rapidly growing niche market segment — warns that fossil fuel-dependent food prices will go up; climate change and increasing population will make it more difficult to prevent hunger; demand is for quality food (not just more calories); mid-size farms can revive within a local food economy; the food supply will increasingly be forced to meet environmental, health and labor standards that the mass-market food industry cannot attain; and a moral economy challenges the monetary economy to be more respectful of customer health, lands, waters, and farmers and ranchers who deserve higher returns for their role as managers of ecosystems.

"An Age of Local Foodsheds and a Fair Trade State" marries desires with do-able dreams that span the next fifteen or so years. To leverage the food system, the conscience, hearts and minds of citizens must ultimately consider a new moral framework for the food economy. New Mexicans will be called upon to learn new ways to live together and make conscious choices of "how" and "what" to feed ourselves. Food — good, healthy, fair and enough — connects us from local farms to the whole planet. This Dreaming New Mexico pamphlet maps the bridges and barriers to our food system future.

## What is a farm?

It is not so simple to decide what constitutes a farm or ranch, or who is a farmer or rancher. In 1997, the USDA defined a farm/ranch (it groups both as "farms") as any operation that sold more than \$1,000 of crops or livestock (or farm-derived products such as milk). The USDA chose \$100,000 of sales as the least that could be sold to be a "commercial" farm, and may raise that to \$250,000.

Whether a farm is "profitable" hinges on definitions of profit or net farm income. Although an overgrazed ranch loses its natural capital (topsoil fertility), this loss is not considered in an economist's definition. An organic farmer may sequester carbon and improve watershed hydraulics (natural capital), but these assets are ignored. A factory dairy farm may cause pollution but this "externality" (usually paid for by the taxpayer) is not subtracted from net gross income.

Is a farmer who "induces" more local economic activity a more profitable farmer? Farmers who set aside winter fields for cranes provide a non-monetized societal desire. Farmland may attract Sunday drivers to be "in the country" and dine at a local restaurant without the farmers receiving any financial reward for attracting customers and aiding local economic development. Until community development services and a broader understanding of the farm/ranch as a managed ecosystem can be incorporated into economic definitions (and maybe they cannot), the definition of "profitable" will remain subjective.

Agro-pastoral livelihoods have been an integral part of New Mexico's "informal" (non-recorded) agrifood economy. In the Indo-Hispanic areas of the State, a Navajo agro-pastoralist may raise sheep or goats and supply part of the family food from a dryland garden/farm. The agro-pastoralist may participate in a "gift" economy in which services and food are exchanged without cash. Or the crops may be grown for celebrations and ceremonies. Certain acequia communities follow a similar "non-monetary" pattern.

Similarly, mounting numbers of anglo and Indo-Hispanic small-acreage

operations seasonally grow much of their own food, sell part of it at "informal" markets such as farmers markets, or partake in gift exchange economics. These operations may or may not appear in State or USDA statistics, yet contribute to food security, to rural or sub-rural economic vitality and helping to reduce nutrition-related health costs.

If the definition of a farm centered on nutrient-per-acre rather than cash-per-acre or cash-per-unit-of-production, many kinds of farming (diverse, permaculture, biodynamic) actually produce more than larger farms. They contribute more to the health of society than just calories or protein. To a nutritionist, they are farms as opposed to "foodstuff factories".

Who is a farmer is often equally confusing. Should farmers be defined by how many days each year they work on the farm? Or what percentage of reported income comes from agricultural production? Or who owns the farm or ranch? Or its size? Should corporate farms with no resident owner be counted as farms?

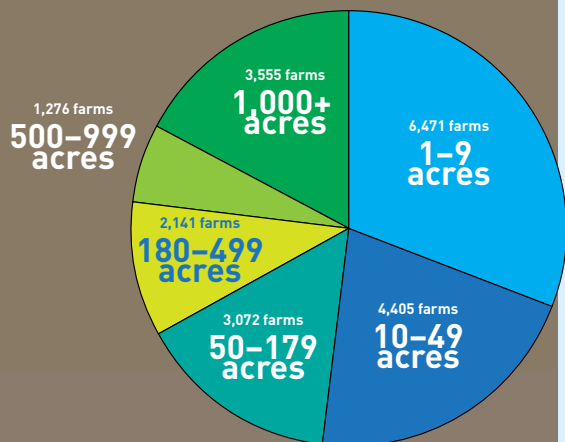
Multi-job or retired farm operators are sometimes dismissed as hobby farmers. Yet, diverse household income sources are the rule in the U.S. Diverse sources include: true off-farm income (the wife teaches school or the husband guides hunts); farm-related income (the farmer leases his equipment or land, works on other farms or does government-supported restoration work); ambiguous farm-related income (the ranching family sells farm real estate); virtual "on-farm" work (Internet sales of livestock or processed goods like jams); non-farm enterprise (selling antiques or writing books); and retirement or financial investment income that supports the farm from national and global sources. Who decides if any of these tasks disqualify a person from being a farmer?

Farming and ranching are hard work occupations with relatively low profits. Dreaming New Mexico celebrates them and is thankful for all kinds of farms and ranches. New Mexico needs hundreds or even thousands more farmers and ranchers.

**DREAM** Government agencies, censuses and the IRS give equitable benefits to this great diversity of farmers and ranchers.

## Farm size

Average size of farm: 2,066 ac. median size: 40 ac.



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New Mexico's  
dreams have many  
dimensions.

New Mexico's dreams have many dimensions: agro-ecoregions; local foodsheds/local value chains; saving farms and ranches; biocultural foods; fair trade; food security; and governance. Each section describes the dreams, the background to the dreams, with sidebars on New Mexico, and what it takes to turn them into do-able dreams.

## **AGRO-ECOREGIONS** page 6

Food comes from sun, rain, snow, soils and watershed home. New Mexico has six major "places" with many different soils, microclimates and water sources; many ways to grow forage and crops. Knowing them prevents "cookie cutter" policies divorced from farmer and rancher realities. Knowing them tells us where our food comes from.

## **LOCAL FOODSHEDS AND LOCAL VALUE CHAINS** page 11

Foodsheds are a geographic region that can provide us our food. The closer to home, the better. Value chains trace food from farmer to plate and give us a "cartoon" of what happens to our food in passage to processor, distributor, wholesale, retailer and places to eat. It portrays the impacts the food creates and helps organize the local food economy. These are two crucial concepts to regenerate local, agricultural prosperity.

## **FARMS** page 19

Every edible crop in the value chain has its own story and harvesting, processing and distribution needs. Major commercial crops (e.g. onions, chiles, pecans) and nursery crops have agro-chemical, water and marketing issues. Truck-farm vegetables, fruits and edibles struggle to scale up to mid-size marketing and find appropriate buyers. This is the heart of the local foodshed, supplying fresh, nutritious fine-tasting edibles to State institutions and local groceries and markets.

## **RANCHES** page 26

New Mexico's top earners of agricultural cash receipts are dairies, beef, and the hay and forage to feed them. But, over 95% of dairy products and beef cattle leave the State. Capital to revitalize the local organic milk and grass-fed (and organic) beef industries remains the major barrier to a local foodshed meat supply. New Mexico also has a traditional sheep/lamb and meat goat commerce and a tradition of hunting for bison, deer, elk and smaller game. Combining ecosystem management, livestock raising and game administration are near-term challenges and long-term opportunities.

## **BIOCULTURAL FOODS** page 32

New Mexico has thousands of years of agriculture. Many New Mexico traditional foods are unique and iconic. Old ways are aspiring to new traditions that combine historic crops with new ecological and organic farming methods; that revitalize agriculture and intergenerational farming; return citizens to nutritional diets; and save local cultivars. The trajectory is heroic given the burdens of history and the discriminatory treatment of Indo-Hispanic citizens.

## **FAIR TRADE** page 38

"Trade with others as you would have them trade with you." A new more ethical, less monetary-driven, trade is needed as New Mexico imports over 95% of its food. Fair Trade between sister foodsheds is a new concept and, as an alternative to today's global trading system, is an embryo waiting to be born. The "new" fair trade helps low-resource farmers, including 5,000 or more New Mexico farmers who need a better return for their labors.

## **FOOD SECURITY** page 42

Food security has many dimensions. In New Mexico, they are: bioterrorism (especially across New Mexico's international border) and global spread of food-borne illness (page 42); climate change (page 44); water and agriculture (page 48); food gaps and health (page 52); saving farms and farmers, ranches and ranchers (page 56); and eco-friendly, healthy working landscapes (page 59). Any one of these threats to food security could result in a disaster. They are critical uncertainties. We do not know when or how or which one could gain sudden force. It is best to have a safety net in mind, reduce the probability of any of them growing into a harmful driving force, and heal the existing vulnerabilities of the food system. Dreams should not become nightmares.

## **GOVERNANCE** page 62

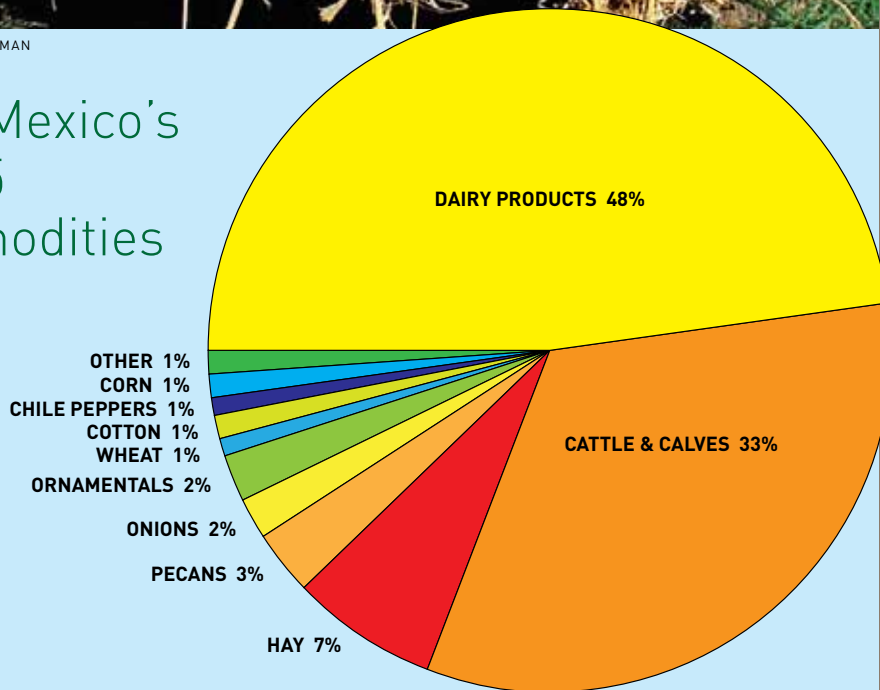
All food systems, large and small, are under pressure. State governance now requires a new form that considers food sovereignty and State food security. State purchases of local food for State institutions could tip the balance in favor of local production, processing and distribution wealth. Siloed departments need to come together in a comprehensive agrifood plan. National governance needs to change the subsidy system to help local food economies, especially those that do not grow commodity field crops. Crucial changes in extension, curriculum and educational programs can accelerate change.





PHOTO: SETH ROFFMAN

## New Mexico's top 25 commodities



Top 25 farm products by cash receipts do not include chicken eggs and farm chickens, which are suppressed data. New Mexico farms and ranches sell \$11 million direct to local foodsheds and consumers, which makes it the 12th ranking source of agricultural receipts, more than sorghum grain. New Mexico ranks 35th in commodity subsidies for all states. Nevertheless, they are New Mexico's fifth largest source of agricultural earnings.

New Mexico ranks in the lower half of states in terms of agricultural income because of its arid and cold climates. The total value of agricultural foods sold ranks 35; value of crops and nursery products ranks 37; and corn for grain ranks 35. The highest ranking products are livestock of all sorts (27); fruit, tree nuts and berries (13); sheep and lambs (13); sorghum for grain (12); milk and dairy products (8 or 9). These rankings indicate good domestic and foreign export earnings.

## Agrifood facts

- New Mexico sells about \$2.5 billion of agricultural goods. 72% is milk and beef. 8% is hay, feed corn, forage and related crops.
- New Mexico households spend about \$4.2 billion/year. \$2.6 billion in stores; \$1.6 billion eating out.
- Farms with harvested cropland: 9,311. Harvested cropland: 1 million acres.
- Average market value of farm and buildings: \$696,000. Average price per acre: \$337.
- Market value of agricultural products sold: \$2.2 billion. Average per farm: \$104,000. Net cash income (after expenses): \$17,558 averaged per farm.
- Government payments to 3,329 farms (16% of farms) equaled \$43 million but totaled \$83 million (includes conservation and other payments) depending on how calculated. Payments decreased by 14% since 2002.
- Agriculture directly employs about 24,500. Another 84,000 work in agricultural processing.
- Schools K-12 have 339,000 students. 208,000 (61%) receive free or reduced-price USDA meals. 50% receive breakfast. 24% of New Mexico's high school students are overweight.



# Agro-ecoregions

## Where does your food come from?

WHEN YOU SIT DOWN AND SAY GRACE or gobble a burger, can you trace in your mind the ingredients that will soon become your flesh and blood? Most food now arrives like the proverbial stork carrying the baby. But all dreams about healthy food and sustainable agriculture must actually start with Nature. What soils and water grew the food? Who grew it? We must look at farming and ranching in a special way.

Farming and ranching are, for the most part, human-managed ecosystems; landscapes in which our species has tried to govern soils, water, weather, plants and animals. Dreaming New Mexico calls these diverse landscapes “agro-ecoregions” to reflect the long history — thousands of years — in which humans have hunted, gathered, cultivated crops and raised livestock in what is now New Mexico (Colorado Plateau, Southern Rockies, Central Plains, High Plains, Arid Lowlands, Transition Mountains).

The six agro-ecoregions are not pristine. With the addition of irrigation from massive waterworks, natural rainfall has become “effective soil moisture.” Hoes, plows, tractors, soil amendments, domesticated livestock and fertilizers greatly altered the soil’s tilth. Custom-designed plants and animals dominate; many are special cultivars from industrial-breeding programs. Hand labor, machines and herbicides remove unwanted plants (“weeds”). Companion plants, crop rotations, integrated pest management, petroleum-based pesticides, and traps and rifles limit unwanted animals (“pests”). Hoops, greenhouses, anti-frost irrigation systems and fans, windbreaks, mulches and greenhouse gases, modify the weather.

Farmers and ranchers dwell in New Mexico’s quilt of agro-ecoregions. “Home” can be on the flat High Plains above the Ogallala aquifer or tucked away, near an acequia, in a mountain valley of the Rockies. Home can be a slot farm on the Rio Grande or on the grasslands between two isolated mountain massifs in New Mexico’s Arid Lowlands. Home can be herding sheep on the cold, desertic Colorado Plateau or out among the windy cap rock of the Central Plains.

**DREAM** Every New Mexico citizen and elected official knows, and every school teaches which agro-ecoregion they live

*within. They know its weather, soils, sources of water, five agro-ecoregional crops and the best dates for planting and harvesting. They learn the specific constraints on crops, and a few cultivars custom-designed for an eco-regional and eco-friendly agriculture.*

Agro-ecoregions are your most local “foodshed” (page 11). They give pride and identity to community life by local, seasonal eating and practical gossip about the rain or drought, gardens, equipment, soil amendments, pest management, new crops, government regulations, and now climate change. They encourage citizens to preserve qualities of home that are not just financial — blue corn, pikki bread, Chimayó chiles, piñon nuts. They shape farm and livestock operations as well as regional food-system businesses, buyers and farmer/rancher organizations (page 17). They provide a rhythm to daily work and honor the hard work of farmers, farm workers, ranchers and ranch hands.

**DREAM** A public that is more in tune with seasonal harvests, celebrates them, preferentially buys from their agro-ecoregion, and relies less on imports.

In short, there is a local coherence to soils and seasons, and agro-ecoregions anchor social and economic life. With recognition, they literally become the fertile local ground for innovation and investment; a way to connect all the dots from farm gate to home plate; to build a more reliable prosperity and revitalized communities. Throughout this pamphlet, we try to put our dream inside agro-ecoregional frames.

**DREAM** Farm legislation and policy are custom-designed, not to the abstract political State, but to each agro-ecoregion, making sure they are all treated equitably.

Six milestones would describe success: teaching agro-ecoregions in schools and colleges; branding New Mexico crops/meats with agro-ecoregion labels; creating agro-ecoregional research/extension services to help farmers adapt to climate change; finding new agro-ecoregional

Can you trace in your mind the ingredients that will soon become your flesh and blood?



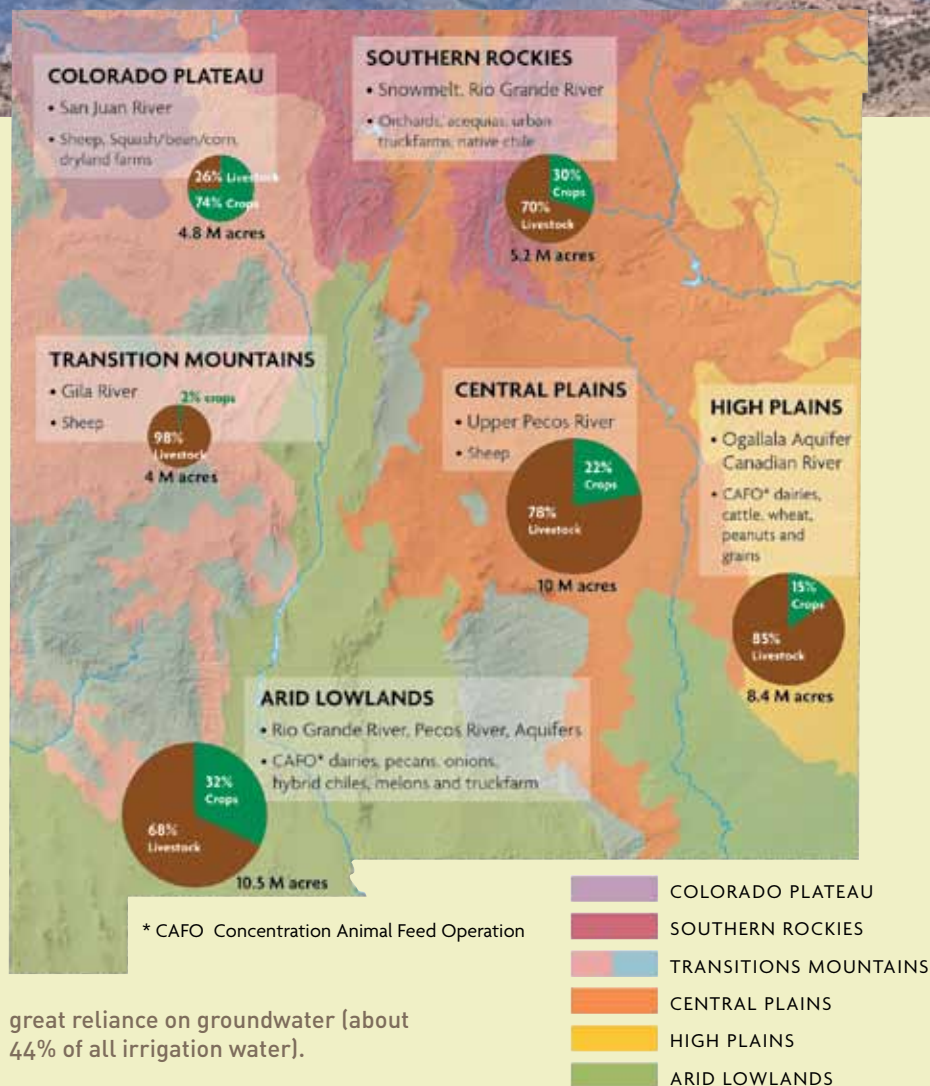
## AGRO-ECOREGIONS >

New Mexico's mountain ranges, the Continental Divide, the Rio Grande valley and the eastern plains create the quilt of agro-ecoregions. The box in each agro-ecoregion lists the main sources of irrigation and most profitable crops. The circles show the percent of cash receipts from livestock vs. crops for each agro-ecoregion. For social data on poverty rates, income, population and more see the web site and Ken Meter's Agro-ecoregion reports. Find your agro-ecoregion, determine what grows best and which crops/livestock can be raised and processed.

## New Mexico's weather: a quick portrait

New Mexico is landlocked with moisture arriving from the Gulf of Mexico (500 miles to the southeast) in summer; the north Pacific (500 miles to the northwest) in winter; with occasional heavy rains from the Gulf of California/East Pacific. The west- and northwest-facing slopes, the highest mountains as well as the lands west of the Continental Divide capture the Pacific frontal storms in winter and have the most snow. The lands farthest from the Pacific, especially in the south, have the least rain or snow in winter. Those farthest from the Gulf (especially the Colorado Plateau) have the least rain in summer.

New Mexico is one of the driest states. New Mexico experiences scant rains and snow (15" average), abundant sunshine, more evaporation (24" to 36") than precipitation, and low relative humidity. 90% of the state receives less than 20" of precipitation and 20 to 30% less than 10". The rainfall and snowfall are, as in all arid and semi-arid regions, erratic — abundant one year, drought the next, early or later with unpredictable inter-storm droughts. This unpredictable flow from both sky and rivers has pushed farmers to a



great reliance on groundwater (about 44% of all irrigation water).

New Mexico's temperature is mild (50 to 60°F) despite large daily and yearly ups and downs. The summer is, in general, the moist season with 45% of the rain falling in three months. (The Colorado Plateau is the exception.) Spring is the driest time.

New Mexico averages 4,170 feet in elevation. Elevation changes are important to farming, as important as going from south to north. For every 1,000-foot climb, the average temperature drops a bit more than 3°F. Freeze-free days, an assured growing season, vary from 220 days in southern valleys to fewer than 80 days at the highest elevation farms.

Although elevation, position in the weather system, and slope-orientation are crucial, significant changes do oc-

cur with latitude. New Mexico's south has 3,700 hours of sunshine vs. 2,800 in Southern Rockies. 10-30 thunderstorms per year occur in southern New Mexico; 30-50 in other parts of state; and 50-70 in higher elevations of Rockies and the Northeast plains.

Hail and wind hurt farming the most. New Mexico's southern half has one to three hail storms per year. The northern half experiences three-plus, with greatest numbers near Los Alamos. Spring is the windy season. Unprotected fields in dry spells are subject to dust devils and wind erosion. Since winds are stronger in the High Plains, the problem is worse. Wind erosion is a major concern with climate change.

# TOWARDS A RELIABLE PROSPERITY

FROM 2006, ECOREGIONS OF NEW MEXICO.  
HTTP://WWW.EPA.GOV/WED/PAGES/ECOREGIONS/NM\_ECO.HTM



COLORADO PLATEAU



CENTRAL PLAINS



ROCKY MOUNTAINS



HIGH PLAINS GRASSLANDS  
WITH SHINERY OAKS



SKY ISLAND WITH  
ARID LOWLAND GRASSLAND

crops; legislation based on agro-ecoregions; and development of food centers (page 17) for each agro-ecoregion.

## **SOUTHERN ROCKIES AGRO-ECOREGION: SNOW, APPLES AND CHIMAYÓ CHILE**

This is the agro-ecoregion of headwater streams of the Rio Grande and, in part, the Canadian rivers. Think snow. Farms are in mountains (mostly 6,000 to 8,500 feet) with a short growing season based on freezes, deep snowpack, snowmelt and spring runoff. It is the only agro-ecoregion with significant surface runoff. The growing season lasts between 100 to 120 days. Elevation and slope are more important than latitude. The highest elevations have very short seasons (as short as 50 days with the threat of freezing at any time). Depending on elevation and slope, precipitation is from 17 to 55 inches, the wettest agro-ecoregion in the state. Farms may need windbreaks and mulches to protect plants that can perish from wind, freeze or winter sun. Fruit trees must be grown on slopes to escape cold air drainage. In some summers, despite the monsoons, high temperatures can cause droughts. At these times, the remaining runoff from snowmelt and shallow wells becomes crucial for irrigating. Wells tap into the valley aquifers fed by snowmelt.

The Southern Rockies is a heartland of Indo-Hispanic farm cultures with many legacy crops. Innovative projects — to regionalize food, aid local farmers, and feed consumers fresh and healthy food — flourish. Truck farms increasingly supply vegetables, fruit, meat and eggs to urban markets, farmers markets and Pueblos. Farms are comparatively small; many farms belong to acequia associations, and a few thrive within Pueblos and reservations (Picuris, Pueblo de Taos, Jicarilla Apache, Jemez, San Juan, Tesuque). Nevertheless, 70% of agricultural income comes from cattle and sheep seasonally grazed on pasture, on montane grassland in spring and summer as well as on brushland. Grazing requires close cooperation among the Forest Service (Carson and Santa Fe Forests), former land grant families, BLM and the pockets of State and private lands.

## **COLORADO PLATEAU AGRO-ECOREGION: COLD DESERT, NAVAJO IRRIGATION, SHEEP AND THE THREE SISTERS**

This is Navajo Country, but perhaps not as romantically envisioned. The San Juan River feeds the Navajo Irrigation Project with two dams, lift stations, canals and drainage works. It is the largest irrigated area (presently over 80,000 acres, scheduled for 110,000) in the agro-ecoregion with hay, wheat, tomatoes, cantaloupes and beans as commercial crops. Besides the Navajo Irrigation Project, irrigation is difficult. Most groundwater is typi-

cally 3,000 feet deep with little near-surface groundwater to help resource-limited farmers.

The agro-ecoregion is predominantly Navajo Nation and BLM lands with pockets of private and scattered State lands. It has two parts: the western plateaus with many unfarmable areas (mesas, shale outcrops, cuevas, and badlands); and the high intermountain valley (San Luis valley), which is counted in the Southern Rockies for economic data. The growing season is relatively short (120-155 days without frost) with a definite winter season (75 to more than 100 nights below freezing). The Colorado Plateau is semi-arid to arid (7 to 16 inches of precipitation) with relatively high elevations (4,000 to 7,000 feet). A cold winter desert. In addition, the Colorado Plateau — furthest agro-ecoregion from the Gulf of Mexico and blocked by the southern Rockies — has scant summer rain.

The Colorado Plateau has the highest percentage of income from harvested crops (74%), though not the most in cash receipts. Livestock income (26%) depends on irrigated hay and Great Basin shrub and Great Basin grassland. Traditional scattered, “dryland” (non-irrigated) farming features the Three Sisters (beans, squash and corn) and low-density sheep grazing.

## **CENTRAL PLAINS AGRO-ECOREGION: SHEEP, SUNFLOWERS AND CAPROCKS**

The Central Plains lies at the foot of the Rockies and slopes southeastward toward the flatter High Plains. The summer rains produce moisture for growth. At other times, it is too cold or too dry. (Average rainfall varies between 12 and 20 inches, depending on elevation.) Crop income is small (22% of total agriculture income), relying on hay (Union and Torrance counties), alfalfa and sorghum. Cattle, sheep and lamb raising — the most important agricultural activities — support themselves on brushland grazing, the irrigated feed, and plains grassland. Most of the land holdings are private with sections of State lands and a few pockets of federal land. Many areas are unfarmable and ungrazable with solution-subsidence basins of karst, cap rock tablelands and steep escarpments.

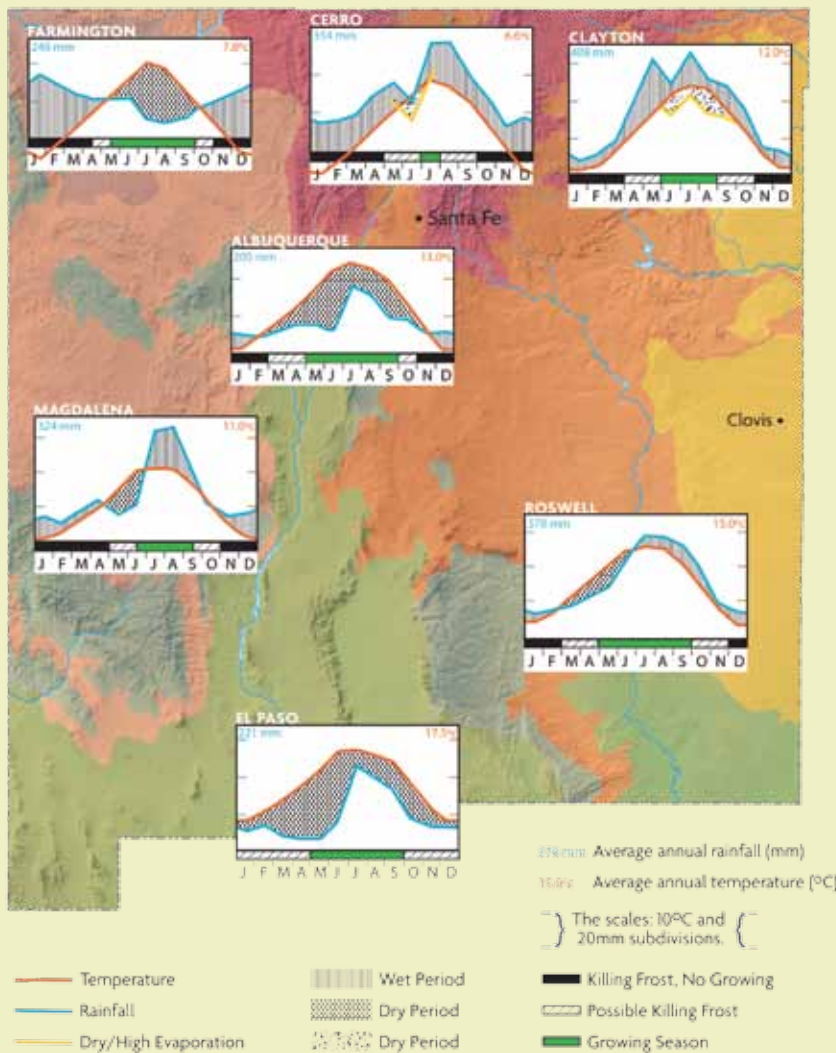
Irrigation comes from the Upper Pecos (Sumner Dam) and upper Canadian (Conchas Dam) and wells in the Santa Rosa aquifer, the Estancia Basin and the valley-basin fill of the Pecos.

## **HIGH PLAINS AGRO-ECOREGION: INDUSTRIAL DAIRIES, CATTLE, GROUNDWATER AND FARM/RANCH WEALTH**

This formerly homesteaded agro-ecoregion, flat to rolling plains, once supported extensive plains grasslands and prairies of little bluestem. The prairie grassland now grows winter wheat for export and grain corn for the cattle and dairy business.

The High Plains straddles New Mexico's eastern border and extends from the extreme





## < WEATHER MAP

"Climatograms" portray the weather of each agro-ecoregion. Two graphic lines (the rain/snowfall line and the temperature line) define dry and wet periods (see legend). When rain exceeds temperature, the soil moisture can support crop growth. When the temperature exceeds rain, soils dry quickly, plants transpire large volumes of water, and the crops may wilt.

Below the climatogram, the solid black line covers months with a mean daily temperature at or below freezing. Cross-hatch (when data were available) represents months above freezing, but with one or more days below. Green bar is months without freezing (the safe growing season).

Note how: the growing season shrinks going north and up in elevation; summer rains in Roswell and the winter/snow on the Colorado plateau define their wet seasons; aridity is year-long in New Mexico near El Paso; summer drought can occur in the northeast through high evapotranspiration, despite good rainfall. Farming has partially escaped weather constraints by irrigation and greenhouses. Grass for livestock still depends almost completely on weather.

south to the extreme north. Elevations vary from 4,700 to 7,000 feet. The growing season shortens from 220 days without freezing in the south to 120 days in the north. Snow increases from about 4 to 18 inches. The High Plains – closest to the Gulf of Mexico— receives 80% of its yearly rain in summer. The northeast section has the second largest number of thunderstorms in the nation. The agro-ecoregion sustains "dryland" (summer season rain) bean farms, short season grain fields and rangeland.

The low rainfall (13 to 18 inches) pressured farmers to irrigate. The Ogallala and Roswell aquifers and water transfers from the Lower Pecos and Canadian River provide for irrigated agriculture. The central and southern High Plains now grow paprika, chile, peanuts, pecans, watermelons and other vegetables as well as all kinds of cattle feed (sorghum, hay, alfalfa, corn silage, grain corn). 40% of New Mexico's commodity sales come from the High Plains.

The flat terrain, predominantly private lands with large pockets of State lands, is good for pasturing and growing grain crops; and the relative low humidity is good for outdoor and semi-confined Concentrated Animal Feed Operations (CAFOs). The railroad connections to America's breadbasket as well as Midwestern CAFOs, feedlots and slaughterhouses facilitate even more grain and livestock trade. The High

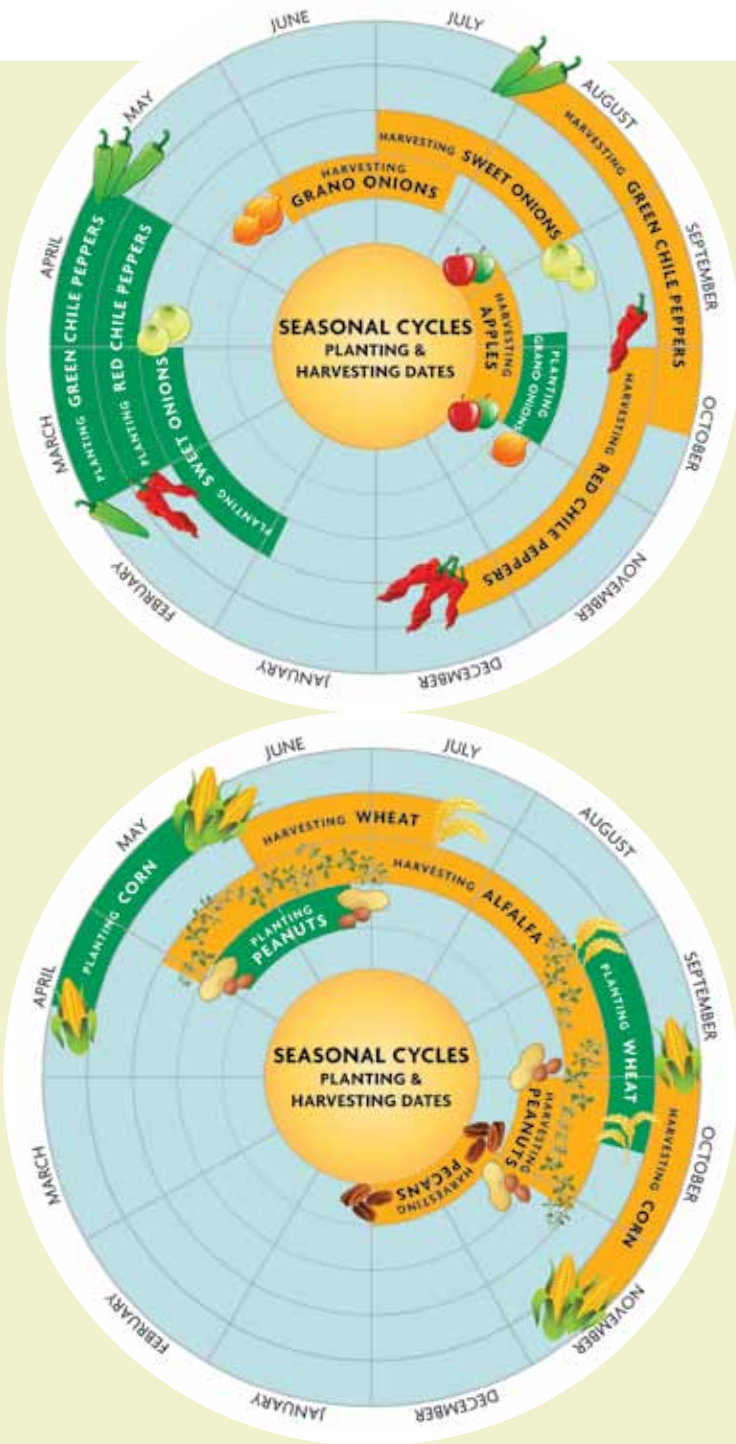
Plains support the largest dairy CAFOs with the largest herd sizes in the US.

### ARID LOWLANDS AGRO-ECOREGION: PECANS, CHILES, ONIONS, DAIRY AND THE RIO GRANDE

The Arid Lowlands produces more crops, nuts, and fruits than any other agro-ecoregion (94% of fruit/nut sales; 93% of orchard acreage; 59% of New Mexico crop sales). Chaves and Doña Ana counties dominate, but northern Bernalillo and Valencia counties produce grapes and potatoes, and raise horses in greater numbers. The southern counties grow chile, pecans, onions, pumpkins, watermelon and many vegetables. Otero has specialty crops like pistachios and sweet cherries. The Arid Lowlands is also the second largest producer of dairy and beef after the High Plains. Livestock feed on hay and graze the Chihuahuan grasslands.

The Arid Lowlands have been blessed and cursed with long hours of sunshine. Blessed by the longest growing seasons (220 days near the Mexican border) and cursed by high evapotranspiration (five to eight times greater than the rainfall, except at its northernmost edge near Albuquerque.) Rainfall is commonly 9.5 to a bit over 13 inches per year, the driest of agro-ecoregions. Think per-

Agro eco-regions  
are your most local  
"foodshed."



## Seasonal cycles

Each crop has its own seasonal schedule of planting and harvesting. There are few generalizations. The diagrams give examples of a few New Mexico crops. Seasonal cycles also govern when pesticide, herbicide or integrated pest management tasks should occur; when soils should be tilled and amendments added; and when orchard trees should be pruned. New Mexico has

six agro-ecoregions, each with its own frost-free growing season and many more microclimates. New Mexico agronomists breed special varieties of crops and livestock for each region. Climate change has already altered the harmony between cultivar and seasonal cycles, and farmers may need special help as temperatures rise and rainfall changes.

Each kind of livestock has its own seasonal cycle of birth, movements and culling (not shown). Seasons determine when free-range livestock young need most protection from predators.

petual moisture deficits. The southern lowlands, the most distant part of New Mexico from the north Pacific, experience the smallest winter rains.

The Arid Lowlands has many differing landscapes: the Rift Valley of the Rio Grande, the mountains and valleys of the Basin and Range, the Madrean Sky Islands, and the separate Lower Pecos section. There are unfarmable areas like White Sands, the lava malpais and military bases; and areas limited to grazing on BLM and State properties. Many of the soils need treatment for high levels of calcium carbonate and salt. There are geothermal pockets that have spawned year-round nursery/greenhouse production.

To compensate for an arid climate, extensive water works have been built. The western part of the agro-ecoregion irrigates from the completely controlled lower Rio Grande; the eastern part from the equally controlled lower Pecos. These supplies depend on southern Rockies snowpack and State Engineer politics. To provide irrigation security, farmers supplement surface water with groundwater — the western section from valley and basin-fill aquifers as well as a major limestone aquifer in Valencia and Bernalillo counties; the eastern section from another limestone aquifer (in Eddy and Chaves counties). The Tularosa Basin irrigates the exceptionally productive farmland and orchards near Alamogordo.

## TRANSITION MOUNTAINS AND PLATEAUS AGRO-ECOREGION: RUGGED LAND AND PIÑON PINES

The Transition Mountains is rugged; all lands are above 6,000 feet with short growing seasons (100 to 180 days) and large expanses of Forest Service property and the Mescalero Apache reservation. Small numbers of farms grow crops in isolated private properties with long distances to markets. There is no principal aquifer and the canyons of the Gila are so deeply incised that there are few extensive floodplains to grow crops. It is little surprise that this agro-ecoregion has only 903 farms and ranches (4% of New Mexico's) and 70% of the farms and ranches are losers of agricultural income. In every recent year, commodity and livestock sales have decreased.

The agro-ecoregion has two parts: the Gila Basin (Mogollon mountains, Plains of St. Augustine, Black Range, San Mateo mountains, Pinos Altos range, Sierra Mimbres, Tularosa/Gallo, Zuni, Mesa and Ladron highlands) and the Sacramento/Guadalupe mountains. Annual precipitation is 14 to 20 inches a year with snow between 16 to 60 inches. Both increase with elevation. Commonly, there are two distinct drought periods (April/May/June and September/October). Warm season evaporation is about three times precipitation.

Cattle and sheep (in Cibola) predominate with grassland, woodland and brushland grazing. Seasonal grazing occurs in a mix of montane and mixed conifer meadows, riparian vegetation, a fourwing saltbush extension of the plains as well as some Great Basin and Chihuahuan grassland. The extensive wilderness and forestlands of the upper Gila have caused friction between the re-introduced and endangered wolf and graziers.



# TOWARDS A PROSPEROUS LOCAL ECONOMY

## Local foodsheds. local value chains

MANY MORE AMERICANS are purchasing local foods. The mushrooming movement of locavores has initiated changes in demand, growing, processing, distributing, financing and selling food. Many consumers are looking not only for the lowest priced food but also for the best value. In many ways, consumers are finding that local food, even if it's nominally pricier, delivers food with better value.

Among the values of buying local are:

- The food is fresher, healthier and better tasting.
- The food has a lower chance of carrying a food-borne illness such as E. coli or BSE ("mad cow" disease) and less chance of entanglement in any bioterrorism scheme.
- Local foods revitalize a sense of local pride with iconic crops such as chile, specialty cuisines, food events and ceremonies, and brands with value-added prices.
- Where governments do not reach down to local geographic communities, self-inspired community-development promises a more fruitful path to harness local social and financial capital and custom-designed creativity and skills.
- Local food supports the community by: increasing the percentage of the food dollar that goes to the grower; keeping farms, ranches and food-related establishments from selling out; increasing local circulation of money (usually three to four times more transactions); decreasing "leakages" of food-related money and jobs; maintaining and increasing



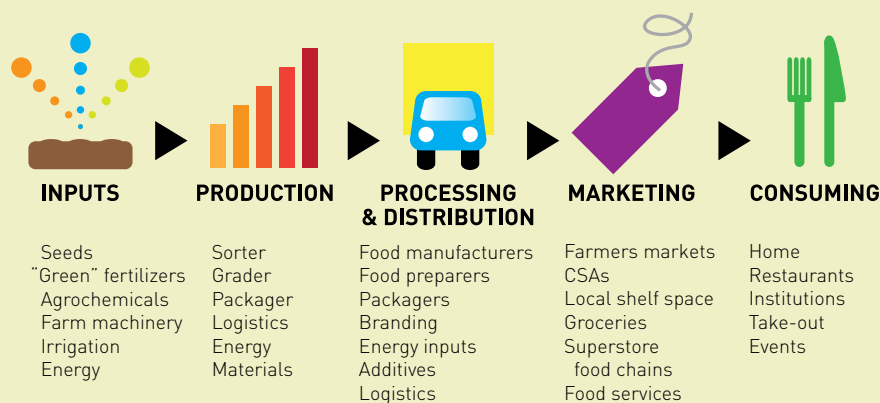
## New Mexico's foodshed

A **Local Foodshed** is a geographic area where locally produced and/or processed vegetables and fruits, nuts and oils, meat and grains feed citizens within the region. It was inspired by the word "water-

shed" which defines a landscape that feeds water flows to a specific point. Foodsheds can be any size. Today, we all eat from the global foodsheds of the planet. Local foodsheds offer a strategic frame for action. They encourage a local food economy; favor organic, diverse and low-input farming, and stimulate seasonal extensions of production. They encourage citizens to become **Locavores**.

# TOWARDS A PROSPEROUS LOCAL ECONOMY

**A VALUE CHAIN** shows food from farm to consumption with the inputs at every step. They help show opportunities and barriers in foodshed creation. The flow chart could be “spidered” to show all the value chains (e.g., agrochemical chains, water and energy chains, packaging materials chain, financial inputs). This elaborate chart is called Value Network.



## Food value chains:

A CRUCIAL TOOL FOR LOCAL FOODSHEDS  
AND A FAIR TRADE STATE

Do-able dreams depend on the practicalities of how food is grown, processed, distributed, sold, financed and eaten. Dreaming New Mexico found that drawing a value chain (sometimes called a food chain) helped envision what could be optimized or what acts as barriers to the success of the local foodshed economy. Value chains are most informative for a single crop or meat.

The value chain is a kind of flow chart that tracks food from seed/birth to eating. It’s a “value” chain because the goal is not the lowest price or fastest convenience but the most embedded value for the food we eat. (The low price/efficiency chain is usually known as a “supply chain.”) That value may include nutrition per dollar; climate change value per dollar; non-monetary celebratory values in ceremonies and food events; or the added value of more revenues circulating in the local community. Above, we “cartoon” the value chain for a typical food. The farmers, brokers,

buyers, movers, processors, manufacturers, wholesalers and retailers can all reduce costs and improve quality at their respective steps of the value chain. The eaters can all make purchasing decisions that reverberate up the value chain right to the farm or ranch. A value chain can make it easier to spot imports (materials, fertilizers, energy, food, livestock) that might have local substitutes. It also portrays all the transport steps that may need attention.

Every step in the value chain has strong influences from government (payments, taxes, extension services, environmental/labor and free trade rules), business practices (capital investment, debt, foreign investment, interest on loans), and non-government organizations (grants, food charity work, coop memberships, commodity/irrigation associations). There are too many interactions to depict here. The very complex inputs of government, business/finance and NGOs should be always kept in mind.

local ownerships; and increasing support of local food-security and health-care nonprofits.

- Local food can be eco-friendly food (page 59) both on the farm and during processing and may nurture more green jobs.

**DREAM** A foodshed economics based on social equity, a healthier environment, community wealth and financial success.

Crop choices in New Mexico are not heavily burdened from subsidies to raise cotton, corn and soybeans. Diverse uses of farmland remain economically attractive. Nevertheless, of the 20,000 farms and ranches, only about 8% make direct sales to local agro-regional buyers of their fruits, vegetables, grains, nuts, meats and prepared foods. New Mexicans currently spend less than one percent of all cash receipts for food on local food. More than 99% of cash spent on food is spent on imported food and food products, and most of the food produced in New Mexico is exported. The Climate Change Advisory Group estimated that only 3% of food grown, meat raised and local food products like milk and salsa (by weight and volume, not cash) was consumed locally.

## LOCAL FOODSHED DREAMS

There are two “tools” that help localize today’s global, mass-market food economy. The first provides citizens with a reasonable sense of trust and geography: the **foodshed**. The second provides transparency, clarifying how the food gets from farm to home plate: the **value chain**. (See map and box for explanations).

Every New Mexico agro-ecoregion loses enormous potential wealth — spending billions on imported farm inputs and imported food purchases. Even the farms in the wealthiest agro-ecoregions (the High Plains and Arid Lowlands) require so many industrial inputs (pesticides, fuels, fertilizers) that a majority of farms experiences net losses each year. From a foodshed perspective, these farm losses are somewhat mitigated by gains from farm-related income as well as from other segments of the value chain: earnings to processors, brokers, distributors, wholesalers and retailers. Nevertheless, New Mexicans spend over \$4 billion each year on imported food and farmer/ranchers spend over 1.3 billion on inputs. The combined losses from imported farm inputs and imported food are enormous.

We set two attainable dreams — one for the State and one for agro-ecoregions — recognizing that the future points to many paths for both the mass market/export (pages 38) and the local economies. The central challenge to localizing the food systems is scaling up the value chain: transforming tiny niche marketing into a mainstream food economy.

**DREAM** By 2030, 25% of all cash receipts for food is spent on local foods and their value chains. And,



direct farm/ranch sales in each agro-ecoregion are 15% of total gate sales.

Michael Shuman proposed an optimistic economic model to Dreaming New Mexico. If 25% of the food (as measured by cash receipts) were grown, processed and consumed within State, then the model predicts: \$1.4 billion in additional State output; \$346 million in additional earnings; \$44 million in new business taxes; and more than 10,000 new jobs. At a growth rate of 2% per year, this dream could be attained by 2030. The model indicates that 17% would come from forage and crop farms; 18% from fish, livestock and game; and 65% from food-manufacturing, distribution, retail and restaurants.

To jump start local foodshed economics, Ken Meter provided Dreaming New Mexico with data on the more conservative possibility of an increase to 15% of all cash receipts coming from agro-ecoregional crop/livestock farm gate sales and supplying local value chains. 15% sales by 2025 (2% increase per year) increased farm earnings by over \$320 million per year, varying widely by agro-ecoregion (see web site for many more details).

## RECONNECTING THE MIDDLE: FOODSHED VALUE CHAINS

**DREAM** Internalize as many inputs and value-chain steps for each crop or meat into the local foodshed. Keep energy and materials inputs as well as foodshed participants as local as possible.

TLC Baguettes, for instance, bakes breads in Albuquerque with northern New Mexican wheat, milled at Jose Cordova's mill in Valencia County. The packaging and labels are, in part, produced within New Mexico. Many groups work to maximize farm-to-table cuisine with ingredients only grown within the local foodshed. New Mexico has 50 farmers markets with over 25,700 customers and about 15 Community Supported Agriculture locations. The Farm-to-School project collects fruits and vegetables from ten farms and supplies eight public school districts (2009). There are Farm-to-Chef/Restaurant value chains, and La Montanita food co-op helps stock "local food" shelves in major retail groceries.

**DREAM** Within each foodshed, each step of the value chain is locally owned (See Ownership Box).

**DREAM** Value-added products include as many local ingredients as possible, processed locally.

Of the approximately 4,350 food-related New Mexico firms, about 150 provide value-added food products (food manufacturers). This does not include "non-commercial" food processors for farmers markets, Internet and direct sales. Food manufacturers with ten or more value-adding establishments include: bakeries and tortilla makers, wineries, fruit and vegetable

canning operations, drying and pickling facilities, and animal food manufacturing (see web site for complete list). Future opportunities appear enormous.

**DREAM** New Mexico food businesses cluster to create new markets for value-added products.

There is minimal multi-crop planning for new value-added products to increase local wealth. New Mexico salsa, for instance, requires a cluster of local onion, chile, herb and tomato growers and processors. Dehydrated onions could use chile dehydrators early in the season and expand their product line without new capital investments.

**DREAM** Build and install the physical components of a local value-chain infrastructure.

For the local economy to function efficiently, the appropriate equipment and facilities need to be capitalized. The apple growers in Velarde, for instance, had trouble selling to local schools because State rules limited the size and dictated the condition of the apples school kids can eat. The State helped Velarde apple growers buy an apple polisher, sorter and packer, overcoming the value-chain barrier. Similarly, Mobile Mantanza and others are working to re-construct the local beef business with mobile slaughter vehicles while the Taos County Economic Development Center is funding a stationary slaughter/packing facility. Many vegetable farmers need facilities to fresh-cut, chop, freeze, dehydrate and prepare ready-to-eat products.

One of the biggest difficulties in creating new value chains is distribution. It is costly to aggregate many small volumes of crops from many small farmers and then distribute a consistent food product to groceries. The La Montanita Trade Co-op has begun self-serve, refrigerated drop-offs to make aggregation easier and to save transport time and costs for truckers and farmers. A futuristic dream attaches a food car to the Rail Runner to increase the volume of local foods efficiently transported. NMSU students are designing a Harvest Assistance Vehicle to reduce costs of sorting, cleaning and packing at the farm. Commercial chile farms need a green chile harvester to replace a shortage of labor. This short report cannot portray all the needs of each specific crop or meat that would remove infrastructure barriers to localization. It is a key research project.

**DREAM** Reconfigure the value chain for more efficiency and recycling.

No overarching report on meat and crop value-chain efficiencies exists. Organic peanut growers can sell remaining forage to organic dairies. Wastes such as dried whey sludge, wheat bran, and blood, feather, meat, cottonseed,

PHOTO: SETH ROFFMAN



Local food revitalizes local pride, cuisines, iconic crops, celebrations. The food is fresher, tastier and can be eco-friendly.

The local food economy is more accurately a “locale-appropriate” economy



MAP: EDITE CATES

## Food centers

La Montanita Co-op Foodshed routes (yellow lines). The Red Arrows show pick-ups and the Purple Arrows show delivery points. The map shows how a foodshed largely follows major trucking routes (except for Silver City) rather than agro-ecoregions or circles from a hub. The dream is to “spider” the routes to smaller and smaller delivery and pick-up points and remain economically profitable.

**DREAM** Food Centers in each agro-ecoregion — a hub with docking areas, cold and dry storage, freezers, a retail food and farm supply store, a restaurant, education garden, an area to drop off greens for composting, and more.

alfalfa and canola meals can be sold as fertilizers. New Mexico small farmers tend to be less efficient in water use than large, commercial farmers. Large farmers tend to over-use fertilizers. Vegetables left after harvest waste in fields, but could become a greater part of food bank procurement. Pruning from nut and fruit trees is often burned in fields, but could become part of compost, presto-log or landscape woodchip markets. Among food manufacturers, bagged salads and pre-cut fresh fruits are in high demand. However, waste and packaging are major concerns. Distributional inefficiencies include empty-truck returns, inappropriately sized vehicles for transport, mileage routing, refrigeration, packaging, and more. Finally, restaurants and home eaters waste 10-15% of their food and urban recyclers rarely pick up organic wastes.

**DREAM** University extension, nonprofits and concerned businesses educate the public on value chains, the need for food production transparency and clear product differentiation based on embedded values as well as price.

**DREAM** Local foodshed and eventually all imported foods are bar-coded with their value-chain history.

A major advantage to the local economy comes from the values embedded in both producing and distributing local foods. Transparency on labels gives consumers the basis for honest price differentiation and health/ecological truths that can level the playing field with imported and mass-marketed products. The consumer can balance “value” vs. price, especially for meat and dairy products. When combined with food education by schools, media, NGOs and private food businesses, the market shifts.

## LOCAL ECONOMIC CHALLENGES

The goal is 25% (not 50% or 100%) because there are limits and barriers with any local food economy. Certain desired foods can never be New Mexico local (rice, chocolate, coffee, green/black teas, salmon). The local food economy is more accurately a “locale-appropriate economy.” In addition, certain foods are seasonal, and many citizens, desiring “fresh” vegetables and fruits, prefer to purchase imports rather than eat local canned, frozen, dried or stored foods. For many citizens, lower prices and convenience trump “values” such as local food. Others prefer and can afford specific imports such as pricier French wine vs. local wine. Further, local food is not always healthy, nutritious food or eco-friendly. A factory farm raising poultry might be local, but

some citizens do not want to buy chicken raised in tight caging with chemical stimulants.

There are practical challenges as well. There may not be enough arable and irrigable land to expand specific crop production. It may be too expensive and non-competitive to re-organize a farmer’s crop portfolio. The size of the New Mexico market may be too small (e.g. organic dairy) for required infrastructure investment.

As niche markets show themselves to be profitable, the larger chains and superstores start selling the near equivalent product at cheaper prices from non-local sources. Niche products are inherently unstable. Many of our local foodsheds also include Mexico, and the organization of bi-national local food economics is rife with difficulties.

## CASH AND LOCAL FOODSHEDS

Access to cash encourages or discourages participation in the local food economy. Cashflows and new capital come from government payments, nonprofit initiatives, and private sector loans and investments. These three sources of cash can work alone or in partnership to encourage a local economy. They can also work against each other or run parallel paths (help local food economics without any significant harm to the mass-market product). How much any investor, lender or donor wants to participate in the local value chain largely depends on their cashflow, profit margin and rate-of-return expectations as well as their moral concerns for local community life and the planet.

**DREAM** New sources of capital to scale up and re-configure the local food economy from sympathetic financiers and funders.

**DREAM** Government, nonprofit and private sector players scale and custom-design their financial instruments and services (loans, investments, government payments, taxes, grants, fees, insurance) to the local foodshed and mid-size markets.

A local food value chain requires *matching supply with demand* for small to mid-size markets. In turn, this requires monitoring the market, gathering and dispersing market information, and predicting where the local value chain can substitute for a national or world product.

New Mexico is lucky to have La Montanita Co-op with 25 years’ experience organizing foodshed value chains — from purchasing and aggregating from dispersed farmers, to distribution and capacity building. The Co-op handles at least 1,000 local products year-round with others on a seasonal basis. La Montanita sells \$28

>>



# Local ownership

**DREAM** *Within the New Mexico foodshed and along New Mexico value chains, local ownership and local legal control of as many businesses and operations as possible.*

The reasons are simple:

- Locally owned businesses contribute two to four times more income, wealth, jobs and tax payments to the local economy.
- Even though a majority of sole proprietorships fails within any three-year period, locally owned businesses are less likely to re-locate. Family-owned farms will try harder to remain in their foodshed rather than move to another nation with cheaper labor.
- Many (but not all) local businesses are more responsive than absentee-owned enterprises to “shame poli-

tics.” They want to be seen as good citizens and neighbors, and will more often work with communities to raise worker standards, find their place in smart growth planning, meet higher health and environmental standards and help local activities with philanthropic contributions.

Local ownership means more than 50% owned by citizens residing in the immediate geographic community. The owners can be individuals, families, shareholders, partners, proprietors or cooperative members. Owners also can be local institutions such as other businesses, banks, investment funds, churches or charities. In Native American communities, the governing agency is the tribal/Pueblo council with complex kin-related rules of ownership. Some “local” ownerships can be held by a public agency such as the City of Albuquerque or the BLM or Forest Service. By Western democratic rules, “local” means a

public agency does not have the controlling interest.

When owners live no farther than three or four hours’ drive from the operations or company, they probably have a more active relationship to their investment. They are likely to know the operators and managers, inspect the land or company, and take more personal responsibility for its success and failure.

Equally important, a business must place most of the legal rights and responsibilities of running the farm/ranch or company in local hands. The business can be a franchise operation as long as the franchisee has the ability to shape the business. A good test of a locally controlled franchise is whether the operator is permitted to source foodstuffs locally. A local business can also own many steps in the foodshed’s value chain as long as the owners of the parent company all live close to all the links in the chain.

The only ownership form

that is inherently not local is a publicly traded corporation. A company that “goes public” — where millions of tiny shares are dispersed globally and can move thousands of miles instantly at the click of mouse — is the antithesis of local ownership.

On the other hand, no one ownership form is absolutely superior to another in financial, environmental or social performance. More important are its critical choices on food products, scale, markets and the “how” of managing its operation. **All local enterprises — big, mid-size, or small; sole proprietorship, coops or corporate; single or net-worked — stand or fall on the underlying philosophy of their founders and their hard-nosed calculation about where sufficient initial and re-investment capital can come from.** To survive and contribute to local prosperity requires achieving a positive cash flow and a continual discussion of ethical choices in purchases, prices, practices and sales.

## Proprietorships:

Sole proprietorships/partnerships are for-profit enterprises governed by people who actually run the business. They are the most basic form of local enterprise. Typically one person, a family, several friends or a small number of individuals are the owners. This business form is the simplest for starting, reporting and filing taxes. Most New Mexico farms are proprietorships.

## Limited Liability Companies:

As farmers and ranchers become more successful, they seek more formal legal structures. Many become corporations to legally shield themselves and outside investors from liability. The vast majority is privately held by a small number of shareholders who elect an overseeing board. Blends of partnerships and corporations can be found in limited liability corporations

(LLCs), which are popular among ranching families, and limited liability partnerships (LLPs).

## Nonprofits:

Technically, nonprofits are owned by no one, and membership nonprofits must be careful not to funnel funds to their members. Instead, a “local nonprofit” can be defined by those who control it. Growing numbers of agricultural and food-related nonprofits have launched “social enterprises” such as urban gardens for school kids and food banks for the food insecure.

## Public-Private Enterprises:

Governments can launch enterprises that they own or co-own in public-private partnerships. If the governmental entity is local, the enterprise can be considered locally owned. For instance, the City of Albuquerque owns farms

that are leased to for-profit farmers. Many tribal farms are government-private relationships. But, most public-private partnerships with ranches and farmers rely on grants, subsidies, loans, loan guarantees, memoranda of understanding and regulation rather than direct enterprise participation.

## Cooperatives:

Cooperatives are essentially voluntary associations that engage in business for the benefit of their members. The members can be consumers, workers, businesses (“producer coops”) or a combination of all three. Unlike for-profits, where control is usually based on the principle of “one-dollar/one-vote,” cooperatives are based on the principle of “one-member/one-vote.” Surplus revenue is distributed to members as “patronage” payments based on

how actively each member uses the cooperative business.

Tricky questions arise with large producer cooperatives that highlight the importance of the underlying philosophy of the founders. The dairy coops of the High Plains are factory farms that pool their milk mainly for export. They follow federal standards but no better. Organic Valley is a dairy coop that sets high production standards for each coop member and insists that a percentage of local raw and value-added products is marketed within the local foodshed. Both the High Plains and Organic Valley coops are nationally networked. Organic Valley is considered local because of its large percentage of local sales requirements and organic production standards.

*Based on Community Food Enterprise (Wallace Center and BALLE)*



## Institutions and local food

Ten percent or more of all food consumption in New Mexico is by institutions. In total, about one in ten dollars spent on food in the State is an institutional purchase. School purchases constitute 3.6% of total State food consumption, and all other institutions about 6.7%. The largest institutional purchasers, other than schools, are nursing homes, prisons and daycare facilities. Other institutions include: orphanages, mental institutions, colleges and universities, government cafeterias, corporate cafeterias and hospitals. A few potentially large purchasers are not fully represented in these calculations: airlines, military cafeterias and commissaries, national park restaurants, hospitals, tribal casino restaurants and non-profits (especially church and food gap groups helping the food insecure, page 52).

### State and federal local food purchases could trigger the transformation of niche to mainstream.

Already \$1.2 million in government food purchases helps supply schools with local food. A concerted State effort could significantly shift about five percent of all food purchasing. The State can also use its regulatory powers to nudge other institutions in the same direction. A great number of support services would emerge with cascading benefits to scaling up a foodshed economy. Local distributors would

expand. Statewide distributors like SYSCO would invest more in intrastate trucking. Food processors would expand operations in-State to take advantage of the new demand. Farmers would begin shifting crop types to meet local sales.

**DREAM** *State and federal facilities agree to purchase a substantial specific and increasing percentage of locally produced and processed foods over the next 20 years.*

To initiate the new value-chain, special contracts need to give preference to local foods. In some instances, these special contracts or bids can favor local food distributors because of nutrition needs (e.g. schools), energy or employment policies. At times, they may conflict with national and international trade rules (page 38) and challenge State policy and law. Interstate prime vendors may object to preferential contracts going to local purchasers.

**DREAM** *The State, federal and non-profit purchasers agree to special pricing for food purchased from local producers and eaten within State. Usually, local purchasers can charge about five to ten percent more than other bidders and be considered equal bidders.*

Barriers to this dream include matching supply with demand, consistent and reliable delivery, conflicts with existing prime vendors, having one supplier with a variety of foods, and the additional barrier of State and federal politics and budgets.

million of products in a year to its nearly 16,000 members, about 20% locally produced, which is close to New Mexico's 2020 goal.

At the moment, because only exports are recorded, local foodshed players cannot easily and continually monitor markets and find price-competitive crops, meats and value-added products that can substitute for imports.

**DREAM** *Growers, processors and retailers pursue promotions that clearly contrast local foods with mass-market imports.*

To begin scaling up, La Montanita and other distributors have negotiated "local foods shelf space" in larger groceries. To create a new product line, local certified organic or the Beneficial Farms Eco Label of the Co-op guarantee sustainably produced and locally grown food and food products.

**DREAM** *Local food-related organizations collaborate, develop or change existing agricultural promotion, business planning and research to further the local foodshed food economy.*

There are many organizations tracking and promoting their sector's products from the Beef Check-off program to the Chile Institute to university and government researchers in the NMDA. These programs focus on the mass market and export value chain (with significant exceptions). There is a need to reform these programs to address the local food track and promote items like local grassfed beef, organic and artisanal chile, local organic milk, and organic pecans (see next section). Or, there is need to create and fund parallel organizations, which focus on the local, sustainable agriculture track.

## AN INFRASTRUCTURE OF PERSONAL RELATIONS

The second aspect of financing a local food economy is *building relationships among suppliers, buyers and sellers at every step of the value chain*. National large-volume "export" buyers increasingly request 12-month contracts, pressuring suppliers to obtain products from different regions in the U.S. or even worldwide. When there are only a few buyers, they can dictate prices to producers. Farmers and ranchers become price takers, not price makers. Local supplier/buyer relationships rest on a different moral philosophy of benefits.

**DREAM** *A buyers' network based on fair (negotiated) pricing and price security for local growers, sorters and packagers; reliable deliveries; year-round supply contracts; a wide assortment of foods and deliveries custom-designed to purchasers' food*



needs. Buyers ensure reliability, consistency and quality (e.g. food safety and post-harvest handling requirements demanded by wholesale markets).

There are many choices in suppliers: produce distributors, growers' collaboratives and coop distributors, direct from growers, and campus and tribal farms. La Montanita operates a Cooperative Distribution Center (CDC). Farmers and producers throughout La Montanita's foodshed can either sell their products direct to their four co-op retail locations or utilize the CDC warehouse to expand their markets and save on gas and transport costs. The CDC offers local producers post-harvest cooler/freezer space and dry storage. CDC picks up food from over 700 regional producers, and delivers to over 30 stores, restaurants and institutions. Its distribution center handles \$2.5 million of food annually (64% local). It also "closes the loop" by bringing needed supplies to the farm and drop-off depots during product pick-up.

**DREAM** *Expand La Montanita and affiliated coops with agro-ecoregional food centers. Provide consistent food quality and volumes to retail customers. Compete or form alliances with prime vendors for food deliveries.*

Coops and CSAs have greater logistics costs compared with national producers. To haul

100 pounds one mile, the vehicles typically used by farmers cost from 9 to 15 times the amount charged by a fully loaded, semi-truck-trailer combination with driver. Local business may need to work with national distributors and prime vendors like SYSCO and the Department of Defense contractors so that purchasers do not have to contract with too many suppliers.

**DREAM** *State and federal option and futures contracts accelerate institutional purchases of local foods (Box, page 16).*

**DREAM** *Field workers along the value chain have safe, healthy working conditions with living wages/take-home pay.*

Farm and ranch work is hard and underpaid. Factory farm dairy or stoop-labor have high injury rates. In addition, it is standard practice to deduct transportation and workday food costs from fieldworker wages. In spite of sub-living wages and minimal health, safety and living conditions, New Mexico is losing market share for labor-intensive crops like chile to other countries with even cheaper labor and worse working conditions. The labor situation has also become mired in immigration politics. Mexican workers increasingly look for better paying, non-farm jobs. An analysis of tenant farming and value-chain-related work was beyond the scope of this report. >>

Transparency on labels gives consumers the basis for honest price differentiation and health/ecological truths that can level the playing field.



PHOTO: EDITE CATES

# TOWARDS A PROSPEROUS LOCAL ECONOMY



When a farmer pays interest to a neighbor or to a local bank, that money has a chance to cycle back through the local economy.

## FINANCIAL TOOLS

Farmers and ranchers have dreams no different from other hard-working Americans. They desire a secure income with a fair profit. They want to minimize risks to their livelihood so they can stay in business. For farming, this means insurance and federal/state compensation when weather harms, when water cutbacks are ordered by the State Engineer and when farm gate prices plummet or become too erratic. Their dream includes health insurance for their family, workers insurance, equity in land they rent or lease, risk sharing with distributors, and access to sympathetic financial agencies to help capitalize land and equipment.

The third task for scaling up local foodsheds is *harmonizing financial incentives and disincentives* to benefit the local food economy.

**DREAM** Banks, especially locally owned banks and credit unions, “green line” their investments, give loans to local enterprises, and cycle investment and loan interest payments back to local enterprises.

When a farmer pays interest to a neighbor or to a local bank, that money has a chance to cycle back through the local economy. When a farmer pays interest to a federal lender or to a larger commercial bank, that money is just as likely to end up helping a shopping center in Paris as reinvested back home. Interest payments are a primary way money is removed from or returned to farm communities.

**DREAM** Insurance contracts and certification costs are scaled to the size of the local market.

A major obstacle to creating and linking local growing to local processing and markets is insurance liability requirements. They have been based on globalized mass-market food manufacturing and the heightened risk of food-borne illness that comes with extensive trade. In addition, costs for both health and organic certifications greatly burden small, low-resource, start-up farms and ranches as well as those transitioning to a more sustainable agriculture. Health certificates for sorters, graders, packagers and processors commonly have rules that apply to interstate and international export, but are largely unnecessary for local value chains. Insurance companies can be an important driving force in transitioning to a local foodshed economy.

**DREAM** The new food system provides loans and mobilizes investments to increase the reliability of the local foodshed value chain.

Many farmers need to take out short-term loans to purchase seeds, fertilizers and water,

and then pay these loans back at harvest. Many growers, distributors and processors need longer-term loans to purchase new equipment. Typical, expensive equipment includes milking equipment, vehicles, processing buildings and small slaughter/packaging/ processing plants. The Old Windmill Dairy, for instance, received a loan from La Montanita Food Co-op to build “caves” to age their goat milk into Gouda and cheddar. Old Windmill paid back the loan with cheese sold at the Coop.

Knowing how to access State, federal, private and nonprofit capital is an essential task of the local foodshed economy. New capital can come from special government programs, social programs of nonprofits, coop members, banks and individuals. Ideally, a local-track incentive would use federal grants and loans to match local investments for business clusters that build a long-term, local food economy.

**DREAM** Revise local, State and federal tax rules to encourage a local food economy.

## VALUE CHAIN CAPACITY

**DREAM** Foodshed Assessments of value chains for specific crops and meats.

These food system assessments — done variously by sustainability departments at universities, crop and meat associations, nonprofits or government extension agencies — are crucial to making choices about import substitution, production potential, market size, and value-added products. They determine how big the foodshed is, which agroecoregions are required for the value chain, as well as the barriers to forming new relationships, navigating market power, and gaps in physical infrastructure.

**DREAM** The USDA and NMDA record food imports into states.

At the moment, because only exports are recorded, local foodshed players cannot easily and continually monitor markets and find price-competitive crops, meats and value-added products that can substitute for imports.

**DREAM** Increase financial literacy, marketing skills and trans-disciplinary skill transfers by seminars, conferences, workshops, schools and agency education.

The difference between success and failure of local enterprises can depend on good record-keeping, computer literacy and cash flow management. Local foodsheds have special needs, especially accounting for logistics costs, operating expenses, inventory/debt, and interest obligations that require assistance.



# TOWARDS A LOCAL ECONOMY OF EDIBLE CROPS

## Local foodsheds local edibles

SUCCESSFUL EDIBLE CROP FARMERS have very intimate, very local, crop-specific knowledge. Knowing how to grow and sell Arid Lowland chiles is not really a help to the grower of Colorado Plateau potatoes. Models and even regional generalities simply do not apply. A major lesson of this DNM project is that *local foodshed and value-chains are very crop-specific*.

New Mexico has over 5,500 farms that grow directly about 50 edible crops (and endless varieties). Santa Cruz Farms in Española, for instance, grows 76 crop varieties of 3.5 acres. Chispas Farms grows 50 varieties of garlic for sale and over 300 to save the cultivars! The number of both truck market farms and crop varieties planted has continued to grow over the last decade.

Top commercial crops for the mass market are: pecans, onions, greenhouse nursery crops, chile (see Boxes) and winter wheat (286,000 acres). Peanuts (about 10,000 acres), potatoes (about 5,500 acres), sweet corn and dry beans (about 7,500 acres) are important in specific agro-ecoregions. There are many farms growing apples (over 900 totaling over 2,000 acres), and over 1,000 acres each of grapes, pistachios, pumpkins, rye and watermelons. Most of the top crops are exported.

Given this mass-market production and local market diversity, New Mexico could eat well (in season) perhaps 50% or more of its edibles from foodshed farms. The exact amount will depend on crop-specific assessments to see what import crops can be most easily substituted and the willingness of farmers to grow the crops.

**DREAM** Plant and harvest crops with a high cash value that are nutritionally superior, drought-tolerant, pathogen-resistant, adapted to agro-ecoregions and their

*microclimates, integrated into a value-added food system and that substitute for an import.*

The major commercial crop producers (pecans, wheat, onions, chiles, some greenhouse vegetables) have different needs from local market growers of vegetables, fruits and grains. Large commercial growers need to find ways to team up with local citizen-consumers for greater local sales, value-added employment and eco-friendly practices. They need incentives to sell a portion of their crop locally rather than for export.

Many farmers who have spent their lifetimes growing edible crops cannot easily shift to new crops or to organic and low-input farming for local markets. The typical New Mexico farmer is nearly 60 years old and may not be eager to redesign his or her business. Nevertheless, with good farmland decreasing, an unknown number of these farms and farmers will need to change crops to fulfill the dream. In addition, new and young farmers are inexperienced (see below). They are usually more interested in participating in the local foodshed economy.

How can government, private investors and nonprofits help increase farm gate profits and direct edible crops into local markets? A good example was the State Memorial to bring fresh, local foods to schools. The Farm to School program requires farmers to carry a one million dollar insurance policy, to harvest less than 24 hours before delivery, package in three-pound increments, and label each box with the farmer's name and the package's destination. Despite this extra insurance and work, this exclusive market segment stabilizes and reduces financial risk to the crop farmer, who knows in advance how much will be bought and at what price. Institutional markets help farmers switch to a new agrarian economy. >>

In season,  
New Mexican farms  
could supply 50%  
of all edible crops  
to its citizens.

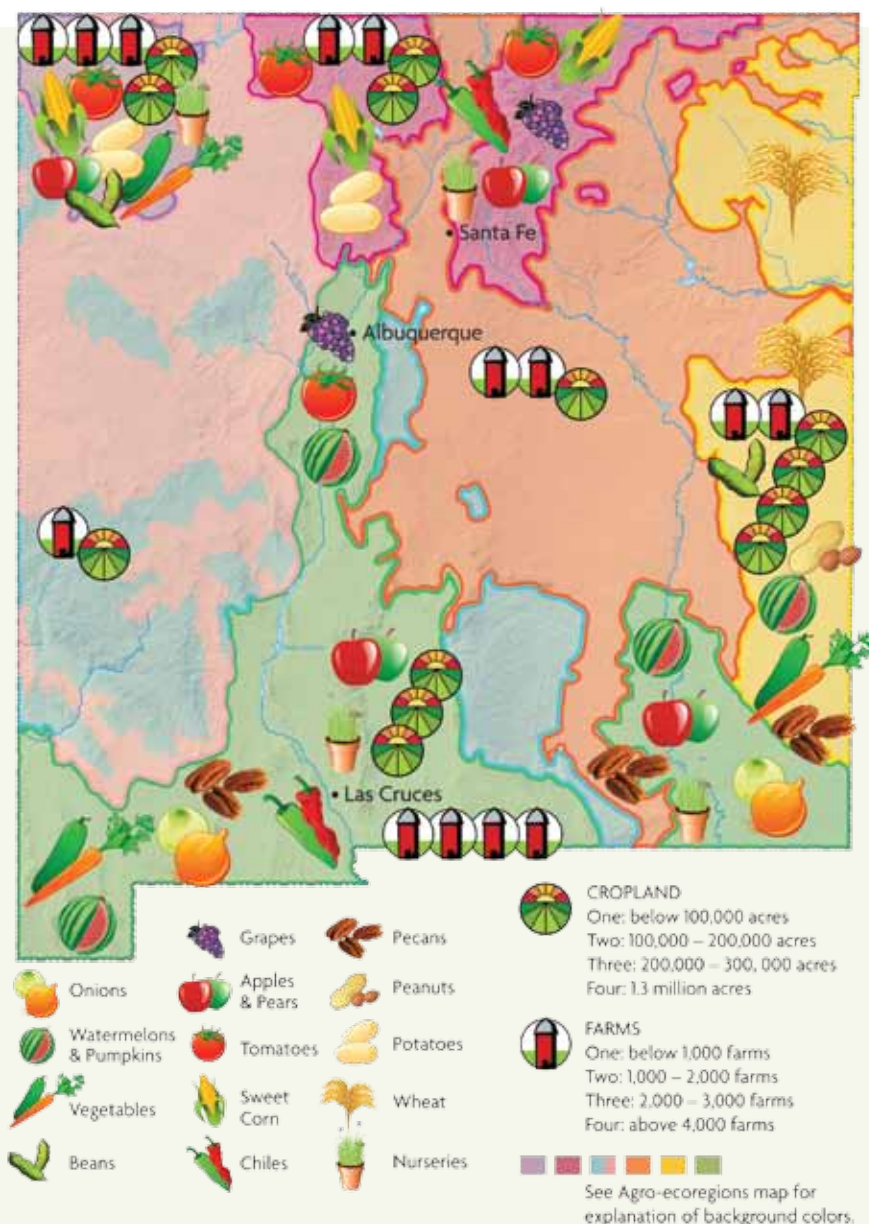




# Edible crop farms and agro-ecoregions

**THE SOUTHERN ROCKIES**, close to major urban areas and with its Indo-Hispanic traditions, has a strong seasonal, market farm agriculture with 750 crop farms covering 3,600 acres. Wheat (13 farms/450 acres) includes an organic wheat coop that supplies a bakery and coop. There are 79 nurseries, about 40 dry bean growers, more than 40 potato growers, perhaps 200 fruit/nut orchard growers (apples, cherries, pears, peaches, apricots, grapes), as well as 344 specialty crop farms and about 40 berry growers (both the most of any agro-ecoregion). Farmers markets and CSAs abound, and Taos County Economic Development Corporation has developed the Taos Food center to help with processing edibles.

**THE ARID LOWLANDS** with its extended growing season and heavy irrigation supports the most crop farms (2,500) and the largest crop acreage (about 63,000 acres). Of this, about 1,960 farms and 41,000 acres are nut and fruit orchards. The remaining 22,000 acres grow other specialty crops on 325 farms: wheat for flour, dry beans, sweet potatoes, berries, potatoes, cabbage, lettuce, pumpkins, squash, tomatoes, watermelons and more. The Arid Lowlands ranks as one of the top three states in pecan production, ranks high in U.S. sweet onions and chiles (see Boxes). Otero County, at higher elevation, grows apricots, pistachios, peaches, pears and cherries. There are more nurseries (about 100) than any other region, and some are major floriculture exporters reliant on geothermal energy.



**THE HIGH PLAINS** with its flat landscape and close ties to the Midwest has more wheat farms (about 465) and more wheat acreage (about 286,000) than any other agro-ecoregion. Peanuts (about 29 farms and 7,900 acres) are the other major field crop, supplying over 90% of the nation's Valencia organic peanuts. Almost all the other crops are for livestock.

**THE COLORADO PLATEAU** supports the largest number of irrigated farms (about 950 on about 11,000 acres) growing specialty crops (e.g. cantaloupes, tomatoes) and additional farms growing wheat for flour, berries

and oats. It is the State leader in field crop potatoes (72 farms and over 200 acres) and dry beans (about 90 farms with undisclosed acreage). Traditional scattered "dryland" (non-irrigated) farming features the Three Sisters (beans, squash and corn) and low-density sheep grazing. The added production from traditional Navajo seasonal rainfall farming has been difficult to assess.

**THE CENTRAL PLAINS AND TRANSITION MOUNTAINS AND PLATEAUS** have the smallest number of farms for directly edible crops (below

200 each) and crop acreage (about 1,500 and 300 respectively) because of difficult locations, irrigation and unfavorable landscapes. Note: All acres underrepresented because of disclosure issues. See Agro-ecoregions and "The Fifty Top New Mexico Crops" on web site.

## CONNECTIONS

More on crops can be found under Saving Farms (page 56), Eco-friendly Agriculture (page 59), Healthy Foods (page 52), Climate Change (44), irrigation (page 50), urban gardens (back cover) and subsidies (page 63).

## < FARM CROPS

New Mexico has over 5,500 farms growing edible crops and the number is growing. Many are small (median size of 1–9 acres in Arid Lowlands and Colorado Plateau; 10–49 acres in the Rockies). Crop-land is smaller in Rockies because of terrain and short seasons. Largest in High Plains with flat terrain and summer rain. The number of farms is greatest along the Rio Grande. Nurseries are common where there is geothermal energy and seasonal-extension agriculture.



# TOWARDS A LOCAL ECONOMY OF EDIBLE CROPS

Specialty crops have never been treated equally with commodity crops such as corn, cotton and soy. Commodity crops receive all kinds of government payments that reduce financial risks and increase profit margins. The WTO has challenged many of these government payments as distortions of trade. Specialty crops have only recently been given financial aid somewhat similar to commodity crops. The best government program, "State Specialty Crop Competitiveness Grants," focuses on State, regional and local programs to enhance producers' ability to compete in the marketplace and provide consumers with safe, abundant food.

**DREAM** Specialty crops are given equal status with commodity crops.

The dream asks for legislative incentives for increased acreage for crops that can: substitute for imports (e.g. tomatoes, cabbage, cantaloupes, spinach); contribute to value-added industries (tomatoes for salsa); and help capitalize both off-season crops with greenhouses (e.g. tomatoes, lettuce, mushrooms) and the value chain infrastructure (refrigeration, sorting houses) needed to transition from mass to local marketing and from industrial to low-input or organic growing methods. For instance, a tax deduction for reducing food-miles and greenhouse gases would provide one incentive.

**DREAM** Finance infrastructure costs to scale up edible crop industries.

Scaling up and integrating the food chain requires outside investment capital. Sunland Peanuts, for instance, is the largest U.S. organic peanut processor. The Valencia peanuts grow best in a special High Plains soil. Sunland helped farmers transition to organic (did the paperwork), and integrated harvesting, aggregating, shelling and food manufacturing into a local cluster of enterprises. With a recent expansion rate topping 175%, the wastewater treatment facilities needed by Sunland to make value-added products like peanut butter proved inadequate.

The New Mexico Economic Development Department and City of Portales provided the funding for a sewer line extension. The gourmet peanut butter plant will employ 200.

Similarly, NMSU students have designed a Harvest Assistance Vehicle (HAV) that can be outfitted with crew and equipment to assist small growers at harvest time. The vehicle is powered by waste vegetable oil and uses solar thermal energy for sanitation. Onboard equipment for washing, packing, weighing and logging pick-ups and deliveries enables the crew to work with farm employees, compress harvest time and then deliver produce to market. Software systems coordinate growers and vendors. If viable, the research costs for the equipment will not cost small farmers who have traditionally found harvest time difficult.

**DREAM** Crop specialists for each agro-ecoregion.

To build a do-able dream requires new kinds of relationships as well as new engineering expertise, experimentation and physical infrastructures. Agro-ecoregional specialists, elder farmers, college-trained agronomists and teachers need to share food technology, cultivar and marketing knowledge.

**DREAM** A farmer-to-farmer program both in-state and between states.

Although the State has a good agriculture extension program to educate farmers about local food opportunities, most of its resources currently support export-oriented agriculture. Alcalde Science Center has been a crucial driving force for local agrifood economics, especially in the Southern Rockies. One member of Alcalde, Ron Walser, has supplied outside advice, especially on unfamiliar crops with commercial local and domestic market potential, such as Chinese medicinal herbs, jujube and pomegranates.

**DREAM** Establish an initiative to develop and disseminate science- and experience-based knowledge to address the needs of specialty crop producers focused on: improving nutrition, addressing



Farm workers, Tesuque Farms

The typical New Mexico farmer is nearly 60 years old and may not be eager to redesign his or her business.

PHOTOS THIS PAGE: SETH ROFFMAN



Hoop house in Dixon, New Mexico



# Greenhouse farming

Here is the state of indoor farming. Greenhouse and hoop-house agriculture ranks among New Mexico's top ten agriculture earners. About 15% is food-related (berries, vegetables, herbs, tomatoes, mushrooms, seeds) and 85% is floriculture (potted flowering and foliage, garden plant seedlings, bulbs, plugs, etc.). Greenhouse vegetables grow on 192,000 square feet. About 3.3 million square feet grow nursery stock (landscaping, forestry and nut/fruit trees) and floriculture. Hoop-house acreages are not known. Greenhouse farming clusters in the Colorado Plateau, Southern Rockies and Arid Lowlands. Ownership parallels outdoor farms with a mixture of small, family-run operations (2,500 to 10,000 square foot range) and a small number of large, multi-acre facilities (10 acres or more). The larger greenhouses often use geothermal heating.

**DREAM** Greenhouse and hoop-house food production extends seasons for foodshed crops with incentives to grow in or near urban areas and use geothermal resources.

**DREAM** Organic greenhouse vegetable production becomes a niche market for out-of-season produce, price premiums and a sustainable method of production.

Five greenhouse production methods are suitable for organic production: soil culture, bag culture, vertical towers, straw bale culture and shallow bed culture. Soil-based systems are readily adaptable to certified organic production, but special care must



be taken for soil-borne disease control. Soil-less systems from local materials include recycled glass beads (a New Mexico local product), sawdust and pine bark, rice hulls, and peanut hulls. They can replace commercial, imported rockwool and be adapted to organic culture. Heat can be provided by solar, compost, animal heat and geothermal.

**DREAM** On the city/county level, public officials work to combine local geothermal energy for town heating/cooling, energy production, tourism, gardening education and greenhouse production.

The greenhouse vegetable business is competitive. Competition stems from an established domestic industry as well as Dutch imports. In addition, field-grown Mexican produce frequently sells at half the price of greenhouse produce. Growers should gather all the economic data they can about the greenhouse vegetable business before building a greenhouse. The NMDA program (NEW MEXICO—Grown with Tradition®) has teamed up with about 40 nurseries and greenhouse growers to build a specialty market in native plants.

Greenhouses are also expensive to build and operate. A commercial greenhouse (30' x 100') with complete heating, cooling and ventilation systems will cost between \$10,000 and \$30,000. Low-cost greenhouses like hoop houses and attached solar greenhouses can be constructed for as little as \$500 to \$1,500.

specialty crop requirements, learning new crops, seasonal markets and price competition.

As discussed, a major driving force for change could be State buyers for schools and other institutions. As local markets become mid-size, buyers will need to follow the onion industry and prepare marketing orders that include specifying grades, size, quality or maturity; purchase price; establishing how much may be marketed during a set period; establishing methods of determining surpluses and their control and disposition; establishing a reserve product pool; inspecting the product; fixing the size, capacity, weight, dimensions or pack of the containers used in marketing; prohibiting unfair competition and unfair trade practices; and requiring processors to file their selling prices and not sell below prices filed.

**DREAM** Find sympathetic buyers for major food crops for foodshed markets and food manufacture.

## ORGANIC CROPS

Of the 166 New Mexico certified organic crops, 108 are for crops (including hay). Of the 195,551 acres that are certified organic, 40,917 are crops (including hay and the remainder for pasture). Organic foods sell for premium prices but can suffer from competitive prices from Mexican organic crops. There are also 15 registered producers (grossing less than \$5,000/year in organic sales) spread across the State. Registered producers are not inspected. They worry some organic farmers because the crops could harbor food-borne diseases that would hurt the whole profession and industry.

**DREAM** By 2050, certified organic acreage for edible crops is 70% of all cropland. Organic local farmers produce 50% of local, in-season vegetables, fruits, nuts and wheat.

The 70% dream was set in 2006 by the Climate Change Advisory group. This dream is part of the general transition to low-input farming with reduced water, petrochemical fertilizers and pesticides, more crop rotations and integrated pest management. Barriers include changing onions, pecan orchards and monoculture chiles.





# The state of chile peppers

PORTRAIT OF A CROP

Chile is the state's signature crop, an icon with a unique cuisine, 400 years of history, many stories and almost patriotic pride. New Mexico has two agro-ecoregions growing chiles. The Southern Rockies grows legacy landraces (Velarde, Chimayó, Dixon) for local niche market sales. The Arid Lowlands grows long (mild and hot) green chiles and jalapeño green peppers, as well as long (mild and hot) red, paprika and cayenne peppers. The south focuses on mass markets and domestic export. Buyers sell green chiles to supermarkets; paprika for spices and oleoresin food coloring; cayenne mash (for export to Louisiana) and cayenne powder; green long and jalapeño peppers for canned, frozen and bottled products, especially salsas; dry red chiles for spices, seasoning ingredients and the small agro-tourism and restaurant markets (4% of market) that purchase fresh green chiles for roadside roasting, local cuisine and red chile rstras. Both north and south chile farms are predominantly family-owned.

Chile was tenth biggest recipient of agricultural cash in 2007; sixth within the narrower group of edibles. At its height in the 1990s, about 400 chile farmers supplied two thirds of US chile. \$40 million went to producers and \$400 M to the complete food chain, supporting 5,000 full-time jobs and 10,000 part-time jobs. But now the chile indus-

try faces collapse. Some ag economists say collapse will occur within five years. Oleoresin factories have closed (one or two companies left), cash receipts plummeted from \$47 M (2005) to \$37 M (2006) to \$33 M (2007); and planted and harvested acreage fell from 35,000 acres (1992) to 14,000 (2006) to 11,000 (2007).

The decline began with NAFTA and WTO. The chile industry went global and other nations outcompeted New Mexico prices because of cheap labor and new lands, which rarely contain pests. Competitors have tripled dry chile product imports from China, India, Peru, Pakistan and others; and doubled imports of fresh and chilled green chile. To compete, New Mexico red chile farmers purchased harvesting machines for red chile. Now, nine workers do the job of 200. The harvester is not ideal and leaves 10 to 20 percent of the chiles in the field. Farmers offer barely living wages for on-your-knees work (called *La Pepena*) to gather fallen chiles. The joke is: Even undocumented workers look elsewhere. The workforce has shrunk by over 55% since the Golden Age of the early 1990s. The green chile sector does not have a mechanical harvester, and some producers hope NMSU will breed a genetically engineered green chile that can remain intact during machine harvest. New Mexico chile processors

now rely on cheaper imported Mexican green chiles, especially in poor harvest years.

Drought, diseases such as bacterial leafspot and electricity costs to pump groundwater and run dehydrators have also increased costs of production. Urbanization has grabbed farmland. The New Mexico Chile Association and Chile Pepper Institute have gone into high gear: How to increase dollar value at the farm gate and reduce the cost of production to compete with imports?

**DREAM** Create an organic chile sector on joint ownership or city-owned (as in Albuquerque) lands with a value chain that can maintain and increase workforce, obtain higher prices and sustain New Mexico's signature crop.

This re-organization is urgent and should be the highest priority project for university, government agencies and chile organizations.

**DREAM** Reduce the cost of electricity and water by drip irrigation, now supported by a 50% State subsidy.

**DREAM** To help the Arid Lowland chile growers, NMSU and private sector design a machine-friendly green chile as well better harvesting and cleaning machinery.

**DREAM** Respect wishes of northern counties to create non-GMO zones that will protect landrace (local) chile cultivars from hybridization with genetically engineered varieties.

Genetically engineered chiles directly conflict with Northern New Mexico's desire to keep legacy landraces genetically clear. A GMO chile, from the north's view, is a nightmare. In the dream, the south uses other genetic techniques, not genetic engineering.

**DREAM** Extend green chile pepper season with hoop-houses and greenhouses. Start an ornamental chile nursery product.

**DREAM** Integrate agro-regional strengths with west Texas and northern Mexico. Take the management of salsa production from the tomato industry, and develop an organic New Mexico-branded salsa industry with New Mexico onion, chile, herbs and tomato production (about 75% of green chile goes to salsa).

**DREAM** PR for a New Mexican brand like Louisiana Hot Sauce and advertising for a more flavorful, "better" (especially local and organic) New Mexico chile than imports. Clear up brand protection for names, such as Hatch and Chimayó Chile and require origin labeling for all products. Develop a higher premium price for local chile products and local foodshed consumer loyalty.

There is conflict and hesitancy among commercial chile farmers about organic chile, origin labeling, labor, genetically modified chiles, machine-harvesting, joining a collaborative salsa project and diversifying. The dream stumbles on farmer resistance to industry changes.



# Commercial sweet onions

PORTRAIT OF A CROP



This export-oriented, fossil fuel-intensive industry is doing just fine by conventional market criteria. Sweet onions have been among New Mexico's top cash-earning crops, usually second to pecans. Cash receipts have increased to the highest ever (\$63 million in 2007). In the mid-summer, New Mexico provides half of all the sweet fresh onions eaten in the U.S. — despite the fuel costs of transporting such a heavy and bulky food from such an isolated state. Onions are both a seasonal local crop and national crop in late spring, summer and early fall. NMSU has played a crucial role developing onion varieties that are male-sterile hybrids (rather than open-pollinated) with high sweetness and pink root rot resistance, and that address issues like single-centered onions for the processing industry as well as a firm onion that can be mechanically harvested.

The onion industry covers 6,000-8,000 acres (120 growers in 2002) centered in the Arid Lowlands agroecoregion because of its great light intensity, high number of sunny days, low humidity, sandy soils and access to still cheap irrigation. The harvest season permits use of equipment and facilities over a long period of time, reducing their unit cost. Because any single onion variety has a harvest window of 7 to 10 days, multiple varieties with

different maturity dates must be grown. New Mexico grows three separate onion crops: fall-seeded, transplanted and spring-seeded.

On the farm, the major issues are bolting of fall-seeded onions and summer high temperatures that sometimes cause heat damage to the bulbs; diseases in wet summers; Fusarium basal rot; percentage of marketable yield; average bulb weight, bulb firmness and single-centeredness. Seed, fertilizer and chemicals are major costs. Canal water, labor and management are also significant. Climate change with hotter summers, erratic winters and more intense storms will impact the industry (page 44).

**DREAM** *Develop high-yielding, high-quality, well adapted, bolt-resistant, disease-resistant onion varieties with bulb firmness and varying maturity dates to extend the season and scale of colors.*

Bulb firmness is necessary because hand harvesting is labor-intensive and accounts for two-thirds of the cost of producing a sack of onions. The alternative — mechanical harvesting — can result in damage, quality reduction, yield reduction and additional grading and processing costs.

New Mexico commercial onions are yellow non-storage types that go directly

to market. The major issue is market competition: July onions compete against Georgia Vidalia, West Texas Grano and Washington Walla Walla. The vagaries of weather and large numbers of onion growers tend to lead to volatile prices. The cost of fuel and transport can also hurt yearly sales.

**DREAM** *A greatly expanded storage onion industry for the winter months, made secure with futures contracts with the State to purchase onions for schools and other state institutions. Additional contracts with casinos and other restaurants.*

New Mexico could grow some onions that would store 4 months. With proper storage conditions, New Mexico could achieve 6-8 months of storage. The months of March and April would be the most difficult to obtain local onions. Storage onion cultivation is not popular in New Mexico. Onions can be purchased from the Pacific Northwest cheaper than they can be produced here. If they are grown here, storage onions do better in the northern part of the state (Colorado Plateau and Southern Rockies) with cooler temperatures.

**DREAM** *Extend the season through new cultivars, an expanded northern industry in storage onions, and cold storage (short term) or controlled atmosphere (longer term).*

**DREAM** *An expanded value-added onion industry. Use the*

*chile industry dehydrators to process some early season onions for seasonings and spice mixtures; establish close ties to the chile industry for New Mexican salsas; and perfect a single-center onion for the frozen onion-ring market.*

Onions are not easy to grow. They are difficult for mid-scale organic vegetable growers (25 acres). Large conventional onion growers have resisted converting even some of their land to organic production until the farming techniques and demand are secure. Many of the present producers are second- and third-generation onion growers. They have tended to integrate vertically: several growers harvest, grade and pack their own onions, capturing a greater fraction of the marketing income that in the past would accrue to shippers and brokers. They see no advantage to organic onions. Organic onions remain a niche market or import.

**DREAM** *Until the organic market is more secure, adopt drip irrigation as a replacement for furrow flood irrigation, and lower input farming with rotations and inter-cropping to reduce pesticide use.*

Drip irrigation results in a higher yield, better quality, reduced water usage, reduced fertilizer and pesticides inputs, less weed growth, and overall better crop management.



# Pecans are profitable

## PORTRAIT OF A CROP

With declining prices for cotton and chiles, New Mexico growers have been switching to pecans. Pecans are profitable: New Mexico's second largest crop export earner and top earner of income for a directly edible crop. There is weak foreign competition, abundant pecan research and strong grower support associations. Nevertheless, the pecan industry, in the dream of local foodsheds and sustainable orchards, needs to change to become more involved with local economic development and eco-friendly practices.

Pecans require hot summers and a chilling period before budbreak (see Climate Change, page 44). They grow best in the southern Arid Lowlands and High Plains with irrigation. Pecans are now a fossil fuel-intensive growing process. At the input/producer step of the value chain, most orchardists apply pre-emergent and pre-harvest herbicides; insecticides to manage pests such as the pecan weevil, hickory shuckworm and Mexican strain of peanut caseborer; miticides for nematodes; and fungicides for Texas root rot. Two or three fossil fuel-derived fertilizer applications may occur each year at 50 lb nitrogen per acre (nitrates and ammonia).

Pecans prefer sandy loams. On New Mexico clay soils, pecan orchards require machine chiseling for improved infiltration of water. Orchardists usually import soil amendments such as gypsum and a zinc foliar spray (and maybe nickel).

These amendments require mining. New Mexico pecan growers also experience drought-year cutbacks of surface water, forcing reliance on more expensive groundwater pumping.

To be a pecan grower is to think long-term. The trees will not reach maximum production for 12 or more years. Pecans must be pruned to allow sunlight to penetrate to the lower branches and, at times, thinned (about 11,000 tons of pruning per year). The ground is leveled and cleaned for harvesting nuts. All these steps require heavy equipment and fuel.

**DREAM** Increased organic pecan production.

Growers are reluctant to give up conventional orchards, despite studies that show more pounds and more income per acre. California has taken the lead, understanding that fossil-fuel products may drastically increase in price. Finding sufficient organic manures to replace conventional fertilizers is a major obstacle. New Mexico has only one organic grower and the local economy waits for the time when there are enough organic growers to support a separate sheller.

At the processing/distribution step, a complex trade system occurs. Growers can sort and grade their own pecans or sell them to brokers unsorted. They can sell them in-shell or shelled. There are five



commercial pecan buyers and three custom shellers in the Mesilla Valley to serve local farmers. Depending on market price and speculation, in-shell or shelled can be stored or directly marketed. (Pecans produce major crops in alternate years.) In-shell pecans are mainly exported, many tons to "local" Mexican *maquiladoras* for cheaper shelling; with jumbo pecans re-exported back to the U.S. Many tons go to Asia.

The industry has not maximized local value-added pecan products (pecan/chile pralines, pecan-flavored beers) nor local purchasing.

**DREAM** Pecan growers create a local value chain; find buyers to supply New Mexico school system and other institutions; increase local economic development by developing profitable use of tree prunings such as presto logs or chips for soil improvement; and increase value-added products such as pecan butters and oil.

- Pecans are New Mexico's top directly edible crop in cash receipts: 37,800 acres of pecan orchards (2007) and 1,536 orchards (1,056 in Doña Ana county).
- New Mexico has been first or second with Georgia and Texas in pecan production in recent years.
- Income generated (2003) by growers (about \$70M); for whole value chain (\$126M).
- Exports earn \$279 M, New Mexico's largest directly edible export. Major U.S. export markets for shelled pecans include: Canada, China, Hong Kong, Mexico, Netherlands and the United Kingdom.
- Alternate year production: 74 M pounds (2007); 46 M lbs (2006); 85 M lbs (2005).
- In-shell prices can vary widely. \$1.90 pp (1990), \$2.28 pp (2004), \$1.30 pp (2007).
- Consumption of pecans now equals walnuts, but is much less than almonds.
- Pecans have highest antioxidant levels of any nut (twice hazelnuts, pistachios; four times almonds; 1.5 times walnuts).
- Organic test pecan orchard surpassed conventional site by 12-18 pounds per acre. Organic acreage generated \$5,290 per acre compared to \$1,750 for conventional.

# New Mexico's cash cows

DAIRY AND DAIRY PRODUCTS bring the highest food-related cash receipts into New Mexico. After dairy, the New Mexico beef industry brings in the highest cash receipts. Beef and dairy both depend on New Mexico's third largest agrarian pursuit — all types of hay, especially alfalfa, corn silage, sorghum, green chop and grain corn.

Cattle and dairy raisers on ranches and ranchettes of all scales have similar concerns: their way of life; the buyer's contract and its profitability (especially after costs of production and processing); consumer desires (demands) which may impact breeds, feed and other inputs such as antibiotics; adequate advertising and promotion; various government standards and supports, and consumers' willingness to pay the price compared to other meats such as pork and chicken or non-milk products such as soy or rice milk.

Cattle and dairy raisers participate in three starkly different value chains: local, domestic and export. Creamland Dairies (owned by Dean Foods) sells locally, producing yogurt, cheese, ice cream, fluid milk, condensed milk, sour cream, whipping cream and other products. Otherwise, the local New Mexico dairy industry barely exists, with only one grass-fed or organic dairy and fewer than ten small organic product manufacturers.

Over the next ten years, the dreams of each track of the livestock industry cannot harmonize to "one size fits all." Europe has recognized this reality for some time and has a two-path value chain — one for the domestic market and one for export. The value chains differ, for instance, in how inspectors track beef cattle from production through slaughter, packing and distribution. They have different rules (performance standards) because international trade has a greater risk of spreading diseases like Mad Cow or foot-and-mouth and export requires different shipping conditions. When tri-track rules for local, domestic and export are well designed, they can spur within-chain innovation, investment and efficiencies that cannot be achieved with a single set of health, ID tracking, slaughtering and processing rules.

**DREAM** A tri-track assemblage of rules that accommodates the differences among local, domestic and export needs. Insurance liability premiums recognize these differences in risk.

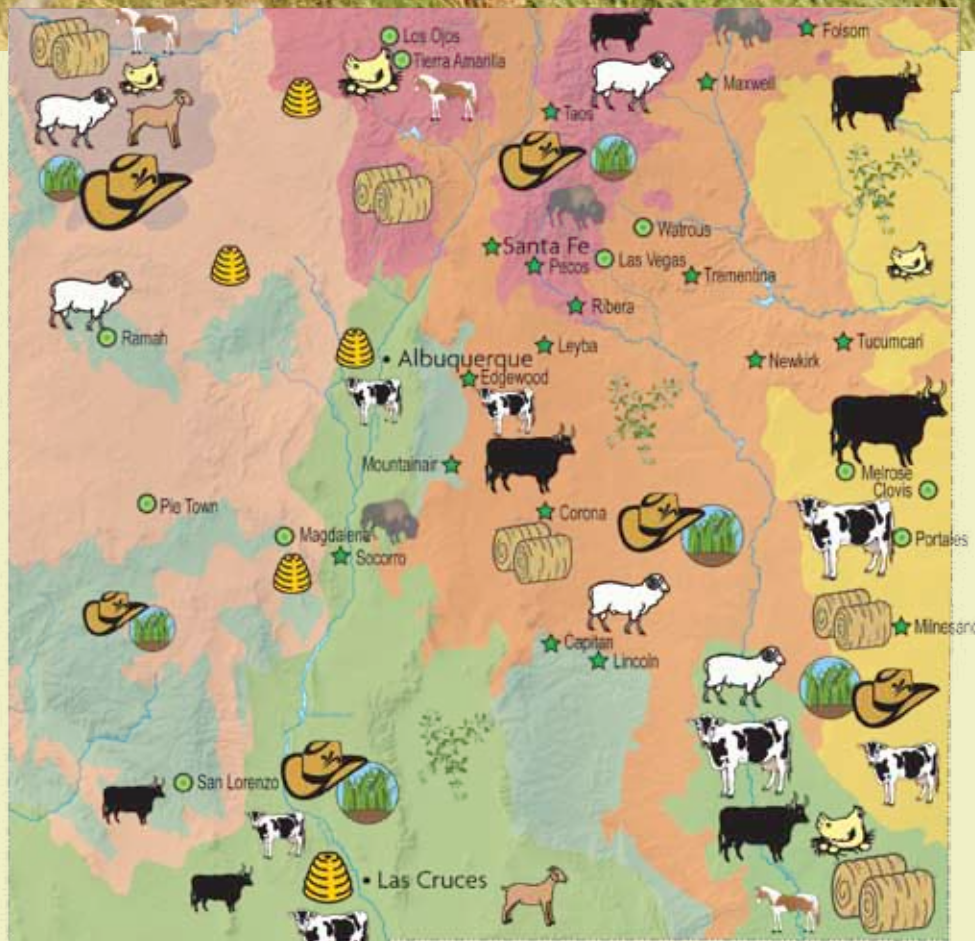
The livestock industry has become specialized in the last 20 years, basically abandoning traditional animal husbandry. Every step in the value chain has become industrialized: large volumes, tightly linked by formal contracts; techno- and mass-market driven and concentrated with tight profit margins with market power in the hands of a few large multi-nationals (see Value Chains). The goals of this integrated food system are: to realize lower costs and higher returns; capture market share through vertical integration; reduce financial risks and speed the diffusion of veterinary, technological, product and accounting innovations. Tyson Foods is typical.

Although most ranches are still owned by New Mexican families, they have become larger, less diverse operations — raising a single species of animal bred for domestic market buyers. They rely increasingly on hired labor and tight integration with buyers. Dairy operators belong to coops and produce milk in Concentrated Animal Feeding Operations (CAFOs). Beef ranchers largely remain independent but sell their cattle to a few buyers who represent industrial CAFO feedlots and slaughter/packing houses. Ranchers and dairy coops have become price takers, rarely with much wiggle room or negotiation power (i.e. price makers).

The commodity beef and dairy export out-of-state over 95% of all new Mexico sales. This global commodity track has become vulnerable because of its size and dependencies. Both beef and dairy value chains depend on imports ranging from veterinary supplies, replacement beef cattle (stockers) and dairy cows to feed and to fodder. The cost and availability of feed has faced strong competition from corn-fed chicken and pork; and grain-corn bioethanol. Fossil fuel costs for fertilizers and shipping have become erratic

Most ranches are still owned by New Mexico families.





## < NEW MEXICO LIVESTOCK

New Mexico's top three food-related cash receipts are dairy (about 40% of all ag receipts), beef (over 30%), and hay and silage (over 10%). About 175 dairy "factory farms," concentrated in the High Plains and Lower Rio Grande, supply most of New Mexico's fluid milk, with controversial health and environmental consequences. There are over 9,500 beef ranches of all sizes. Over 90% of dairy products (dry powder milk, cheese, whey) as well as fluid milk and beef cows leave the State. New Mexico has only one organic dairy, and no more than ten goat dairies and organic/grass-fed beef and lamb ranches.



# Agro-ecoregions and livestock

## SOUTHERN ROCKIES:

70% of agricultural income comes from cattle (and sheep in Rio Arriba) that seasonally graze on pasture, montane grassland in spring (sheep fescues, mountain muhly, various sedges) and summer grasses (mutton bluegrass, pine dropseed, wheatgrass, subalpine needlegrass, tufted hairgrass, Junegrass) as well as on brushland. 1,500 ranches raise about 84,000 cattle on 5.7 million acres of grazing land. There are 11 feedlots (about 20% of New Mexico total); 10 are small. There are substantial horse and private and tribal bison operations. The Southern Rockies has the third largest number of chicken farms (close to 300). Rio Arriba County supports organic lamb, beef, poultry, turkey and egg operations, including organic feed mixes and alfalfa.

## COLORADO PLATEAU:

Livestock income (26% of ag cash receipts) depends on irrigated hay and Great Basin Shrub (Big sagebrush, fourwing saltbush, shadscale) and Great Basin Grassland (ricegrass, galleta, poverty threeawn, sand dropseed, blue grama, alkali sacaton). Including public lands, there are 4.7 million acres that can be grazed. There are four small feedlots. 5,250 ranches raise 56,000 cattle and large numbers of sheep/lamb (over 55,000 head) and meat goats. The agro-ecoregion's sheep (many the unique

Churro sheep) are used both for mutton and wool. Horse numbers are among the highest in New Mexico. The agro-ecoregion supports the second highest number of poultry farms (over 400).

## CENTRAL PLAINS:

Beef cattle (perhaps 200,000 in Torrance and Lincoln counties) and sheep (over 30,000) are the most important agricultural activities with over 1,700 ranches and 10 million acres of brushland grazing, irrigated feed, and plains grassland (side oats grama, fourwing saltbush). There are 13 feedlots; 11 are small. Harding County has the most organic beef acreage.

## HIGH PLAINS:

This formerly homesteaded agro-ecoregion once supported extensive plains of side-oats grama, fourwing saltbush, blue grama, buffalograss and prairies of Little bluestem. The prairie grassland now grows winter wheat for export and grain corn for the cattle and dairy business. There are over 1,400 ranches raising 600,000 cows and calves. 85% of the agro-ecoregion's cash receipts come from livestock. The High Plains supports the highest number of feedlots (almost 40%), dairies (145,000 dairy cows) and cattle (about 600,000) of any agro-ecoregion. Curry, Roosevelt, Union, Lea and Eddy counties are the dairy centers of the State. Curry, Quay, Roosevelt, Union and Lea counties support beef. High Plains has 32 feedlots (two with more than \$2M in business/year; 18 small).

## ARID LOWLANDS:

Livestock earns about 68% of the agro-ecoregion's

food-related receipts.

About 1,950 ranches support about 500,000 cow/calf cattle and 17,000 dairy cows. The cattle feed on hay and graze the Chihuahuan grassland (burrograss, black grama, grama grass, dropseed, ricegrass, sacaton and tobosa). 43% of New Mexico's livestock sales originate in the Arid Lowlands, which supports 19 (about 20% of New Mexico's) feedlots with three earning more than \$2M/year and 11 considered small (\$100,000 to \$350,000). The Rio Grande and groundwater make for the richest livestock area in New Mexico. Bernalillo, Chaves and Doña Ana counties have the most dairy cows; Chaves, Doña Ana and Eddy have the most beef; Chaves the most sheep; Eddy the most meat goats; with pockets of bison, horses and meat goats in other counties. The Arid Lowlands has the most poultry operations with 100 plus in Bernalillo. Roosevelt has the most certified organic pasture, hay and dairy cattle, and Quay an organic cheese business. Bees are a major mini-livestock.

## TRANSITION MOUNTAINS:

Small numbers of both sheep (5,000) and cattle (68,000) seasonally graze on 4 million acres of mixed conifer and piñon/juniper with some Chihuahuan grassland, woodland and brushland grazing. This is 98% of agricultural cash receipts. There are six small feedlots. There are one or two goat organic dairies and cheese operations as well as an organic goat meat business.

and expensive. Feed is the top economic cost in all six agro-ecoregions.

Other challenges to commodity beef and dairy include: costs of tracking cattle and inspection to prevent disease; aerosol pollution and wastewater and manure-handling at the CAFO step; consumer health concerns; health-related export barriers; animal welfare issues; and worker discontent. The lack of transparency as well as financial vulnerability to recalls and lawsuits have opened the market to new niches: local, grass-fed, natural, organic and others. In the "upstream" segments of the value chain, ranchers and dairy coops have become price takers, rarely with much wiggle room or negotiation power.

**DREAM** *Commodity value-chain partners pay increasing attention to dairy cow, veal calf and cattle and human health risks as well as consumer desires; and start to re-design their operations to accommodate new market demands, preventing both company and market downturns, if not collapse.*

## MARKET POWER

Expanding from niche to local, mid-size dairy and beef markets has been difficult for livestock raisers because the current financial system works against local production and processing because the current financial and bureaucratic system works against foodshed production and processing. Many non-local CAFO feeds are sold below market prices because of federal subsidies for corn and soy. In addition, various cattle associations have been export- and interstate-oriented for 50 years.

**DREAM** *Beef Checkoff Program funds, dairy coops and livestock associations support a local livestock economy, emphasizing grassfed ranch management, healthy beef and milk products, bio-safety, erosion (dust cloud) control and transparent labeling for the public.*

**DREAM** *Cattle and dairy raisers who receive State and/or federal funds agree to sell a percentage of their product to local wholesalers and retailers by special contracting. The State uses this market share for institutions like schools, prisons and elder care centers. The USDA and New Mexico write standards and rules that support and encourage small, local slaughter, packaging and milk processing facilities. State and federal tax incentives flow to livestock raisers who transition to grass-fed or organic value chains.*





# New Mexico's milk cows

Concentrated in the High Plains and Lower Rio Grande, about 175-180 dairies support over 360,000 dairy cows in Concentrated Animal Feeding Operations (CAFOs) supplying the majority of the State's non-organic milk (2007). However, most dairy products (dry powder milk, cheese, whey) as well as fluid milk leave the state. The multiplier impacts of the non-organic dairy industry have been impressive with five cheese plants, four fluid plants, four powder plants, and one ice cream and ultra-filtration plant. It estimated that the value-chain employment exceeds 17,000 with gross receipts over \$2.5 billion. In Portales, for instance, Tama-ki Control of New Zealand supplies automated services for the dairies and Automated Dairy Systems provides milking parlor systems. In Roswell, one of the world's largest mozzarella factories, Leprino, consumes 4.5 million pounds of milk each day. In Clovis, the Southwest Cheese plant is one of the largest cheese and whey industries in the world. It produces 250 million pounds of 40 and 640 pound blocks of Cheddar, Monterey Jack, Colby and Pepper Jack cheeses as well as whey products. The dairy industry makes at least 5% of its revenues from selling non-productive dairy cows as beef and selling male calves for veal.

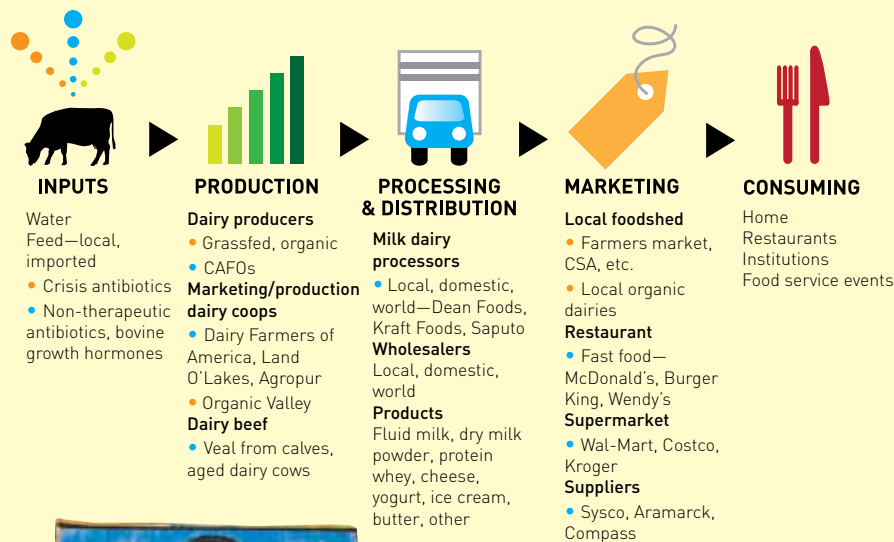
The factory farm dairy business has confronted many of the same problems as the beef industry: costs of tracking cattle to prevent disease; aerosol pollution; wastewater and manure-handling; consumer health concerns; health-related export barriers; animal welfare and dairy worker challenges.

The dairies in southeast New Mexico have been implicated in New Mexico's highest asthma rates because of airborne dust near CAFOs. Over half the dairies have regulatory issues related to wastewater disposal and/or handling manure wastes. The ability to spread CAFO manure has been limited by the presence of hormones, antibiotics and over-supply. The employment of undocumented workers working in unsafe conditions has put particular CAFOs on the defensive.

**DREAM** Commodity value-chain partners pay increasing attention to milk cow, veal calf and human health risks as well as consumer desires for eco-friendly, humane and local dairy products, and start to re-design their operations to accommodate new market demands, preventing both company and market downturns.

A local organic milk market has many market advantages: no bovine growth hormone; no antibiotics; no feed additives; no environmental issues; and access to the European Union market. An increasing population of consumers is willing to pay the price of raising organic/humane dairy. They want to be assured that the

**DAIRY VALUE CHAIN** shows inputs and major players in milk and dairy products industry. Blue dots are for conventional value chain; orange dots for small dairy/organic path.



dairy cows have good lives (e.g. they do not have their tails cut for easy automatic milking); that they have access to pasture and sunshine; live in smaller herds of about 200 (not more than 300); are not "over-bred" breeds created for giant udders; and do not suffer greater calving, mastitis and leg/foot problems.

New Mexico consumers do not have access to local, organic milk and their value-added products; virtually all organic milk is imported. Nature's Way (Portales) is the only large organic dairy with 2,000 cows. It sells to Horizon and most milk is exported.

**DREAM** A major effort occurs to create an organic dairy cooperative and distribution system. Scale up local organic dairies with value-added products and transparent labels. 15% of all dairy products come from in-State organic dairies by 2020.

The barrier to scaling up has been the small size of the New Mexico market compared to the high cost of infrastructure. However, some Midwest studies indicate that given equal access to government payments, small dairies can compete with CAFOs. The commodity milk industry benefits from federal Milk Marketing Orders (a price support program) direct payments to producers, and the Dairy Export Incentive Program (essentially a subsidy for nonfat dry milk, butterfat and certain cheeses).

**DREAM** Federal and State payments provide a level playing field with special grants and loans to help transition to certified organic and insitutional purchases of organic milk and dairy products.

## Dairy facts

- New Mexico is seventh in the nation in milk production and produces about 600 million pounds of milk per month (about 4% of US total) which can be visualized as 150,000 tanker loads. Milk production has increased over 30% since 2001. About half the milk is processed locally into cheese.
- In 2007, 360,000 dairy cows; sixth in nation; record production of 7.64 billion pounds of milk.
- Dairy sales produced \$1.4 billion in 2007. With value-chain additions for labor, transport, processing and products, the dairy industry produced close to \$2.7 billion in cash receipts. Dairy industry generates about 2,900 direct full-time jobs; 5,700 indirect jobs and 8,600 part-time related jobs. Total: 17,200 jobs.
- CAFO cows produce 21,000 pounds of milk per year (about 2,600 gallons). Despite CAFO living conditions, cows remain seasonal. They produce 20% more in May; lowest in January.
- New Mexico has the largest dairy herds in the nation (about 2,000 per herd). 98% of the herds exceeded 100 head; 0.2% had fewer than 100 (2004). In the upper Rio Grande (Bernalillo and Valencia), the herds average fewer than 500 head.
- New Mexico has one organic dairy and no more than ten goat dairies.



## Cattle facts

- New Mexico supports 1.58 million cattle and calves (2007). Gross income of \$955 million (2008). In-State commercial slaughter: 11,000. Ranches 7,200 to 10,000 (some dairy beef).
- Grazing fees (2007): private (\$15.10 per AUM), federal (\$1.35), State (\$3.86).
- Organic: No slaughter facilities. 18 organic and grass-fed livestock operations. 64,634 acres are certified rangeland (35,170 in 2005).
- New Mexicans spend \$620 million dollars/year on meats, poultry, fish, and eggs, the most of any food group.
- Major livestock feeds (tons) commercially sold: corn products, dairy and cattle feeds, distillers' by-products, soybean products, cottonseed and grain sorghum products, mineral feeds, molasses.
- 85 to 102 feedlots (mostly small) for beef cattle (both finishing and complete feeding); 32 in the High Plains and 19 in the Arid Lowlands. Cash receipts (2007): cattle/calves 9.5 million; feed crops \$282 million. Some suppressed data.

## New Mexico's beef cows

About 10,000 families (farmers, ranchers and dairymen) raise one or more cattle that will become beef. Cattle are New Mexico's most locale-appropriate agriculture (see Agro-ecoregion box) with a history of animal husbandry spanning 400 years. In 2008, there were 1.58 million cattle. The beef industry is completely domestic-export-oriented. More than 91% ship out to Texas, Colorado, Kansas and a few other states for finishing, slaughter and packing. Most New Mexico consumers purchase beef imported from out of State from unknown origin.

The beef industry runs higher health risks than the dairy industry. Most dairy foods are processed. The New Mexico beef industry imports increasing numbers of cattle from Mexico and packaged beef through multi-national wholesalers. The U.S. exports prime and choice cuts as well as other beef parts. Although Chihuahua has better tracking than the U.S., the cow's origin is lost in the diverse, decentralized U.S. trading system and feedlots. It is nearly impossible to track a cow to the cut-and-wrap stage, yet disease concerns for domestic/export beef have made prevention, ID and tracking imperative.

In addition, raising cattle at a cheaper price concentrates them into a limited area during the feedlot stage with higher health risks — easier transmission of disease; more accidents (downers); pollution from manure-based nutrients; and harmful local bioaerosols. Large operations are prone to use antibiotics intensively to pre-empt the spread of animal disease and accelerate animal growth. Extensive antibiotic use raises concerns about increased pathogen resistance and risks to human health. The presence of hormones in beef also raises human health concerns, especially in processing operations that co-mingle CAFO dairy cow beef with

range/feedlot beef. The greatest risks to human health have occurred at the packing house from bacterial contamination with subsequent illness, deaths, lawsuits and recalls of meat. Any large scare from Mad Cow, tuberculosis or a new exotic disease can put the whole industry at risk.

Even more than dairy, commodity value-chain partners must pay increasing attention to cattle and human health risks as well as consumer desires, and start to re-design their operations to accommodate new market demands, preventing both company and market collapse. Concentrated hog and broiler production parallels the benefits and concerns raised by commodity feedlot beef.

Finally, there is a direct cross-over between dairy cows and range/feedlot beef. Non-performing dairy cow beef is co-mingled in ground meat, processed meats and specific cuts. Dairy beef usually has higher drug concentrations. It is a major source for fast food restaurant hamburgers. Since male calves have no value to the dairy business, they are sold to the meat industry for veal. Because most calves are raised in tiny cages for three months before slaughter, veal has become an animal welfare concern.

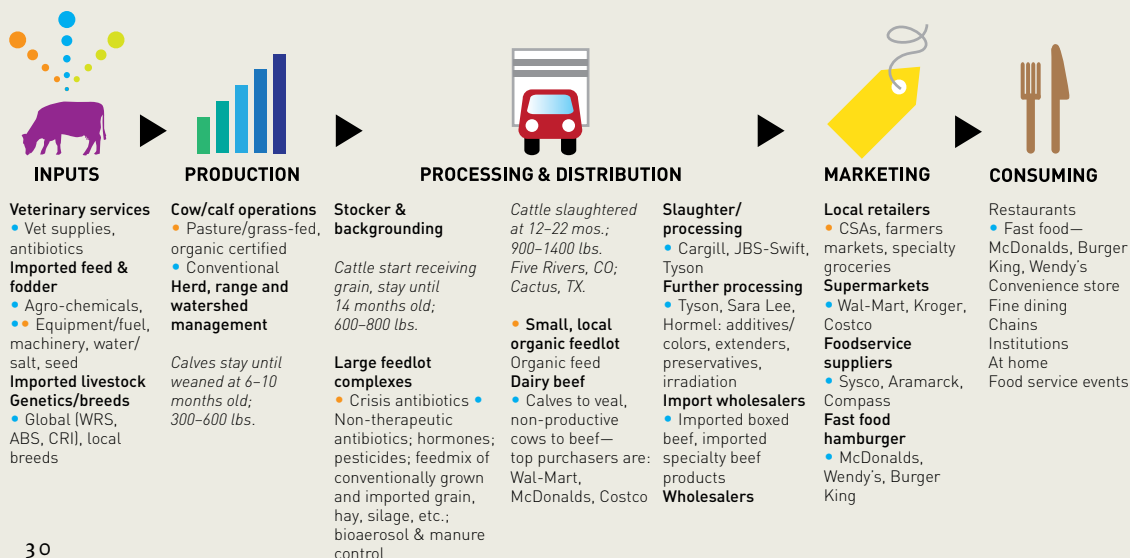
## CONSUMER CONFUSIONS

Another distinction between dairy products and beef is that the different qualities of beef have led to much confusion. With milk and milk products, the food is either organic or conventional. With beef, the ability to compare price against qualities is much more difficult. While the desire for transparency grows, labeling and monitoring have not been adequately addressed on a state, national or world level.

Consumers, of course, first look to taste and flavor, freshness, safety, tenderness and price. More gourmet buyers look to muscle texture, leanness, the type of cut, and other aspects like animal welfare, eco-friendliness, the type of feed,

or even packaging and the origin or "track" of the meat. Increasingly, freshness, safety and a desire to support the local community have encouraged consumers to distinguish between local and domestic/imported beef. Consumers have a hard job. Besides local, beef advertises itself as organic, natural, grass-fed, grass-finished, Kosher, sustainable, predator-friendly, pasture-raised and other labels. The confusion has been amplified by the conflicting definitions of government agencies and cattle association labels. All this confusion is a market advantage for local, grass-fed or organic beef.

**BEEF VALUE CHAIN** explains the life-cycle of a beef cow (italic). It shows the two value chains: the conventional (blue dot) and the grassfed/organic (orange dot). It lists major multinational players that dictate much of the conventional value chain from ranch to eater.





At the moment, there is fierce opposition from the commodity beef industry to set one *comprehensive* beef label. Few citizens want to know they may be eating cow lips, or which parts are in the cutter, canner or Standard USDA grades. Labels do not tell the consumer that beef has been co-mingled with non-performing dairy cows. In part, industry opposition comes from the increased cost of tracking individual cows or following disease-avoidance rules, especially on the ranch, during slaughter and packing, or for boxed or ground beef.



*All meat products are labeled with:*

- Sites of origin;
- Method of weight-gain (pasture, range, and/or feed-fed or unknown);
- Whether the pasture grazed is certified organic or “natural”;
- The type of feed (certified organic, “natural,” commodity or unknown);
- Feedlot care (use of non-therapeutic antibiotics, implants, and ionophores);
- Slaughter house care (animal welfare certification that minimizes stressful slaughtering aka “cruelty-free beef”);
- Healthful meat concerns (dairy cow beef);
- USDA meat quality grades.

In the dream, labels would be allowed to advertise other characteristics such as: predator-friendly (e.g. wolf-friendly); greenhouse-gas reducing feeds; pollution-free practices; food miles; value-chain ownerships; the cow’s age at slaughter; and the aging process of the carcass. In ten years, the beef would be bar-coded with its value chain history.

## LOCAL BEEF

The grass-fed or organic local beef market has many advantages and value-added potentials that cannot be found in commodity beef.

**DREAM** *Local cattle mature on grass, receive crisis-only antibiotics and humane branding and slaughter. The consumer receives a clear, transparent value-chain label for retail-cut beef aged for taste and flavor. The value-chain steps and financial transactions circulate within the foodshed. Consumers know whether workers have a living wage, health insurance and safe working conditions.*

**DREAM** *For local cattle finished on local feedlots, the feedlots must be small with short residence times, hormone-free (no implants and ionophores), serving feed derived from plants. They must have access to fresh air and sunshine, well-managed living conditions and be able to walk or minimally ride to the slaughterhouse with cruelty-free slaughter. In the near future the feed would be adjusted to reduce greenhouse gases and the feedlots designed with superior manure and wastewater management.*

The local beef value chain was dismantled decades ago. There are too few local feedlots and slaughter and packing facilities for a local mid-sized market, and the new start-up rules are for the gigantic facilities. These rules act as a financial barrier for any new local facilities. Local growers, shippers, processors, certifiers, farmers’ associations, distributors, consultants, retailers and others require a new food system to scale up.

There are signs of change. The Mobile Matanza and the Taos County Economic Development Center’s Mobile Livestock Processing Unit, for instance, will help livestock raisers stay on the land, slaughter small numbers of cows, and join a local value chain.

**DREAM** *Certified organic or certified grass-fed raised and processed beef sold within State is 50% local by 2020. Local slaughterhouses and packaging plants return to New Mexico to support local beef production and sales. Local consumers are willing to pay higher prices for their value-added product. Mutton, broilers, and turkey reach 25% of the natural or organic local market by 2020. Pork might strive for 15%.*

Because local is small-scale and lacks crucial facilities, adequate logistics and an experienced value chain, the price per pound will be greater than conventional beef. New Mexico certified organic beef has the hardest road. Certified organic ranchers have more responsibilities and accountability. For example, an organic ranch must certify its pasture and feed. Organic livestock feeds are very costly, making organic beef much more expensive. Organic slaughter animals must be born organic, meaning their mothers must be raised organically for at least the third trimester of their pregnancy. After all this, an organic rancher must process in an organically inspected facility, and these are hard to come by. With the closing of the Ft. Sumner organic certified processing plant, some New Mexico organic ranchers use the processing facility in southern Colorado and others travel as far as Texas. Currently, it is near impossible to find New Mexico local/organic in stores.

The most accessible market niche is “New Mexico 100% grass-finished beef.” The cattle are “matured on grass” which means the minimum number of grazing days must be at least 120 days, with each agro-ecoregion’s “personality” making the grazing season’s dates variable. (Over-wintering can be a difficulty for grass-fed cow-calf operations.) Though not strictly organic and with occasional problems of tenderness and taste, grass-finished beef is drug-free, grown from local cattle and has higher nutrient values. Consumers have been satisfied with American Grassfed Association certified beef (which differs from USDA and certified organic definitions) that is hormone- and antibiotic-free meat, raised 100% on open pasture and range, has certified humane care, and sells at a lower price.

## Small livestock

- Certified organic operations: 5 beef, 2 lamb, one egg farm and one turkey operation.

- NM estimates: 1,150 poultry and egg farms; 351 hog farms; 2,577 sheep/lamb and 1,500 goat operations. Bison farms (40), ducks (270), geese (180), llamas and alpacas (160). See Biocultural for goats, sheep, elk, deer, and bison.

- Poultry and eggs (suppressed but around \$24 million); hogs (\$375,000); small ruminants (suppressed, probably over \$5 million).



## Horses

New Mexico has over 7,200 horses on over 1,400 equine farms and ranches (tribal data unavailable and data include donkeys and burros). Horse trades bring \$7.8 million in cash receipts. Amendments to the 1970 Horse Protection Act prohibit the possession, sale, transport or shipping of horses for slaughter and processing. The lost market for horsemeat for pet food, zoo animals, human cuisine and byproducts is controversial. What is ethical? Letting horses live out their lives on range or pasture? Humane slaughter? Horses overgrazing public and tribal lands? The loss of the U.S. highly regulated facilities has burdened many government and private rescue organizations that deal with abandoned horses; and overburdened state and local agencies charged with the transport and welfare of horses. State livestock programs that once recouped costs of caring/feeding abandoned and stray horses by marketing or giving them away for adoption are now forced to charge taxpayers. Horses going to Mexico receive poor treatment.

# Biocultural foods

The tradition teaches that food is in part the story that goes with it.

IN THE LONG ARC of New Mexico history, local and invading cultures swapped crops and livestock. Traditional meat supplies — elk, bison, deer and smaller game — expanded with the addition of Spanish semi-wild *criollo* cattle, domesticated *churro* sheep and goats, and now Angus, Herefords and Holsteins. To the gathering of mesquite beans, acorns, agave, wild greens, wild potatoes and piñon nuts, Native American first added the Three Sisters (beans, corn and squash), then chiles and then European and Asian crops. Many traditional foods are still gathered and hunted. Juniper ash, for instance, still a crucial ingredient in piki bread, was once mixed with deer brain, then horse fat, before today's commercial vegetable oils.

New Mexico is exceptionally rich in Indo-Hispano foods. The Indo-Hispano agro-ecosystems (e.g. Zuni waffle gardens, acequia irrigation, floodplain gardens, non-irrigated gardens) continue to produce crops from both the Old and New Worlds. Acequias, for instance, grow and raise: wheat, barley, oats, alfalfa and pasture grasses for livestock, apples, pears, peaches, cherries, plums, apricots, nectarines, melons, chile, corn, corn *chicos*, beans, *bolita* beans, squash, peas, garbanzos, *haba* (fava) beans, lentils, cabbage, lettuce, broccoli, tomatoes, cucumber, *calabacita Mexicana*, garlic, onion, cilantro, asparagus, potatoes, turnips, radish, carrots and artichokes.

These agrarian traditions have been fading. Many cultivars and even cuisines are rare or endangered. For instance, The Ark of Taste has listed cultivars in danger of disappearing for New Mexico: Rio Zape bean, Santo Domingo casaba melons, Four corners gold bean, *bolita* bean, native tomatillo, Wenks yellow hot pepper, chiltipin chile, Chimayó chile, *chicos* corn and blue corn piki bread.

Various Native Americans and Hispanic (and Anglo-European) groups want to preserve crops and animals as well as methods associated with traditional agriculture, seasonal ceremonies, special meals, *querencia* and sacred landscapes (*tierras sagradas*). The tradition teaches that food is in part the story that goes with it.

Just as in the larger society, there are usually two tracks in Indo-Hispanic communities: agriculture on the mass-market, domestic export path and agriculture for the niche local market path; tribal members and Hispanic farmers who pursue mass-market farming and ranching, and tribal members and Hispanic farmers who desire a revitalization of traditional agro-pastoral knowledge and foods.



**DREAM** Revitalize local traditional food systems and food traditions, educating community members about diet-related diseases and the health benefits of local/traditional foods, and developing new food and agricultural biocultural enterprises.

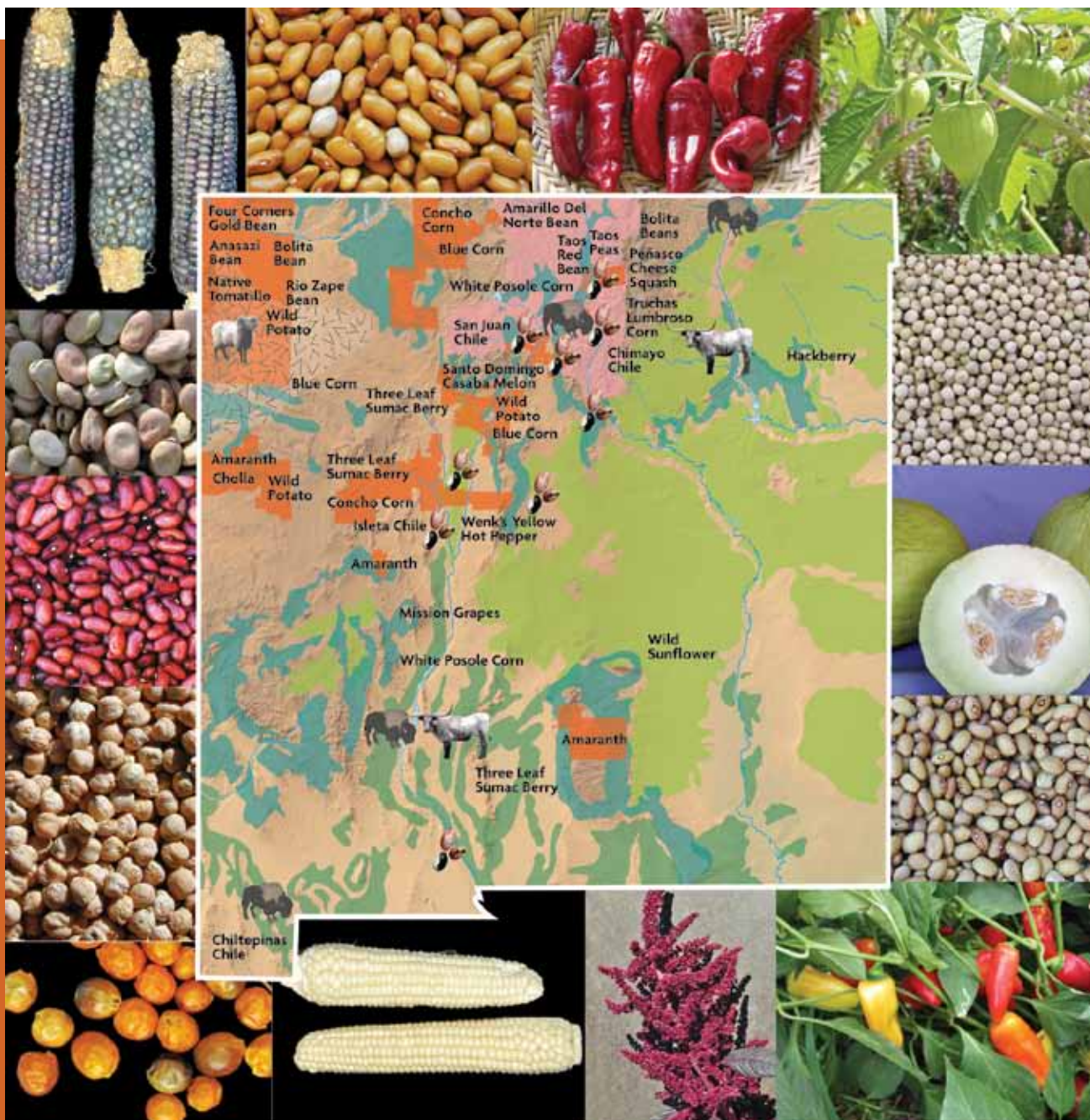
**DREAM** Teach that land and water are a gift to unite kin and community; to sustain community over time; and to provide intergenerational respect and agrarian learning.

**DREAM** Teach that all wild and cultivated animals and plants are dependent on each other. Retain respect and give thanks to them for sustaining us and the beauties of New Mexico.

It would be inappropriate and presumptuous of Dreaming New Mexico to dream for 22 sovereign nations and hundreds of traditional Hispanic communities. In addition, these communities are very diverse with different languages,

&gt;&gt;





PHOTOS: NATIVE SEED SEARCH

	Mesquite		Bison		Criollo Cow		Seed Banks		Churro Sheep
	Yucca								
	Piñon/Juniper Woodland								
	Acequia Region								
	Traditional Dryland Agriculture								
	Native American Reservations & Pueblos								

Crops pictured around map, listed clockwise from upper left:

Hopi Blue Corn	Wenks Yellow Hot Chile
Amarillo del Norte Bean	Hopi Red Dye Amaranth
San Juan Pueblo Chile	Rio Lucio Concho
Zuni Tomatillo	Chiltepinas Amarillos
Taos Pea	Garbanzos del Norte
Santo Domingo Casaba Melon	Taos Red Bean
New Mexico Bolitas Beans	Ojito Fava Bean

## BIOCULTURE

Background map colors show crops that were traditionally gathered: mesquite beans for flour, yucca fruits, pine nuts and juniper for piki among other uses. The acequia region shows area of highest concentration of acequias (not all).

The hatched marks show traditional dryland farming areas of the Colorado Plateau. Seed banks are organizations that are trying to maintain traditional cultivars. Bison, elk, deer, javelina and water fowl persist in biocultural diets.

“All the traditional seeds are like brothers and sisters. It was mostly the women who kept the seeds. My mother would tell me she had to trade seeds with my ‘Tia’ in Ohkay Owingeh because every five years we have to keep rotating the seeds to invigorate them with other seed sources from the different waters: Rio Embudo, Rio Grande, Rio Santa Cruz, Rio Chama.”

Estevan Arrellano,  
New Mexico Historian  
from Embudo



histories, agro-pastoral practices, stories and agro-ecoregions. DNM knows that food is not a separate “sector” but intimately involved in everything from marriage to family life, from grazing and water rights to local politics. Generalizations are nearly meaningless. DNM can only emphasize the distinction between having enough to eat, on a strictly caloric basis, and having enough nutritional and culturally appropriate food.

However, DNM does think it is important to ask the question: How do biocultural and traditional farming and husbandry practices inform the dream of a local foodshed for all the citizens of New Mexico? Among many small farm communities, the First Nations Development Institute food sovereignty questionnaire is one useful tool for the dreaming process ([www.firstnations.org](http://www.firstnations.org)) — to help assess what an acequia, Pueblo or other small community desires and needs to know for its future food system.

**DREAM** For all citizens and local foodsheds, gather and share information of heritage crops and traditional practices such as dryland farming, seed saving, animal husbandry and seasonal ceremonies.

## TRADITION IS TRANSMISSION

Food is a critical part of community revitalization. Communities can create the means to recover the skills and culture of self-reliance and mutual support that are central to an “informal economy.” These acts can help revive an old land-based moral philosophy to reduce hunger, preserve biocultural crops and agro-ecosystems and encourage youth seeking farming/ranching futures. There is a lot of detailed information that must be transferred, especially about moral authority and dispute settlements. In the acequia communities, for instance, there is a continual need to train new *mayordomos* and *parciantes* regarding: by-law changes to enhance local control; water sharing agreements; dispute settlements by *hombres buenos*; recording easement and property rights; conserving heirloom crops; farming and marketing; water banking, and other topics. (See Box: Revitalizing Native American farming.)

However, at this moment in history, the transmission of farming and cuisine knowledge, food-related prayer and ceremonies, and respect for elder teachers requires money to purchase food and take the time off to travel to farms, events, ceremonies or home schools. Transmission of knowledge and morals to become a farmer, singer or *mayordomo* sometimes requires years of practice and understanding. In addition, intergenerational transmission has been difficult because of TV culture, the temptations of urban life and cheap and convenient mass-marketed food.

**DREAM** Elders, traditional farmers, schoolteachers and programs encourage a shift in food culture from “fast, cheap and easy” to local and traditional.

There is a renaissance of re-thinking agrarian life. Working to educate young people on farming are The Red Willow Center Farm, Farm to Table/Farm to School, and schools such as Dragon Farm in Albuquerque’s South Valley region. The Taos County Economic Development Center provides internships to Hispanic youths. *Sembrando Semillas*, a program of the New Mexico Acequia Association, works with youth.

Besides the two-track marketing differences, there are distinct differences among Native American and Hispano dreams for local foodsheds. Although Native American communities maintain their land and water rights through treaty and State/federal law, these communities have a difficult time finding tribal members willing to engage in sustainable agriculture. They are losing the cultural agricultural practices that bring younger farmers to the land. Much of the irrigated land and rangeland has been leased to white operators.

The tribes also differ from Hispano communities in having casinos. More than half of New Mexico’s Pueblos now operate gaming establishments, as do both Apache tribes and the Navajo Nation. The income from these gaming operations has lifted the quality of life among most of the casino tribes and attracted youth to pursue casino jobs for more money, more free time and less backbreaking work.

In a tribal casino dream, which some members have been exploring, these Pueblos and reservations could use a percentage of their profits from gaming to invest in organic farming and to support elder farmers to mentor youth in traditional farming methods. In addition, they could support scholarships to obtain agrarian degrees as a way to modernize and update traditional farming methods. The tribes could contract for crops and meats and use them in their casino restaurants. If there were excess, the meat and crops could go to on- and off-reservation schools. Over time, these markets could expand to foodshed markets in the region.

On the other hand, Hispano farmers do not have a source of capital like casino revenues. Although some Hispano farmers engage in high-value crop farming (fruit and nut trees and organic vegetables), most Northern New Mexico farmers are engaged in raising pasture crops like alfalfa and grass. Pasture crop popularity derives from its low labor, low-tech, assured market, and free time to take outside work. Yet, the pasture strategy has not been able to preserve farm and farming traditions.

The Center for Southwest Culture suggests this dream: A region-wide agro/cultural/nature tourism project involving acequias and land grants that includes: cleaning acequias, watershed





## Revitalizing Native American farming

The forfeiture of Native American irrigated acres due to U.S. non-use laws began in the late 1930s. Between 1938 and 1964, tribes in New Mexico, on average, lost more than 60% of their arable lands from non-use by tribal members.

As early as 1967, the All Indian Pueblo Council, under the leadership of Domingo Montoya, instituted a series of agricultural demonstration plots in all 19 Pueblos. In 1987, the Southern Pueblos Agency led an effort to return tribes to their agricultural roots. Sandia Pueblo initiated a pick-and-grow vegetable operation; San Felipe Pueblo combined traditional and modern farming methods in a demonstration project; Picuris Pueblo began clearing new lands for agriculture, including vegetables, wheat and alfalfa. This re-commitment to agriculture among Native Americans in New Mexico continued through the 1990s and continues today. Among the leading Pueblos in the back-to-the-land movement are Tesuque, San Juan, Zuni and Laguna.

restoration; outfitting in nearby national forest areas; nature touring; traditional inns with local cuisine; and related tourist destinations. The net proceeds could subsidize the conversion of arable Hispano farms from pasture/alfalfa to sustainable organic farming. These subsidies could include purchase of greenhouse and earth heating systems, market development and youth outreach.

### NEW TRADITIONS

Traditional and small farm agro-pastoral pursuits cannot be the same as in the past when iron tools were scarce, Indo-Hispanic people lived on more land in many different places, laws were completely different, and the economy was not monetized.

**DREAM** *Codify agro-ecoregion practices for agrarian life with the best strategies of both Indo-Hispanic traditions and modern, sustainable agro-pastoralism. Create a more locale-appropriate foundation for small livestock and irrigation agriculture with direct sales to midsize markets.*

At certain New Mexico universities and in small and isolated extension courses, specialists teach Native American ranchers about vaccination and herd health, feed programs, animal genetics, record keeping, range management and marketing. The Alcalde Science Center and NMSU have begun outreach on traditional cultivars, farm management and marketing, as well as the medicinal and nutritional value of some traditional crops and meats. Santa Cruz farms and others have intimate experience with greenhouses for season extensions. They provide advice on grass-finished livestock as well as organic farming and permaculture practices that are basically compat-

ible methods that can be adopted, incorporated and modified to fit traditional agro-ecosystems.

### EXISTENCE VALUE

There are three kinds of “values” that help cultures grasp their dreams. *Existence values* hold desires to keep something alive that has no particular monetary value but is part of a spiritual or community tradition. It has intrinsic value. The preservation of Blue Lake by the Taos Pueblo was a struggle to give existence value to an exploitable body of water. *Option values* are keeping some plant, animal or farming tradition alive because it may have an economic value in the future. Examples are preserving native or landrace chiles or “gift exchange” ceremonies among families and communities. Finally, *production values* are raising crops or meats for economic, monetary return (local, domestic or global).

A common dream for those holding and evolving traditional ways is:

**DREAM** *Expand the preservation of biocultural crops and agro-ecosystems by “food events” that augment traditional ceremonies. Build seed banks and seed libraries to complement hand-me-down traditions. Recover and manage bison, deer and elk.*

These stories, plants, animals and places have existence and option values. They have no clear price and cannot be adequately evaluated by economic accounting. There are nine known seed banks in New Mexico. The Embudo Valley Library, for instance, has collected the varieties of apples remaining from the 1940s. Historian Estevan Arrellano, orchardist Gordon Tooley and fruit specialist Ron Walser have grown many of these varieties that now have names lost to memory.

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## Game & small livestock

Bison, elk and deer as well as churro sheep and goats hold a special place in Indo-Hispano traditions. The State owns all wildlife and working with the State for preferential licenses has been difficult.



These varieties remain from an estimated 400 cultivars. Loretta Sandoval and Pueblo farmers now grow landraces of chile (Chimayó, Isleta, Zia, Española) that have been selected for hundreds of years. A few NGOs have begun to fund local landrace preservation.

Similarly, the Picuris, Pojoaque, Sandia, Tesuque, Taos, Cochiti and Nambe Pueblos as well as the Jicarilla Apaches have formed an Intertribal Bison Cooperative to restore herds to ancestral lands. The Indo-Hispanic churro sheep has new supporters.

A major obstacle has been genetically engineered (GE) seeds which can spread through research and field trials, especially new GE seeds for crops like green chile. Recently, a consortium of acequia farmers of the Chimayó Valley revitalized the production of a native chile variety long known for its singular flavor and appeal, protected the name with a registered trademark and marketed it as "Chile de Chimayó." The Chimayó Chile Project aims to make the growing of this traditional chile profitable and to contrast it with the commercial and hybrid varieties produced in the Hatch Valley and China. They fear contamination of the traditional cultivar with genes from a GE chile planned for southern New Mexico (page 23).

### OPTION AND PRODUCTION VALUES

There is widespread demand for authentic biocultural foods as well as local, fresh foods that can be grown by acequias and Native American farms. Local schools and families need healthy foods (page 52). Farmers markets, casinos and fine restaurants can promote traditional foods as well as venison and bison. Traditional medicines have an indeterminate market value. The international market wants to market "Made by American Indian" food and food products (page 41).

Atole, for instance, a breakfast drink of blue cornmeal, sugar and spices is made with a cappuccino steamer, and is one of the many items produced at Santa Ana Pueblo's grain mill. To scale up the value chain, the Pueblo received a federal grant for computerized packing machines and other improvements at the mill. The tribal enterprise mills more than 21,000 pounds of corn a year. They sell products such as pancake mix,

wholesale and retail. They sell to the Body Shop, a cosmetics company in London that bought 6,600 pounds of cornmeal. The Pueblo has expanded to a casino retail shop and garden shop with many locally grown native plants.

To combine old and new, each community needs food assessments for its particular livestock and crops (page 18). Marketers of blue corn, chiles, lamb, mesquite flour and staples such as corn, beans and squash have not paid adequate attention to the value of unique branding and promoting locale-unique foods and their special agro-management.

**DREAM** Tribes, acequias, coops and private-public partnerships build new markets for traditional, medicinal and staple crops with already existing distributors.

### AGRARIAN JUSTICE

The last 200 years of federal policy toward Native American and Hispano communities have reduced their control of land and water, disrupted traditional agricultural practices, and dramatically changed diets. Indo-Hispanic farm workers, farmers, and grocery workers, low-income families, the elderly and kids have not received equitable treatment compared with mainstream American society. This inequality comes, in part, from the geographic remoteness of the populations; political corruption within communities; the mass-market orientation of many tribal councils; the increasing dependence on federal food and welfare; inadequate federal assistance for rural economic and nutrition-related programs; and the relentless promotion of junk foods. Yet, overwhelmingly, the inequality has been driven by the enclosure of millions of acres of ancestral lands (tribal and then Mexican American) to establish public domain and control over water rights.

Since the American replacement of Spain and Mexico, Hispano farmers have suffered greater losses of land and water than Native Americans. Between 2002 and 2007, Hispano farm and ranchland decreased by 3.7 million acres. Gentrification in northern New Mexico has squeezed cattle ranchers and raised property taxes to burdensome levels. Forest Service and BLM policies



have not worked well for local needs for grazing and timber. Urban demands have threatened acequia water rights. The sub-division of inherited parcels of family land (until they were too small to raise cattle or profit from fruits and vegetables) has led to sales for non-farm uses.

**DREAM** *Equitable access to public land and open space resources that shows preferential respect for long-term farmers and ranchers. Custom-design public land grazing management to meet the needs of impoverished Hispanic communities and carrying capacity that favors regeneration of pastures. Wild game licensing that gives economic rewards for communities that support elk, deer and bison.*

**DREAM** *Provide access to private-sector credit markets, protection against land loss from predatory lending policies, and rules to manage real-estate speculation and rural gentrification. (See the general problems of saving farms and ranches, page 52).*

Small Native American farms were not included in the national census until the late 1990s. The tribes had to sue the federal government to receive equitable shares of government payments based on the number and size of farms. The NMDA still does not include reservations or Pueblos for county-level agricultural info. Throughout the last century, these agencies have been discriminatory in the allocation of subsidies. They favored government funds for research in land grant colleges, government payments, extension services, agro- and techno-scientific research, census recognition, rural economic development funds, school programs custom-designed to reinforce farming traditions and nutritional health prevention interventions. They favored or did not oppose policies that encouraged water and land losses, especially on issues of debt and foreclosure. Recent progress has been made. For instance, the Outreach and Assistance for Socially Disadvantaged Farmers and Ranchers (OASDFR) Program, administered by USDA's Cooperative State Research, Education and Extension Service (CSREES), gave a small grant to Indo-Hispano farmers and ranchers so that they can enhance their capacity to improve upon farm management and marketing skills. There are still many outstanding lawsuits on water rights, land grants, civil rights and allocations that impact Indo-Hispano farmers.

**DREAM** *An equitable distribution of government funds.*

After World War II, the Bureau of Indian Affairs discouraged traditional crops and farming as inferior. Federal policies destroyed Native American knowledge by forcibly sending children to Indian Schools where they could not eat local diets. The majority of foods available in most Native communities is provided by non-Indian-owned businesses or the federal government. Advertising and the lack of good foods near rural villages have further hurt nutritional health.

**DREAM** *Similar to many limited-resource communities, access to healthy foods such as fresh fruits and vegetables, better and closer stores, and a revival of home/family gardens (page 52).*

The predominance of Hispano workers (half of dairy factories are reportedly undocumented workers) in the regular farm economy suffers from: exposure to pesticides, herbicides and bio-aersols; poor wages and living conditions; lack of farmworker rights; farm labor contractor exploitation; food security; little political influence; immigration rules; civil rights violations; inferior education; and poor housing.

**DREAM** *End the persistent patterns of inequality in the enforcement of environmental and legal protections, including standards that have led to the disproportionate exposure of Indo-Hispanics to safety and environmental risks.*

## CONNECTIONS:

For water protection and agro-ecoregion culture (page 48).

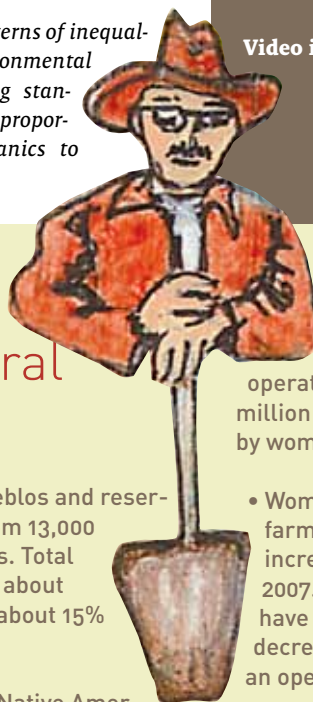
For land use and cultural protection (page 56).

For world trade and culture (page 41).

Biocultural crops, a full listing (see web site).

Video interviews (see web site)

## New Mexico Biocultural facts



- 16,284 farms/ranches operated by men (2007) on 39 million acres; 4,646 operated by women on 4 million acres.

- There are 22 Pueblos and reservations varying from 13,000 to 3.5 million acres. Total ranch/farmland is about 7.4 million acres (about 15% of New Mexico).

- Minimally 6,600 Native American farm operators. About 60% of all Native American farms are fewer than 10 acres. Another 20% are between 10 and 50 acres. Native Americans comprise 10% of New Mexico's population.

- The U.S. census reports minimally 8,900 Latino-owned farm operators. About half own farms of 50 or fewer acres; about a quarter are less than 10 acres. Hispanic citizens comprise about 44% of New Mexico population.

- 24,200 white farm operators. Lowest white population of any state in the West (70%).

- Highest percentage of speakers at home of a language other than English in West (36%).

- 43 Asian-American, 66 African-American and 26 Pacific Islander farm operators (2007).

- Women- and Latino-operated farms and acreage have increased between 2002 and 2007. White male operators have increased but acreage decreased. The average age an operator is 60 years.

- The Navajo Nation has 70,000 acres of commercial farms and growing (7,000 acres of grain; 16,500 of alfalfa; 14,000 of corn; 5,000 of pinto beans; 2,000 of potatoes). They lease 10,000 acres to outside commercial operators.

- New Mexico has about 15,000 or more meat goats; 1,500 goat farms. The market increases because of migrant communities, health benefits, low start-up cost, minimal labor requirements and use of goats for brush control. Challenges include: internal parasites, marketing strategies, inadequate information, and credit.

- New Mexico has had about 130,000 (2007) sheep and lambs, with declining populations. Income (about \$6.65 million) has held in the last five years.

# Fair trade & sister foodsheds



STARTING AS BARTER and gift exchange thousands of years ago, trade has always been central to New Mexican societies. In the twenty-first century, trade can still be local; however it is heavily monetized. New Mexico's food commerce connects the State with the national market, with our nearest neighbor (Mexico), and, to a small extent, to the globe. From a cash point of view, about 87% of food receipts come from the domestic (out-of-state) markets. About 12% (\$385 million) of all agricultural cash receipts come from global trade, but it could be more because any food or food product leaving the State has an unknown destination. About one-quarter of all global trade is with NAFTA partners (Mexico and Canada). Only about one to two percent of food trading occur within the local foodshed and State.

Trade helps boost and stabilize the incomes of farmers and ranchers, allowing them to specialize in what they know their agro-ecoregion can best produce and market. Trade has a value chain of logistics and inputs that supports additional jobs and incomes while providing consumers with richly diverse choices. It can supply relatively fresh food, fish and meats in seasons where otherwise only canned, dried and processed foods would be available. Trade helps support better nutrition. Some products (chocolate, tequila, rice, ocean fish, coffee, tea) would not be part of New Mexico daily diets without trade. New Mexico buys almost 100% of its limes and mangos from Mexico and probably over half its frozen broccoli/cauliflower and papayas. The percentage of Mexican cantaloupes eaten by New Mexicans increases each year despite strong New Mexico production.

Trade allows sellers to precisely appeal to customers. In-shell New Mexico pecans, for instance, are traded to Mexico. There, they are shelled and sorted. The jumbo pieces trade back to the U.S. for a premium market. The broken and small pieces stay in Mexico for the bakers and confectionary trade. In an opposite trade circle, Mexican cattle trade north to New Mexico as stockers and feedlot cattle through the Santa Teresa crossing. Many stay in Texas or New Mex-

ico, but some travel as far as Washington, Iowa and Mississippi. These well-travelled cattle are slaughtered/package in the Midwest and then "exported" as prime and choice cuts back to both New Mexico and old Mexico.

Not all foods can be easily traded and not all trade is to everyone's benefit. Compact, dried and dense food products like chile, onion or dried milk powders can be traded longer distances than bulky or perishable foods such as fresh green chiles or fluid milk. While frequently advantageous, the consequences of freighting and free trade can hurt local rural economic life. For instance, New Mexico increasingly loses market share in the U.S. chile powder market because it's a labor-intensive crop: nations with cheap labor as far away as Peru, Ethiopia and China can beat the New Mexico price. Such practices are often characterized as a "race to the bottom" for both environmental and labor standards.

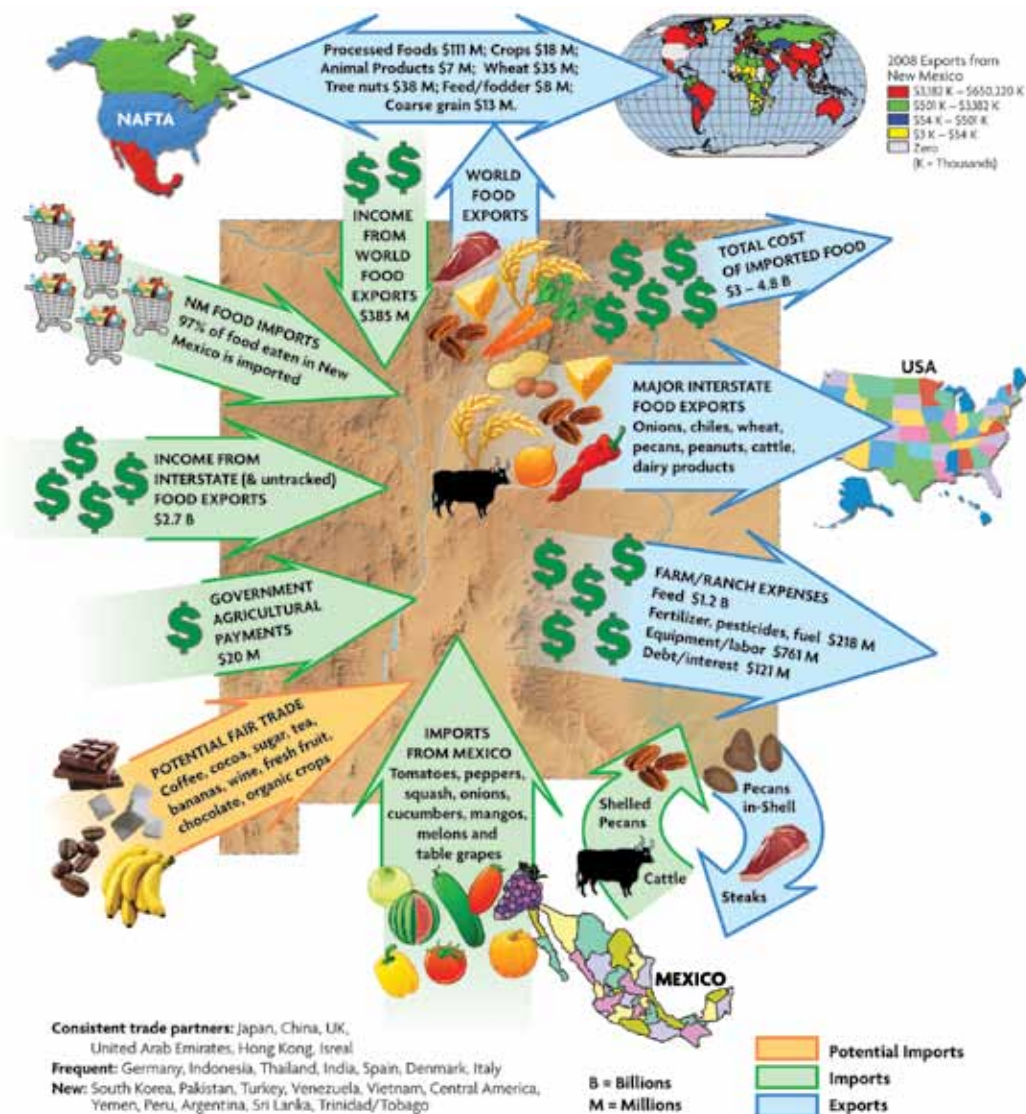
**DREAM** By 2020, New Mexico purchases 85% of its food and food products from out-of-State. 15% come from the local foodshed.

The Dreaming New Mexico project asked: What kind of trade policies do we want as State citizens or as foodshed locavores? What "tools" could make the dreams come true? More than any other part of this project, we found that few had asked these questions and that trade was entangled in many issues of morality and power. This is a humble beginning to refocus the relationships of local foodsheds, trade and moral values.

## TRADE AND THE RURAL ECONOMY

Trade exists because there is a difference (an inequality) between two producers and value chains and unfilled desire of consumers. If the food products were identical and their promotion equally believable, there would be no trade. Sometimes these differences work to benefit consumers. However, sometimes cheaper prices are not persuasive. At times the production and distribution of a traded food are so immoral that





## < FAIR TRADE

Map shows the movement of food/ food products and food-related cash in and out of the State. At bottom: the back-and-forth trade with Mexico of beef and pecans; and the major food imports from Mexico. Most of Mexico's organic output comes to the U.S., including New Mexico. On lower left are Fair Trade foods coming into New Mexico. On left side and top left: The income and food coming into New Mexico. Income includes: government payments from Washington; income from domestic and world exports; and food consumed in New Mexico. Top and right side of map shows exports of food and expenses related to food: exports of food to world and domestic markets; money leaving the State to purchase agrochemicals, labor, and machinery and cover debt; and the total cost to consumers of imported food. Of all world exports, 25% of New Mexico's export trade is with NAFTA nations.

The legend lists New Mexico's consistent (every year) trading partners; frequent (one or two years in the last five); and new. Note that New Mexico spends \$5 billion on food per year that is eaten in New Mexico. Because no agency tracks cash receipts for imported food and food products, estimates vary from \$3 to 4.8 billion. 97% of the actual food (by volume, weight) is estimated to be imports from outside the State.

the knowledgeable consumer refuses to purchase the food or food product. From the local foodshed point of view, food production and trade that destroy rural economies are always questionable. It can occur in the developing world or in New Mexico.

Local foodshed buyers, distributors and consumers can decide what is and isn't acceptable to them. "Fair Trade" (see page 41) has many meanings: many groups hold differing values about the kind of commercial trade in which they are willing to participate. Most consumers and companies agree that exploitive child labor is unacceptable. Most want food safety rules to apply to their trading partners to avoid recent calamities such as pet foods with poisons, Mad Cow disease or leafy greens with E.coli. Many would like to know about gender equity and working conditions along the value chain. Still others desire foods that do not cause ecological destruction or are produced locally. To some, fair trade means reduced or eliminated trade barriers such as quotas, tariffs or restrictive sales licenses.

In Europe, the FairTrade logo assures consumers

that disadvantaged farmers in developing nations receive a fair price and have not been exploited by middlemen traders. A few faith-based groups combine fair trade with capacity building for disadvantaged farmers in recognition of past exploitation and the desire to do good works while on Earth. How does a state or local foodshed trade and protect the local foodshed economy?

**DREAM** Build a parallel commerce and trade system with "sister" foodsheds that share the same ethical values. Build an import/export trade system in which monetary gain is modified by the mutual ethical concerns of the sister foodsheds.

Since New Mexico is among the three poorest states in the nation, many disadvantaged "low-resource" producers could profit from a "fair trade" type of certification that has formerly been given only to farmers in less industrialized nations. Over 15,000 New Mexico farmers sell less than \$10,000 of produce a year. Perhaps 10,000 are retirement and "life-style" farmers; 5,000 are simply poor.

# Trade facts

- New Mexico's cash receipts (2007) from farming totaled almost \$3.1 billion. World exports (2008) estimated at \$385 million.
- New Mexico exports of: processed foods \$111,058,976; crops \$38,143,000; animal production \$7,313,000
- New Mexico to NAFTA: \$727,626,390 for all kinds of exports. Processed Foods: \$60,602,000; Crop Production: \$11,621,000; Animal Production: \$6,896,000. About 25% of all New Mexico exports are to Mexico and Canada (NAFTA).
- Major world exports: tree nuts, dairy, wheat and wheat products, grain and grain products.
- New Mexico exports in the top six commodity groups to the top six importing nations (China, Malaysia, Mexico, Canada, Philippines, Japan) do not include agricultural products, except food industry residues and waste which go to the Philippines to prepare animal food (\$97,000). Dairy products were the eighth largest money earner in exports for New Mexico (\$19,610,644, 2007); sugar and sugar confectionary second (\$16,106,684); and fertilizers third (\$11,215,233).
- New Mexico's 90-acre Santa Teresa port of entry can house about 30,000 cattle on an average day. The most modern of the nation's cattle ports of entry, Santa Teresa handles about a quarter of the cattle that enter the United States from Mexico, some 250,000 feeder animals. The Santa Teresa port of entry is in reality two facilities: San Jerónimo on the Mexican side receives cattle trucked from the northern states of Mexico, where they are inspected, tested and dipped; then moved across the border to Santa Teresa, where they're sold and shipped.

**DREAM** *New Mexico works to become a Fair Trade State by promoting its own rural economic development and an integrated, ethically based value chain, as well as by parallel purchases from less privileged nations.*

The two most frequent tools for building the sister foodshed trade system are *product certification* and *trade association certification*. The first certifies the product and value chain from farm to retailer; the second certifies that anything traded by the association follows specific agreed-upon rules. Both rely on truth of accountability, effective monitoring and transparency. Both rely on the positive power of giving market share to those companies and traders that follow specific ethical guidelines. In this dream, the State adopts the certification process and uses it for government purchases. Local foodsheds adopt the standard for their own production and sales in local groceries.

Three important standards are farmer compensation, labor and purchasing. Fair trade minimally provides farmers with a living wage, price security and a long-term contract. In India, local foodshed farm insurance helps farmers in times of weather catastrophe. Milestones in labor practices include: how the producer and processors employ minors, children and other family members; grievance procedures; ability for workers to provide input without punishment; nondiscrimination policies; compensation and employee benefits; worker housing and food; pesticide safety; sanitation and safety rules.

**DREAM** *All food and food products have a bar code that can be scanned from an iPhone or equivalent that provides information on production methods, labor, environment and locations within the value chain.*

**DREAM** *New Mexico's Office of International Trade helps support ethical trade and develops guidelines for its own ethical trade practices.*

The OIT already has offices in Japan, Israel and Mexico. It works both to expand sales of New Mexico products and encourage foreign direct investment in New Mexico. Recently, it has promoted a New Mexico salsa company's sales in Asia. It has helped multi-ton contracts for export of New Mexico pecans to Asia. Ultimately, the OIT is the State agency that would develop a State label honoring fair trade practices.

In theory (though rarely in practice), the impacts of lost trade can be compensated for with alternative production (e.g. new crops substituted for the unprofitable, and training to enter the new market). The Trade Assistance Act has not been effective in the agricultural sector in providing alternatives that keep farmers on the farm.

**DREAM** *NMDA and OIT review the local crops most threatened by world trade and design "Green Box" policies (see below) to protect them or explore alternative crops to meet farmers' income needs.*

A major opportunity for fair trade, local foodsheds and increased income to local farmers from world trade is the burgeoning organic market. Combining New Mexico fair trade practices (organic food and food products from low-resource Indo-Hispanic and Native American producers) would appeal to the strongest importers (Europe, Japan and Canada). Sister foodsheds (be they in New Mexico or developing nations) and their nearby cities would trade edible organic crops, grass-fed "natural" or organic meats and sustainably harvested fish. The strongest organic export categories have been grains, beans, fresh and dried fruits, frozen vegetables, nuts, wine, juice, snacks and prepared foods. New Mexico low-resource producers are well situated for many of these foods.

## A SEAT AT THE TABLE

The major barrier to State and local foodshed fair trade with an ethical component is current international and federal laws. National negotiators cite the Constitution and discourage states and citizen groups from having a seat at the world trade table, let alone a vote on trade rules. Local consumers and citizens have little power to change the trade aspects of the food system, except once every five years in the Farm Bill or by pressuring through their Congressmen to revise specific trade bills. Being "pawns" in the food system chess game (an economist's term), their only powers are to refuse to purchase food and food products that they know have been produced with unacceptable ethics ("buycotts"), or stage general boycotts to cut a company's market share and shame it into altering its practices. The "sister foodshed" alternative trade system is the only positive action that goes beyond individual consumer choice.

**DREAM** *A local foodsheds federalism (more decentralized decision-making by states) allows ethical standards to become part of the rules of trade as long as they do not discriminate on unreasonable or unfounded grounds.*

From the ethical point of view, New Mexico preferentially purchases its own low-resource farmers' crops and livestock without violating interstate and global commerce rules. The State also preferably purchases Fair Trade food and food products from marginalized farmers in developing nations. In that sense, it is non-discriminatory in its trade policies. The State purchases the food for emergency, school program, elder



and day care, hospital, government cafeteria and prison foods.

**DREAM** *New Mexico preferentially procures food at a 5–10% price premium, offering long-term contracts, price security and pre-payments to all its own low-resource farmers. By 2020, New Mexico negotiates parallel terms through fair trade associations that represent farmers (and fishers) in similar positions in other states and nations, particularly Mexico, for 5% of New Mexico imports.*

New Mexico's export trade and internal production are so small that they have little chance to violate or be challenged by global rules, especially the World Trade Organization. The State can preferentially procure local food in the WTO's "Green Box" which allows state support of agriculture without limits because it does not distort world trade or causes a minimal distortion at most. In short, nothing stops the State from carving out laws favoring rural economic development including: local purchasing; minority-owned businesses; protection of cultural food cultivars; payments for a transition to organics and payments for eco-friendly practices.

On the other hand, almost anything that crosses a state or international border cannot easily be influenced by the State or a local foodshed. Cross-border commerce falls within the provenance of the federal government: migrant labor, trade rules, direct foreign investment, international loans and direct agricultural aid, food and food product tariffs and quotas. New Mexico cannot, for instance, make its own rules about "green cards" nor place quotas on the amount of chile entering the U.S. market. New Mexico cannot tier its rules about cattle with separate rules for those that remain in-State and those that are re-exported.

In short, global trade rules and foreign investment can pre-empt State goals such as preserving its iconic crop (chile) or improving rural economic development. When trade has multiple goals such as State food security and cultural identity, what should be binding? State policies and budgets, or international trade rules? New Mexico's attitude toward food security and food sovereignty will impact the expansion of local foodshed markets and rural economic health over the next twenty years.

**DREAM** *Any state, which has a substantial interest in the market share of a commodity, should have a seat on the Agricultural Policy Council for discussions of trade about that specific commodity. For New Mexico, seats should be reserved for chile, onions, dairy, beef, pecans and wheat. States with substantial interest can submit an amicus brief in WTO negotiations and international court procedures.*

## Fair trade

Dreaming New Mexico uses "fair trade" in a unique sense. It means market access for low-resource food producers both within New Mexico and in poorer nations. It means an integrated trade network among these producers based on ethical constraints: no child labor, ecological sensitivity, safe food, male/female equity, and fair (negotiated and transparent) profits at every link of the value chain. It is based on an international trade organization formed between two "sister" foodsheds.

**FAIRTRADE** is also a European organization and label that focuses on trade exclusively with marginalized producers and workers in developing nations. **SAFE TRADE** focuses on food security, biosecurity, food safety, biodiversity and preventing serious global climate change. **JUST TRADE** adds national and regional political considerations of local sustainability, food sovereignty and the protection of important sectors and fledgling industries.

**FREE TRADERS** use "fair trade" to mean lower tariffs, quotas and license fees.



## OVERSEAS TRADE

The USDA Market Access Program provides means for agricultural products to expand overseas. The Intertribal Council and its cooperating organization Navajo Tribal Agricultural Products Industry trade globally. They recently promoted New Mexico pinto beans and pelletized alfalfa. Global markets for Native American arts and crafts and blue corn started over a decade ago. Native American agriculture could use export profits to help its own marginalized growers and/or lead a "fair trade/local foodshed" project.





IN THESE TURBULENT TIMES,

# Food security

THESE ARE TURBULENT TIMES and the food system is not immune. If all food commerce suddenly ceased, food stores have one to three days of supplies. In its simplest definition, a “secure” State has seven days of available food. However, Dreaming New Mexico found that “food security” has multiple meanings. This introduction describes the varied approaches to food security and how they intertwine.

Bio-security has become a new and crucial part of national security. Homeland Security investigates the possibility of terrorists contaminating the food supply. While other modes appear more likely (water or power plants), the concern has made traffic between Mexico and New Mexico congested, especially at the Santa Teresa crossing. The food supply, especially the cattle trade, now reflects these inspections and delays. Similarly, ranchers along the border have found their operations entangled in the crossing of undocumented workers, many hoping to work as farm hands, as well as *narco-traffickers* who tear down fences, let fires escape, create anxiety in isolated ranch families, and can greatly burden already over-worked ranch hands. Similarly, the Border Patrol has built roads along the border fence that have removed significant acres from grazing potential.

Globalization and domestic movement of foods have particularly changed our understanding of food security. New Mexico pecans, for instance, have increasingly been exported to Asia. The demand lured Georgia into the export business and Georgia pecans were sent to Texas shellers and to Long Beach, CA for export. With them came a new pecan weevil. This led Mexico to ban the import of U.S. pecans into Mexico to protect its own substantial orchards and export business. (New Mexico pecans are customarily shelled in Mexico.) After months of investiga-

tion and expense, it was determined that the pecan weevil had reached only Texas, and the New Mexico ban was lifted.

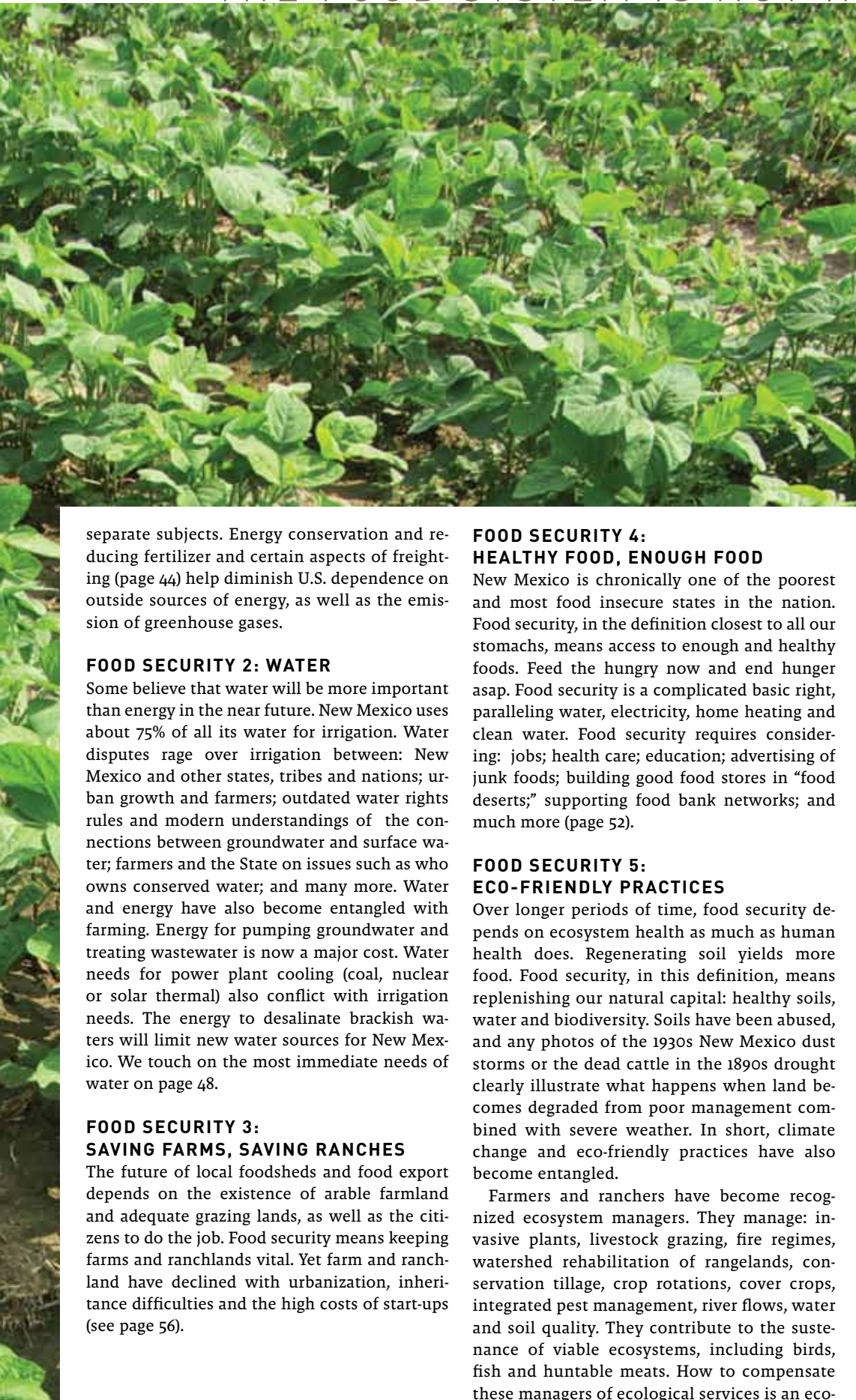
Similarly, the presence of Mad Cow disease from a cow imported from Canada harbors a new need for costly inspections for bovine tuberculosis, poultry New Castle's disease, foot-and-mouth disease and new exotic diseases. These cattle movements do not have to be international. The movement of rodeo bulls (great travelers) apparently spread bovine tuberculosis to some herds in New Mexico's high plains and led to a quarantine and cessation of all sales until the herds could be verified as TB-free. Leafy green vegetables have received special attention after the spinach *E.coli* outbreak.

Besides terrorism and the increased risks of food-borne illness, food security emerged as five distinct concerns among New Mexicans: climate change; water; lost ranch and farm lands; degradation of land and waters; and access to enough healthy food to keep citizens active and in the job force. All have rippling impacts up and down the value chain and all have local, regional, national and international implications.

## **FOOD SECURITY 1: CLIMATE CHANGE, FOOD AND ENERGY**

Food and energy connections are now more apparent. Climate change means more heat energy, and food yields can suffer from this energy imbalance (page 44). To grow foods also requires natural gas for fertilizers, electricity for pumping water and running milk parlors, and fuels to run on-farm machinery as well as to freight food planet-wide. Food has the first or second energy needs in the nation (depending how one calculates these uses) and “energy security” and “food security” are no longer





separate subjects. Energy conservation and reducing fertilizer and certain aspects of freighting (page 44) help diminish U.S. dependence on outside sources of energy, as well as the emission of greenhouse gases.

## **FOOD SECURITY 2: WATER**

Some believe that water will be more important than energy in the near future. New Mexico uses about 75% of all its water for irrigation. Water disputes rage over irrigation between: New Mexico and other states, tribes and nations; urban growth and farmers; outdated water rights rules and modern understandings of the connections between groundwater and surface water; farmers and the State on issues such as who owns conserved water; and many more. Water and energy have also become entangled with farming. Energy for pumping groundwater and treating wastewater is now a major cost. Water needs for power plant cooling (coal, nuclear or solar thermal) also conflict with irrigation needs. The energy to desalinate brackish waters will limit new water sources for New Mexico. We touch on the most immediate needs of water on page 48.

## **FOOD SECURITY 3: SAVING FARMS, SAVING RANCHES**

The future of local foodsheds and food export depends on the existence of arable farmland and adequate grazing lands, as well as the citizens to do the job. Food security means keeping farms and ranchlands vital. Yet farm and ranchland have declined with urbanization, inheritance difficulties and the high costs of start-ups (see page 56).

## **FOOD SECURITY 4: HEALTHY FOOD, ENOUGH FOOD**

New Mexico is chronically one of the poorest and most food insecure states in the nation. Food security, in the definition closest to all our stomachs, means access to enough and healthy foods. Feed the hungry now and end hunger asap. Food security is a complicated basic right, paralleling water, electricity, home heating and clean water. Food security requires considering: jobs; health care; education; advertising of junk foods; building good food stores in “food deserts;” supporting food bank networks; and much more (page 52).

## **FOOD SECURITY 5: ECO-FRIENDLY PRACTICES**

Over longer periods of time, food security depends on ecosystem health as much as human health does. Regenerating soil yields more food. Food security, in this definition, means replenishing our natural capital: healthy soils, water and biodiversity. Soils have been abused, and any photos of the 1930s New Mexico dust storms or the dead cattle in the 1890s drought clearly illustrate what happens when land becomes degraded from poor management combined with severe weather. In short, climate change and eco-friendly practices have also become entangled.

Farmers and ranchers have become recognized ecosystem managers. They manage: invasive plants, livestock grazing, fire regimes, watershed rehabilitation of rangelands, conservation tillage, crop rotations, cover crops, integrated pest management, river flows, water and soil quality. They contribute to the sustenance of viable ecosystems, including birds, fish and huntable meats. How to compensate these managers of ecological services is an economic challenge.

“Chemical fertilizers (made from natural gas), pesticides (made from petroleum), farm machinery, modern food processing and packaging and transportation have together transformed a system that in 1940 produced 2.3 calories of food energy for every calorie of fossil-fuel energy it used into one that now takes 10 calories of fossil-fuel energy to produce a single calorie of modern supermarket food . . . . When we eat from the industrial food system, we are eating oil and spewing greenhouse gases. This state of affairs appears all the more absurd when you recall that every calorie we eat is ultimately the product of photosynthesis — a process based on making food energy from sunshine.”

MICHAEL POLLAN, AUTHOR



# Climate change

FOR FARMERS AND RANCHERS, climate change is not the immediate concern. It adds to other pressures such as: urbanization and taxes; finding good workers and future farmers; existing climate fickleness; price fluctuations and new trade rules; water disputes; species protection; and other financial and ecosystem demands. Many farmers are over sixty and the impacts of climate change will entrench after they retire. Nevertheless, climate change will change New Mexico's food systems and could undermine food security and many of the good intentions of local foodshed and value chain advocates. Some researchers predict farmed acres could fall by 20-25% as a result of climate change.

The most likely future between now and 2050 will see:

- Temperatures increasing anywhere from 4°F to 8°F. General warming will encourage the spread of specific pests and pathogens as well as certain shrubs on rangelands. Higher night-time temperatures will threaten the required chill-hours needed by trees like pecans. Winter warming will cause aseasonal budbreaks and bolting of crops like onions.
- Increased atmospheric carbon dioxide with warmer temperatures can increase yields of certain New Mexico crops as long as irrigation water is available (e.g. corn for grain and silage, soybeans, sorghum, barley and citrus fruits). But other New Mexico crops (e.g. wheat, oats, hay, potatoes and field tomatoes) without irrigation have a less productive future. Projected climate change could reduce New Mexico wheat yields by 10-30% and sorghum yields by 7-9% as temperatures rise beyond the tolerance levels of the crop. Hay and pasture yields could fall by 4% or rise by 9%, depending on how climate changes and the extent of irrigation. Rangelands may see increased invasion of shrubs that prosper with increased greenhouse gases (GHG);
- Milder winters and hotter summers (the frost season will be one or two months shorter) with longer growing seasons, changes in cultivars and increased water use;
- Increased evaporative losses from reservoirs, playas and small wetlands, as well as drier soils from the hotter conditions that will increase farmer dependence on groundwater as, at the same time, recharge may decline;

- Increased evapotranspiration by crops and pastures with increased risks of wilting;
- Increasing precipitation in the form of rain (not snow) with the snow line moving upslope 300 to 1,000 feet. Impacts on acequia farming and *mayordomos* from the earlier runoff peaks and reduced early-summer runoff because of less snow;
- An indeterminate change in rainfall amount and patterns with difficult to predict changes in creek, acequia, and river flows, as well as times of water availability for irrigation; increased groundwater needs during low flows; concentration of water salts and pollutants; and increased water rights disputes and more;
- Increased extreme events, including drought severity, flood intensity, the number of dust storms, and unpredictable hail and inter-storm droughts that will make yields less assured and change crop/livestock insurance rates.

To the consternation of dryland farmers and rangeland cattle-raisers, New Mexico climate has always been variable. The unpredictable weather will now be more so. New Mexico will feel particularly severe temperature increases because it is an inland state without the moderating impacts of oceans. The rate of warming in New Mexico has been about twice the global average. The temperature is now 2°F higher than in 1900.

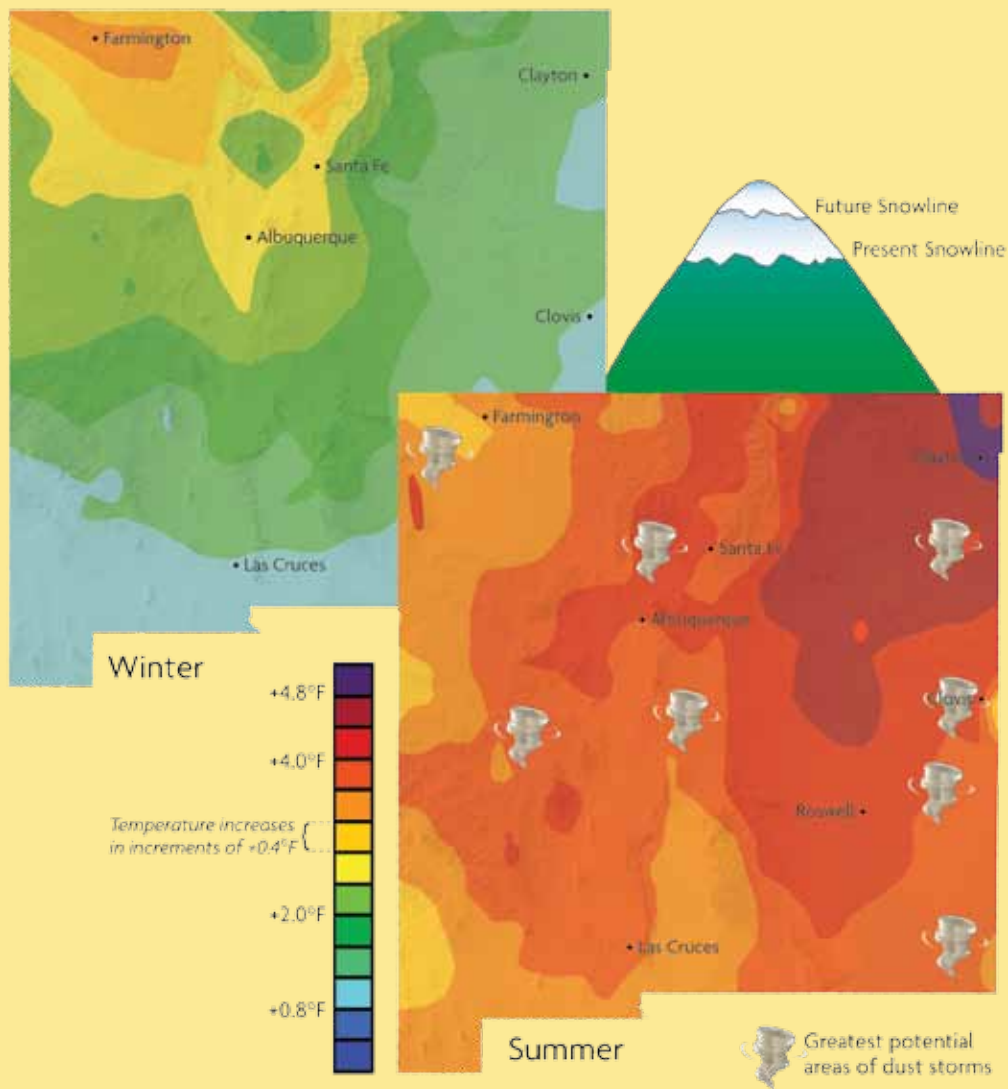


*State and federal research improves weather prediction for farmers and ranchers including hail, dust storms and wind erosion, as well as river flow volumes and water quality.*

## ADAPT AND REDUCE

There are two tasks facing farmers and ranchers. They must adapt to the new weather conditions; and they must determine how much they are willing to help reduce greenhouse gas emissions (below). The first impacts profitability and the second may require financial incentives. A third task goes beyond the farm/ranch gate. Complete value chains need to be assessed for their ability to reduce greenhouse gas emissions — from freighting to wholesaling and consumption. This is both a local foodshed and domestic/world trade challenge.





MAPS COURTESY DAVID GUTZLER (NMU)

**DREAM** A greenhouse gas, agro-ecoregional framework guides this generation and following generations of farmers, ranchers and dairymen. They adapt to and reduce greenhouse gas emissions. Packers, transporters, food manufacturers, retailers, wholesalers reduce their food carbon footprint.

**DREAM** Extension agents and others start agro-ecoregional research on new cultivars that includes cross-discipline expertise in agriculture and climate change. More funding focuses on new pest and pathogen invasions. Incentives to build geothermal greenhouses as well as local hoop houses become part of government climate change payment, green jobs and tax incentive programs.

## VALUE CHAINS AND GREENHOUSE GASES

There is no easy way for consumers to know how many metric tons of greenhouse gases are embedded in their food choices. Embedded greenhouse gases emitted can be measured in: calories/mile, tons/mile or cost for each ton of GHG emitted. Even careful studies have not been inclusive of the complete value chain.

There are many unaccounted “embedded” GHG costs such as mining for minerals, the extraction and manufacture of urea-based fertilizers from natural gas, and energy needs for water conveyance. Difficult to track are additions such as GHGs produced while making a TV spot to advertise a food or construction costs for groceries that carry many food products as opposed to a fast-food restaurant.

Of course, any re-thinking of agriculture and climate change must focus on water. In a separate section (page 48) are tasks to mitigate water-related climate change impacts such as revising Rio Grande and Colorado compacts and water conservation demands.

As in other parts of this pamphlet, there are two value-chain tracks: local foodshed and global-local, mass-market export. We look at freighting first and then the value chain steps. The global-local track averages (with many variations) about 4,200 miles to deliver a bit over 4 pounds of food each day to a U.S. household. The highest number of food miles in the global-local value chain is for red meat because there is so much freighting of both cattle and the feed and fodder they consume in feedlots. Dairy is similar to red

## < CLIMATE CHANGE

Maps show the likely temperature increase in both winter and summer over the next 75 years. The snowline will move 300 to 1,000 feet upslope. Predicting rainfall/snowfall change is difficult (not mapped), but it's certain less snow will fall.

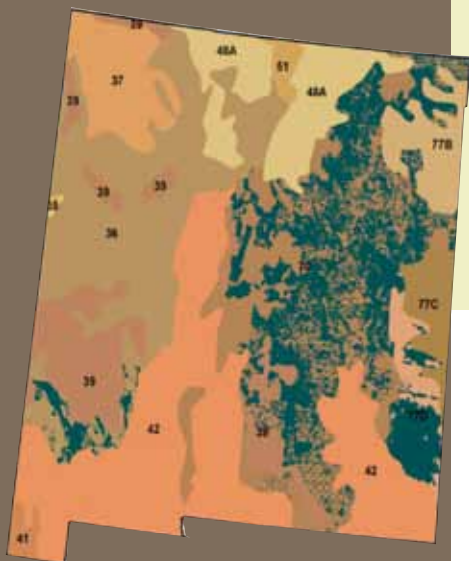
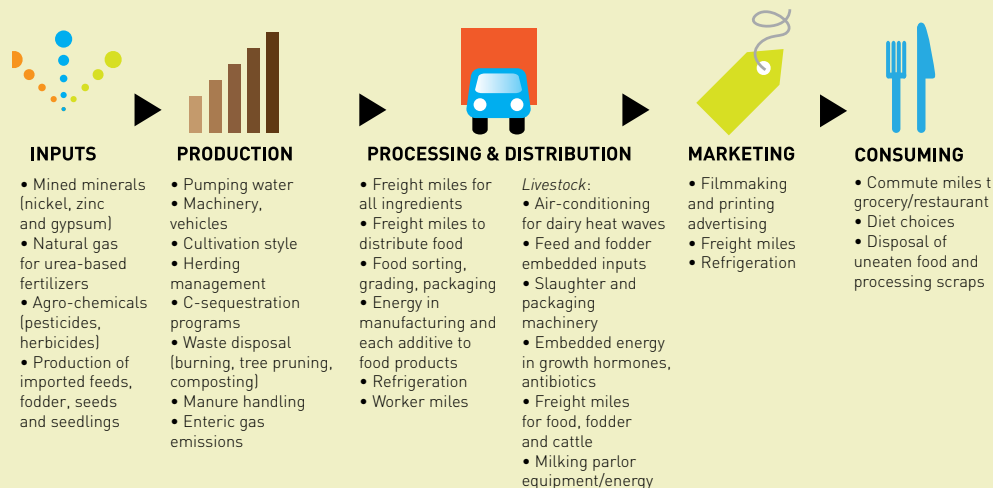
Agro-ecoregional impacts include: The Southern Rockies will have less snow cover and shorter periods of surface runoff and creek flow. Increased soil drought will occur in the fore summer and perhaps summer months. The southern Arid Lowlands will experience lower soil fertility, aseasonal budbreaks and bolting, more invasive species on rangelands, and increased wind erosion. The Colorado Plateau could have warmer temperatures and, if Pacific storms continue or increase, more forage and winter replenishment of soil moisture. Decreasing rain will increase shrubs and reduce carrying capacity of range. Mountainous areas will lose even more piñon trees to severe multi-year drought. Agriculture contributes about 10% to NM greenhouse gas emissions (depending on how much of the value chain is included in assessment).

The rate of warming in New Mexico has been about twice the global average.

# CARBON-FOCUSED FOOD CHAINS

## GREENHOUSE GAS VALUE CHAIN FOR AGRICULTURE

shows all the points where GHG are emitted in the growing of food, from farm/ranch to consumer. Livestock in righthand column of Processing & Distribution.



## Carbon sequestration

Carbon sequestration is limited in New Mexico by the amount and erratic nature of rainfall and the costs of irrigation. The map shows areas considered to have the best potential for carbon-sequestration programs because of elevation and summer rains. The Pecos Canadian plains and valleys would switch about 9,000 hectares of irrigated corn and small grains to perennial grass to sequester about 0.6T of C/ha/year and 1.1T of C/ha/year. No-till gains little carbon. The most promising carbon sequestration would be diversifying rangeland species by adding legumes and retiring some existing cropland.

meat by cost per ton transported, but half that of red meat when measured by calories per ton of GHG emitted (milk has many more calories per unit weight).

**DREAM** Consumers eat less red meat each week, but eat higher quality, local meat.

Globalocal freighting produces about 11% of all household food-related freight emissions. Freight emissions are relatively small because so many more tons of GHGs are emitted during production (especially freighting fertilizers, feed and fodder); and trucks emit many more GHGs per weight of freight (for equivalent mileage) than containerized foods traveling by ocean ships or rail. In today's food economy, becoming a locavore would save about 4% of the total freighting emissions. (This number does not include commuting to the store, or switching from red meats to other sources of protein.)

Within the geography of the local foodshed, trucking can be over 60% of total value chain GHG emissions. Re-configuring the logistics of local foodshed transport becomes a high priority.

Local foodshed knowledge must depend on the farmer's and freighter's own experience. Neither the Federal Highway Administration nor New Mexico State Department of Transportation (NMSDT) estimates local (secondary) traffic. Freight flows to and from in-State distribution centers do not include foods and do not help local foodsheds understand their freighting costs or emissions. To scale up, it would be helpful if these agencies began to collect local traffic data.

**DREAM** Universities and NMSDT help understand logistics costs for small farmers delivering locally.

Consumers try to reduce their commute miles to farmers markets, groceries, superstores, food chains, restaurants and other places with food sales.

At the production stage, there can be a balance between GHG sequestration (see below) and GHG emissions. Nitrous oxide, a potent GHG, comes mainly from petro-based fertilizer application but also from certain soil management methods and manure handling. Though always part of farming, nitrous oxide is particularly plentiful in the animal-based food groups because ruminants are not all that efficient as converters of feed to flesh. Similarly, methane is 23 times more potent than carbon dioxide and comes from New Mexico's large populations of cattle, sheep and goats. GHG emissions are particularly voluminous at dairy feedlots where there is no opportunity for the soil to sequester them.

**DREAM** Reduce nitrous oxide emissions by increasing organic production and improved timing of fertilizer/manure additions; leaner application of fertilizer/manure applications, including better placement of fertilizers and manure; and use of nitrification inhibitors. Reduce methane by improved livestock breeding and nutrition, including non-harmful feed additives to inhibit methane (dairy); and capture methane from manure (biogas electricity and heating).

**DREAM** Concentrated Animal Feeding Operations with over 1,000 animals are placed in a special cap-and-trade program to lower GHG emissions, improve manure handling, change feed composition to reduce enteric GHG emissions, and reduce any degradation of groundwater that requires pumping or wastewater treatment.

MAP COURTESY OF JOEL BROWN, NCRS



New Mexico has quite a bit of leverage with the New Mexico dairy **coops** by virtue of significant loans and grants to their operations. New Mexico has little leverage over beef feedlot operations and diverse multi-national processors, which are outside the State. New Mexico can include GHG assessments in the licensing of in-State small feedlots and slaughterhouses.

Corn and sorghum have been diverted to bioethanol production, attracted by federal financial incentives. Tucumcari has the first mid-scale bioethanol plant connected to a feedlot system to recycle wastes as a protein meal. Each local foodshed will have to decide if this is the best way to use farmland. Should bioethanol come only from waste material? Or should farmers be subsidized to grow feed crops for bioethanol? How much should be left in the field for conservation tillage? Is the future in algal biodiesel aquaculture?

**DREAM** *Each agro-ecoregion assesses its community values and what it desires for bioethanol or biodiesel production.*

Most farming tasks are copasetic: They save farm costs as well as reduce greenhouse gas emissions by conserving energy, reducing inputs and improving nutrient and water management. They also provide value-added ecological services (page 60).

**DREAM** *Farmers and ranchers work to reduce energy inputs for fertilizers, water conveyance and pumping, machinery fuels, pesticides and herbicides, and nutrient management.*

After the farm or ranch gate, local foodshed value chains have a much more effective means to manage for GHGs at all steps than global-local enterprises. Less processing reduces greenhouse gases, and local foodsheds encourage fresher food purchases. Local foodsheds can also recycle organic wastes because they truck between the discarded organic waste and the farms where the waste could be composted or fed to livestock.

**DREAM** *Waste foods from sorters, packagers, institutions, groceries and consumers are sorted so that food can be recycled to livestock or local composting operations.*

## SOIL SEQUESTRATION

Soil organic matter is the key to increasing carbon storage and often nitrogen-compound storage, as well as preventing soil losses by wind erosion in New Mexico. It requires soil aggregates (crumbs), which are glued together by mycorrhizal fungi, and has been defined by government as leaving 30% crop residue cover over the soil surface at planting time. On farms, many conservation tillage techniques and reduced field passages lessen the cutting or turning over of the soil and use

of herbicides to kill weeds. Conservation tillage can reduce GHG emissions and increase carbon sequestration. Organic tillage does not use herbicides with conservation tillage and sequesters the most carbon.

In sprinkler-irrigated High Plains wheat growing, farmers saved over \$60 per acre between conventional and conservation tillage for similar yields. They saved on gas and fuel for irrigation; and less labor on each field. In other words, reducing GHGs, saving money and similar yields all benefited wheat farmers. (They still used fertilizers and herbicides.) During transition, growers may experience increased management needs: yield reductions until crop rotations, residue management and fertility patterns and techniques are established; changes in weed, insect and disease pressures; delayed planting times for cooler soils; and purchases of specialty equipment.

**DREAM** *More soil organic matter on farms and range.*

Other conservation efforts such as computer-guided fertilizer additions for different soils on a field can reduce GHG emissions and increase GHG sequestration. Resting fields in the CRP programs, improved rotations of crops and cover crops can increase sequestration. Adding biochar can also help build soil organic matter and reduce GHG emissions. On rangelands, rotational grazing and improved forage can both reduce GHG emissions and increase sequestration. Joel Brown of Jornada has suggested feeding cattle a “pill” (bolus) with legumes to diversify rangeland plants and improve the carbon/nitrogen ratio. (Cattle would spread the seeds through cow paddies.)

There has been much enthusiasm for paying farmers and ranchers for carbon sequestration. The issues have been the effectiveness and cost of soil monitoring and who would do and pay for it. Instead of monitoring the soil, others have suggested farmers and/or ranchers be paid for carbon sequestration when they perform “certain practices” rather than soil monitoring. “Practice standards” may be preferred by organic farmers who have already built up the carbon in their soils.

In arid New Mexico, the main problem is unreliable and low rainfall. The regeneration of soils may require more irrigation water than can be obtained. The lack of water greatly limits the ability of an agro-ecoregion’s soils’ ability to sequester GHGs in non-irrigated farms and rangeland compared to areas of more reliable summer rains such as rangeland in the Central and High Plains.

**DREAM** *State and federal funds help farmers transition from conventional/chemical to organic or no-till agriculture with special loans, grants and tax breaks for a specific number of years.*

## Freight facts

- Top New Mexico commodities by weight are farm products and coal. Farm products that moved to, from and within New Mexico weighed 13 M tons (1998); projected to grow to 16 M in 2020. Freight receipts for commodity farm products were about \$5 billion (1998); expected to grow to \$8 B in 2020.

- New Mexico imported over 102,000 tons of natural gas-derived nitrogen fertilizers, over 5,000 tons of mined phosphate-related and 15,000 tons of potash fertilizers (2007). Additional multi-nutrient and other fertilizers exceeded 130,000 tons. A total of 235,000 tons of imported fertilizers shipped into New Mexico.

- Although difficult to determine in total feed-miles, New Mexico shipped more than 2.4 billion tons of feed around and into the State. Major feeds include canola pellets, mixed dairy and cattle feeds, corn products, distillers’ by-products and soybean products.

- Over 26,000 tons of pet food were shipped to New Mexico in packages of more than 10 pounds.



# Water



WATER IN NEW MEXICO is “*Don Divino*,” the divine benefactor of sustenance. Native Americans have worshipped and danced for rain for thousands of years. When local foodsheds were the only foodsheds, water was life. Today there are great disharmonies between humans and water resources. As discussed in the Bio-cultural section, water can be viewed as a monetary commodity, an option for growth in the future that must be “banked” in the present, or for its intrinsic worth to all life (fish, trees, riparian birds).

Farming uses the most water from rain, surface water diversions and groundwater. In drought years, 78% of all New Mexico water use goes to farming. Depending on the year, New Mexico farmers irrigate about 900,000 to 1 million acres, totaling about 25% to 75% of all the farmland in an agro-ecoregion. Surface water comes from the Rio Grande, Colorado, Canadian and Pecos rivers basins as well as small amounts from runoff in the closed basin areas of the Transition Mountains and southern Arid Lowlands (map). Groundwater basins — especially the Ogallala (High Plains), Estancia, Roswell, and Tularosa — supply significant irrigation water.

Water is also the most complex of agricultural resources. It can come from surface water “hydro-basins” or watersheds, which do not match the boundaries of the groundwater (page 51) basins below them, and do not overlap with the agro-ecoregions that are fed by a diverse suite of weather patterns, river flows and groundwater. The inability to look at these three different sources (weather, riverflow and groundwater) and see their interconnectedness has produced a bizarre and Byzantine set of water rules that resist harmonizing. Local foodsheds, of course, utilize many river and groundwater basins with varying weather patterns in order to ensure secure food supplies.

## SEVERE DROUGHTS AND WATER-YEARS

In New Mexico, a particular region can experience a “weather drought” from too little or infrequent rainfall, but compensate for the drought by pumping groundwater or diverting surface water. For instance, during the 2005 drought, Doña Ana county in the Arid Lowlands could not divert its surface water allocation because rains and snow had failed hundreds of miles north in the Southern Rockies (weather drought upstream

had become river drought downstream). Doña Ana switched to groundwater and suffered no losses in irrigation water. Cibola County, also in the Rio Grande basin, had little groundwater and could not compensate for low Rio Grande flows. It suffered a 75% water shortage for irrigation. With the fickle behavior of rain and snow and increasing annual temperatures, New Mexico irrigation security has greatly diminished.

**DREAM** *New Mexico revises its water compacts and irrigation allotments by water-years.*

Water-years equitably change farmer and urban water use in harmony with surface water flows and weather. They define (usually) six types of water-years: normal; above average; very wet; below average; very dry; and critically dry (which occurs when there are three to five years of consecutive below average water-years). At the moment, even in critically dry years, New Mexico is obligated to send Pecos River water to Texas at a level that would not occur with equitable understanding of weather patterns. New Mexico has been forced to pay cash for “under-supply.” The “water-year” approach has been adopted in California and will become crucial as climate change deals its cards.

The subject is complex. Some regions of New Mexico can compensate for surface water and weather with groundwater. However, some wells near rivers are not subject to water diversion rules even when the wells indirectly suck the water from the rivers. This practice lowers the river volume available to downstream irrigators, who may have senior rights to the water.

**DREAM** *New Mexico defines those areas where groundwater can compensate for low river flows and allows these irrigators to sell their surface water during very-dry and critically-dry years.*

**DREAM** *Irrigators with senior water rights become safe from emergency urban allocations and withdrawals by planned critically-dry year revisions of water rights in which irrigators would (for that year) be financially compensated for their irrigation losses.*

The process is of course not as easy as it sounds, as upstream withdrawals can impact downstream users and monitoring of the water diversions would have to be honest and verifiable.

PHOTOS THIS PAGE: SETH ROFFMAN





## < NEW MEXICO'S LIFELINE

New Mexico is an arid state. Farms and ranches withdraw as much as 78% of New Mexico's water supply (2005), almost 4 million acre-feet of water. About 875, 500 acres require irrigation. About 60% comes from surface water and 40% from ground-water wells or a combination of the two.

The maps shows: major river basins, aquifers, dams and irrigated areas. The circle graph shows irrigated vs. non-irrigated agriculture for each agro-ecoregion.

Agro-ecoregions: The High Plains relies on the Ogallala and Roswell aquifers as well as the Canadian River for irrigation. The Arid Lowlands irrigates from the lower Rio Grande and Pecos Rivers as well as the Tularosa Basin, closed basins and other limestone aquifers. The Central Plains relies on the Upper Pecos River and Santa Rosa aquifer. Although some local wells exist, the Southern Rockies depends on Rio Grande and Canadian surface waters; while the Colorado Plateau relies mostly on diversions from the San Juan River.

## GROUNDWATER AND SURFACE WATER

**DREAM** Define areas where groundwater can compensate for low flows and critically-dry rain-fall years, and zone these as "food security" zones.

These areas have the greatest potential to produce food far into the future, no matter what the climate or politics of food imports. They need to become agricultural "reserves" free from conversion into urban areas.

**DREAM** New Mexico defines those areas where it is known that well pumping impacts surface flows and where wells potentially interfere with surface flows. Apply water-year pumping limitations on those properties.

Pretending that well pumping does not seriously impact surface flows has been a major bar-

rier to rational water management and has hurt farmers more than any other New Mexico constituency. By authorizing domestic wells one-by-one, the cumulative impacts of subdivisions and urban diversions have been largely ignored (with a few exceptions). In addition, upstream irrigators with wells have been able to take surface water from downstream senior rights holders. These water rights are called "conjunctive water rights" in hydro-lingo in order to specify that groundwater and surface waters are interconnected.

## HELPING DON DIVINO

**DREAM** Assure priority calls and priority rights of the watershed of origin cannot be undermined.

Acequias, Pueblos and to a lesser extent tribal reservations have suffered by rules that do not protect their water at the headwaters of their watershed. The acequias have success-

When local foodsheds were the only foodsheds, water was life.

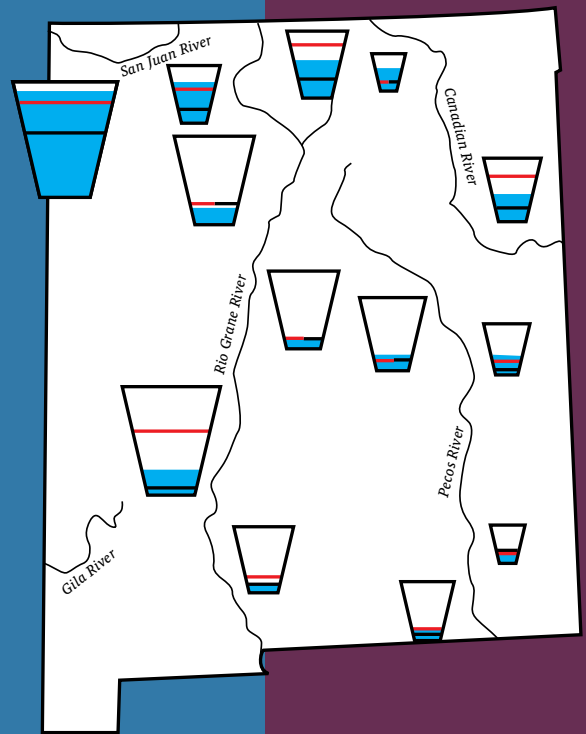


## Irrigation

There are three basic choices for irrigation in order of increasing effectiveness of water use efficiency (conservation): surface, sprinkler and trickle. Besides choosing the most efficient irrigating equipment, water conservation measures include: canal liners; control of weeds and vegetation in conveyance structures; improving flow regulations structures; monitoring soil moisture and scheduling water deliveries and irrigation to meet crop demands; land leveling; conservation tillage and no-till; recovering runoff and tailwater; and selecting/improving proper application methods.

## Reservoirs in drought

The "glasses" are the reservoir capacities for major New Mexico dams. The blue filling shows the level of the dams during the drought year of August 2005. The red line is the reservoir's average volume. The dashed line was the level in 2004. The biggest reservoir is Navajo dam which is 90% full. Elephant Butte Dam (second from bottom on Rio Grande) is 23% full, less than half its average. Caballo Dam, the most downstream dam on the Rio Grande, is only 7% full. The Pecos River dams vary from 14% to 39% full. Can this drought year become the new normal with climate change?



## Water banks

Water banks exist in almost all western states. New Mexico has a water bank for the Pecos River and acequias can create water banks, if they wish. There are significant differences in the ways water banks work, particularly the degree of involvement surrounding sales, pricing and price controls. The common goal is moving water to where it is needed most. Water banks assume the roles of broker, clearinghouse and market maker. Brokers connect or solicit buyers and sellers to create sales. A clearinghouse serves mainly as a repository for bid and offer information. A market maker attempts to ensure there are equal buyers to sellers in a market. Many banks pool water supplies from willing sellers and make them available to willing buyers.

## Water facts

- Irrigated farms (2007): 10,200. Irrigated acres: 830,000. Irrigated farms with harvested crops: 8,492 (648,000 ac). Irrigated pastureland: 2,918 farms/ranches (182,000 ac). Irrigating more than 2,000 ac each: 800 farms (total of 430,000 ac).
- Drip irrigation accounted for 18,875 acres (2%); flood for 448,599 acres (51%); and sprinkler for 407,941 acres (47%).
- Self-supplied livestock withdrawals were over 57,000 acre-feet or 1.4% of total ag withdrawals (2007). Per capita daily water needs: non-dairy cattle (10 gpcd); dairy cattle (100 gpcd); chickens (0.08); hogs (3); horses and mules (13); sheep (2.2)
- Generally, 60% irrigation comes from surface water; 40% from groundwater. Of this, 15% irrigated with either or both surface and groundwater.
- Irrigation varies with agro-ecoregion and weather (see page 7). For example, Alfalfa, at Elephant Butte, requires 4.6 feet of irrigation water; at Middle Rio Grande, 3.2 feet; at Rio Arriba, 2.3 feet.



fully won special water rights that prohibit transfer of water by pipe outside the watershed of origin without acequia permission. Because of ancient claims, most Native Americans have won priority calls on their traditional waters. Both acequia and Native American rules preserve irrigated farmland.

The best way to share water is to use only what you need and devise ways to save more. There are two different paths to water conservation: for the farm and for the waterworks system of the river basin. They have two different goals. Farmers need “growth” water, “leaching” water (to rid the land of salts) and “conveyance” water to move the water from river to the fields. Hydro-basin administrators need to meet compacts of downstream users — Texas and Mexico. Their goal is to minimize in-stream water depletions. Each works with different tools.

Farmers work with on-farm conservation practices. They may not be concerned about hydro-basin administration as long as they receive their promised volume of water on schedule. Farmers try to finesse the right amount of application water to grow the highest yields. With State subsidies, they may switch to drip applications.

On the other hand, hydro-basin administrators try to store water without great losses to evaporation. Dreams include holding water in northern New Mexico as long as possible or storing surface water underground. Some even dream of shutting down Elephant Butte dam and replacing it with another dam near the Colorado border.

## CONSERVATION COMPLEXITIES

Water conservation rules and understandings make simple conservation practices rare. New Mexico rules allow farmers to market water used in the field but not the “conveyance” water. This discourages canal lining, which in many circumstances would save water. On the other hand, many farmers like “leakage” which supports trees and habitat. Should farmers be paid for this eco-service instead of the eco-service of saving water by ditch-lining? And, should they be forced to sell only to downstream users? If they sell to up-stream users, they reduce conveyance waters and in-stream flows above their point of diversion.

**DREAM** Allow flexibility in conservation practices by creating a checklist of potential harms and benefits, and hold forums with the State Engineer’s Office in which all players in the watershed have a seat and equal voice.

## ADJUDICATION

The situation for farmers has become even more insecure because many river basins remain unadjudicated. Adjudication determines who has a senior water right and how much water it involves. There are: federally reserved water rights for military and tribal reservations and endangered species; special water rights for Pueblos;

water rights under the Treaty of Guadalupe Hidalgo with Spain; and State water rights in declared groundwater basins. In 2001, fewer than 15% of all agricultural water rights had been adjudicated in the last 100 years. To provide security to farmers and ranchers, adjudication must be the highest priority.

**DREAM** Adjudication is considered a “green jobs” project. The State requests federal funds and completes all adjudications by 2020. Install meters at all wells and diversions.

The green jobs request can easily be argued for all inter-state basins. Funding for training, measurement, metering wells and monitoring can be included in the green jobs request. To spur completion, the Legislature could pass a bill that no more water permits can be issued in un-adjudicated areas after 2015.

**DREAM** “Adjudication” becomes a locally agreed upon decision of watershed users. Authority to re-organize priority calls and sequence water diversions devolve to a watershed water master in any watershed community that wishes to revise existing timing and volume rules for the sake of efficiency, conservation and other watershed protection goals.

## BENEFICIAL USE

The beneficial use rule, as originally written, requires use within a four-year period or forfeiture of the water right. The beneficial use doctrine brings up questions of ethical choices about benefits. Who is to decide what is “beneficial” — golf course irrigation, protecting the silvery minnow, the future plans of towns and cities who do not need the water at the moment, or farmers more than city folks.

If farmers, for instance, conserve water and do not use it for four years, they run the risk of losing it. This happened to Native Americans, starting in the 1930s. Between 1938 and 1964, tribes in New Mexico, on average, lost more than 60% of their irrigable lands to non-use by tribal members. This loss was exacerbated by the hostility of non-tribal agencies, in particular the Middle Rio Grande Conservancy District, the Bureau of Reclamation and federal courts in rulings on water rights tribes had historically claimed.

Beneficial use has been tweaked to favor certain constituencies. Cities can now obtain waivers despite non-use, to retain their water rights for forty or more years. The Pecos River has New Mexico’s first water bank (see facing page). The USFWS has tried to guarantee in-stream flows for endangered fish as a beneficial use. Beneficial use like conservation practices needs an informal (rather than litigated) forum to make decisions watershed by watershed.

**DREAM** A cabinet-level Secretary of Water and Watersheds, held by a person with trans-disciplinary training and experience in ecology, biology, anthropology, law and hydrology.

# Why water management is complicated

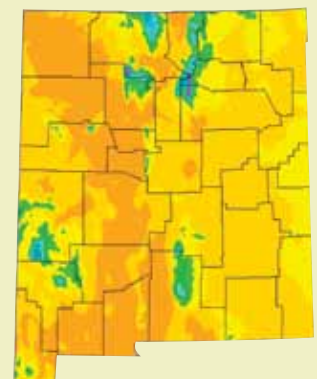
The boundaries of river basins (a), groundwater basins (b), weather patterns (rainfall shown, c), and agro-ecoregions (d) do not coincide. This makes coordinated water management complex. On top of these boundaries are water district boundaries and more complications. The natural boundaries are not clear: ground and surface waters exchange waters; snow delays recharge and runoff compared to rain.



a



b



c



d

# Healthy farms, healthy people



PHOTO: SETH ROFFMAN

About one-quarter of the State's children are not sure of their next meal.

NEW MEXICO HAS A CHRONICALLY high poverty rate, usually one of the nation's bottom three states. In 2006, the New Mexico Association of Food Banks provided emergency food for an estimated 237,900 different people. Approximately 35,800 individuals receive emergency food assistance in any given week. The situation appears to be worsening. New Mexico is 49th in child food insecurity — about one quarter of the State's children (120,000) are not sure of their next meal. New Mexico diets have deteriorated over past decades. The Center for Disease Control estimates that 60% of New Mexico residents are either overweight or obese. Close to 80% eat fewer fruits and vegetables than nutritionists recommend, and over 20% report they do no physical activity at all. Major nutrition-related diseases (diabetes II, cardiovascular) are above national averages when undiagnosed cases are included.

The government, faith-based communities, non-affiliated nonprofits and a few businesses have tried to provide access to food for those in need. In the best survey done in New Mexico, faith-based groups (churches, mosques, synagogues and other religious organizations) run about 70% of food pantries, 63% of soup kitchens and 33% of shelters. Private nonprofit organizations with no religious affiliation perform the balance. For the New Mexico Association of Food Banks, volunteers staff 89% of pantries, 93% of kitchens and 77% of shelters. Many programs rely entirely on volunteers: 67% of their pantry programs and 46% of their kitchens have no paid staff at all. These compassionate organizations keep New Mexico from experiencing widespread and persistent hunger.

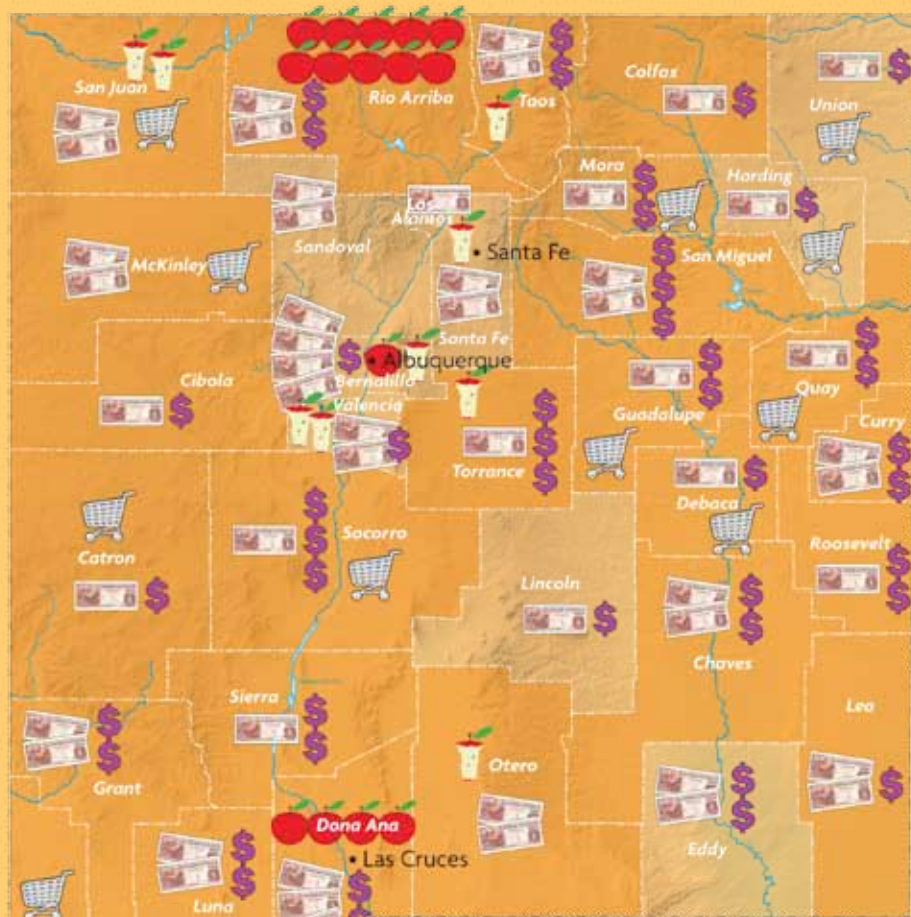
**DREAM** By 2020, eliminate chronic food insecurity. All people have access to a culturally acceptable, nutritionally adequate diet through non-emergency ("conventional") food sources at all times. Government, faith-based and non-affiliated nonprofits and the business community ensure a price spectrum affordable to all citizens.

## ENDING HUNGER

Is nutritious food a basic right like clean water and air, home heating in winter or electricity? What are the moral obligations of NGOs and religious institutions to reduce food insecurity and find work to lift citizens out of poverty? What are moral obligation of NGOs and religious institutions as well as the private sector? How do food groups, businesses and the State balance charity and jobs? How many additional jobs can the local foodshed create that will relieve the most food insecure?

Secure food is closely tied to income. In 2006, among those seeking emergency food, 73% had individual incomes below the official federal poverty level during the previous month; 17% were homeless; and 81% of the households had an income of 130% below the federal poverty level. The food-needy fall into two general and ambiguous groups: those who cannot fully take care of themselves nor earn enough income to pay for their basic needs such as the poor elderly, children and mentally or physically disadvantaged and those who find themselves in circumstances that are hopefully transitory and not chronic. The later group should be considered a resource to help end hunger.





Counties with 17% or more in Poverty

Number of Citizens on Food Stamps per County (2008)

One: 0 – 2,000  
Two: 2,000 – 5,500  
Three: 10,000 – 15,000  
Four: 30,000 +

Food Deserts

Fewer than 3 groceries per thousand square miles and/or more than 50 miles to nearest grocery.

Amount of Monthly Food Stamp Value per County

None: less than \$75 per capita  
One: \$75 – \$150 per capita  
Two: \$151 – \$224 per capita  
Three: above \$225 per capita

Each apple represents a farm supplying schools  
School districts buying from local farmers



## < THE FOOD GAP

This map shows the connection between poverty and food insecurity. Russet areas are counties with 17% or more poverty rates and food stamp needs. The inset map shows areas with food banks. Food access is a major problem in poor sections of cities, which lack full-service groceries, and in rural areas with long distances between home and a good grocery (see icons on map).

Healthy food is a new challenge for emergency and school food distributors. The map shows farmers and school districts that purchase direct fresh food for their students. In simple terms, food security requires two tasks: Feed the hungry now, and end hunger asap. It includes health care and job quality issues.

## Federal definitions

**FOOD INSECURITY:** Limited and uncertain availability of or ability to acquire nutritionally adequate and safe foods.

**HUNGER:** Uneasy, painful sensations caused by a lack of food; recurrent and involuntary lack of access to food.

**FOOD SECURITY:** Access at all times to enough food for an active, healthy life. Minimally: the ready availability of nutritionally adequate and safe foods; an assured ability to acquire acceptable foods in acceptable ways (without resorting to emergency food supplies, scavenging, stealing or other coping strategies).

**DREAM** The food gap is approached as multifaceted, not solely the provision of emergency food. The local foodshed community sees the pantries, kitchens and shelters as crucial resources to coordinate job training and health care programs in nutrition, cooking, gardening and food service.

The partial solution for those who will always remain disadvantaged and the complete solution for those in transitory poverty require various food banks, shelters and pantries to: Counsel clients on nutrition, WIC, food stamps, other government programs, legal services, housing services, finding short-term shelter, subsidized housing, housing repair and rehabilitation, and short-term financial opportunities; directly assist clients on utility, heating and energy bills, health, transportation, clothing, furniture, senior programs and food pantry take-home bags; enroll clients in programs such as welfare-to-work, job training, job choice, work for the physically disabled and mentally

challenged; and educate (e.g. nutrition, consumer protection, language translation).

The dream has already achieved a few major steps such as: nutrition tied to health care; fresh food for food banks; and school gardens (see back inside cover).

## THE FOOD GAP AND LOCAL FOODSHED

The qualities of food have not been the high priority for those trying to feed the needy. New Mexico pantries, kitchens and shelters all need more food or meals than food banks can supply. They graciously accept food donations from food drives, local merchants, farmer donations and religious organizations. Perhaps half of all emergency food comes from the federal commodity program.

Local foodshed farmers and distributors could provide seasonal fresh fruits and vegetables, milk and dairy products, beans, nuts and eggs

## Healthy school dreams

- Schools improve the quality of their offerings by increased reimbursements for school meals, funding for Backpack take-home foods and buying local, fresh foods with information about the farmer.
- Funding has “strings attached:” no trans-fats, no high sugar and only low fat foods. These same rules apply to à la carte meals and vending machine foods and beverages.
- Recess occurs before lunches to improve appetites and lunch-eating times extend for better digestion and consideration of the importance of food.
- Schools provide classes in nutrition, cooking and growing foods (once called “home economics”) to reduce incidence of diabetes II, cardiovascular disease and obesity. Nurses screen high risk schools. All schools grow a Zia Garden (back cover).

closer to users than most farm-to-food-bank distributors. With capital, a subsidized local bakery could produce nutritious bread with local wheat with an assured subsidized market. With more difficulty, food banks could become part of the revival of local broilers and meat sources.

**DREAM** *Local foodsheds make important contributions to feeding those in need, especially with local, fresh foods. Food banks and food distributors pursue a local, subsidized distribution and processing organization to increase the procurement of local, fresh foods for feeding emergency and disadvantaged families and citizens.*

The best way to assure the origin of foods and food products is to buy them direct from a local farmer. Groups like Farm to Table (F2T) have been leaders in connecting farmers to schools with food insecure students. (Among households served by the New Mexico Food Bank, 70% of students also received federal school lunch and breakfast programs.) F2T has the benefit of providing very fresh food direct to the schools and avoiding many intermediary costs. Major steps toward helping elderly and poorer citizens have begun with authorizing special farmers market debit cards and a small CSA/elder delivery program.

There is no program of farm to emergency food distributors, even though over 20% of the pantries, about 60% of the kitchens and over 65% of the shelters purchased fresh fruits and vegetables (2006).

**DREAM** *Contract with local farmers to provide fresh food by donating and/or purchasing at cost their cosmetically imperfect foods to food banks and other emergency food services. At the end of farmers market days, pick up the good quality produce that farmers do not want to take back to the farm.*

Often local farmers are looking for secondary markets for lower-grade produce. It can provide a stability and diversity of market options for culled seconds and final cleanup of field harvests. They can also receive receipts for donations for any produce gifted to food banks.

The direct purchase process, besides its moral satisfaction, provides a double security: The farmer can predict part of his/her income, and the food bank or food destination knows what it will receive. There are two challenges: Meeting State procurement standards and logis-

tics costs requires start-up financial help, and diverting federal commodity purchasing funds to local purchasing requires changing the federal Farm Bill.

## HEALTHY FOOD

Most pantries and food banks rely almost entirely on nonperishable food. Much of the food provided through pantries and food banks is not low-fat, low-sugar (corn syrup) or low-sodium. This means that people who rely on food pantry food have an overconsumption of high-calorie and high-salt foods. Many of the clientele already have severe obesity, cardiovascular and diabetic issues (see Fact Box). They need special diets, and the system is completely insufficient to meet the special diet needs. Many are not aware that the option is even available in a limited way. Because New Mexico also has the second lowest health coverage in the nation, the costs of treating these nutritionally related diseases fall on the taxpayer. The situation is only a bit better for “non-emergency” government-helped diets of school children, the battered and the elderly.

**DREAM** *By 2015, ban all trans-fat foods in school programs. By 2020, eliminate trans-fat from emergency food programs. Change institutional environments (especially schools) to provide easy access to physical activity opportunities and healthy foods. Require all health insurance vendors in New Mexico to cover obesity.*

**DREAM** *Institute a statewide tax on beverages with minimal nutritional value (the “corn syrup” tax) and direct the revenues to fund obesity and health-related services.*

**DREAM** *Eliminate vending machines in schools and public buildings that sell foods that contribute to obesity, diabetes and cardiovascular diseases. Pass legislation to eliminate all “junk food” advertising on publicly supported media and institute equivalent bans for children’s shows on a national level. Require nutrition education in schools.*

**DREAM** *Expand preventative screening at major food distribution nodes and schools to diagnose Type II diabetes and cardiovascular diseases. Establish public health body-mass index surveys to pinpoint locations in need of the most education and aid. New Mexico now requires physical activity during recess or another time of day for schoolchildren.*





## FOOD DESERTS

Poor access occurs when there is no food source nearby and transport is difficult. In cities, poor access occurs when food distributors run out and when there are no or scarce good groceries in a neighborhood. Poor access occurs in the rural areas (“food deserts”) when a good grocery cannot be found within 35 to 70 miles of a household.

**DREAM** *Help New Mexico Passenger Transport Association find funds for an improved rural transport system. All over the State, bus routes and elder/disabled vans are designed for full-service groceries and access to food stamp offices.*

In towns and cities, when demand so exceeds supply that a food pantry or soup kitchen runs out, there is currently no system for sending clients to another site. Manual Salud, La Comunidad Habla and The New Mexico Alliance of School-Based Health Care have begun to address this issue. In non-emergency planning, the long-term solution includes: expanding neighborhood stores to stock healthier foods; facilitating local food coops and buying clubs; developing year-round public markets; and cities helping to assemble enough land and provide tax incentives for full-service groceries.

**DREAM** *Create a network that notifies all emergency food distribution centers of food needs so that clients can go to nearest food source, or the food source can truck more food to the depleted location.*

In rural areas, there is a need to attract regional or national chains to underserved areas. If a casino can subsidize a local full-service grocery, then the Pueblo or tribe can create better access. To attract markets to underserved areas requires a State policy on tax credits and/or a subsidized transport system. La Montanita, for instance, has started a Gallup branch with weekly deliveries from its storehouse. Philadelphia’s Fresh Food Financing Initiative has built a revolving loan fund for cash-strapped storeowners in rural areas to purchase coolers to increase the availability of perishables.

**DREAM** *Casino, government and private funding help subsidize the spread of full-service grocery stores into food deserts.*



## Food gap facts

- 17% of New Mexico households are food insecure (’06). 6% have very low food security.

- New Mexico is 49th in child food insecurity (24% of the children; 120,000/495,000). 18% live below the poverty by federal definition.

- Diabetes II from poor nutrition has become a major cost issue for New Mexico health care. Diagnosed diabetes in New Mexico continued to increase from 2000 to 2008. Diagnosed and undiagnosed diabetes exceed 10% of the population.

- A high-calorie diet, combined with a lack of exercise, accounts for one-fifth of the annual deaths in the U.S.

- For the same foods, a rural basket costs \$85; an urban basket \$55. In one study, 25% of small rural stores do not carry fresh vegetables or fruits.

- 60% of New Mexico residents are overweight or obese (one-third overweight; one-quarter obese). Nearly four of every five State residents eat fewer fruits and vegetables than nutritionists recommend; 22% report they have no physical activity. Source: Centers for Disease Control.

- Cardiovascular disease (CVD) generally takes years or decades to develop. Prevention begins during

childhood, where healthy habits can be developed. Over half of New Mexico high school students reported not engaging in recommended amounts of physical activity, and nearly 11% are obese.

- Death rates from heart disease and stroke are lower than the national average. However, certain New Mexico groups are disproportionately affected by CVD. From 1996-2000, American Indian/Alaskan Native men, Asian/Pacific Islander men and Hispanic men and women had higher rates of CVD death than their U.S. counterparts.

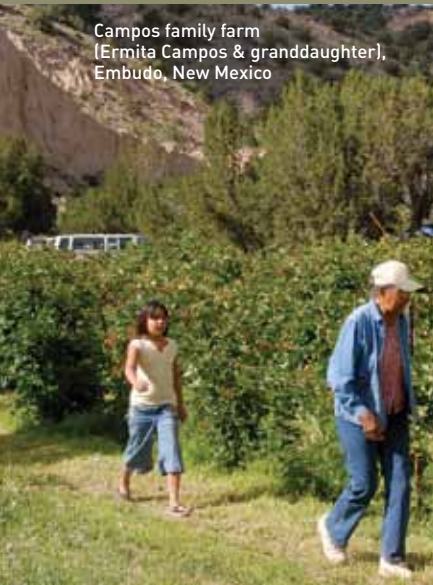
- One-fifth (20%) of New Mexico residents have no health insurance — the second highest rate in the U.S. Only half of New Mexico State employers offer health coverage. Lack of insurance carries significant public costs, since both county governments and medical facilities pay for treating customers who are not covered. Costs are estimated to be \$6 billion per year.

- New Mexico’s poverty rate: 17 to 19%, depending on year.

- Feeding America serves New Mexico, distributing 28 million pounds of food to 162 emergency pantries, 12 soup kitchens, 7 shelters, 29 residences, 7 day care centers, 22 multi-service facilities, and 12 senior agencies. They sponsor 38 youth programs. About 35,000 volunteer-hours are donated each year.

# Farms and ranches forever

Campos family farm  
(Ermita Campos & granddaughter),  
Embudo, New Mexico



Many farmers and ranchers have only one asset — their land.



ONE CRUCIAL MEANING of local food security is enough farmland and rangeland to seasonally feed the citizens of the local foodshed. New Mexico lost 3 million farm/ranch acres between 1997 and 2007. The American Farmland Trust reports over 2.6 million acres at risk from low-density developments, especially in the high mountain valleys of the Southern Rockies and on the mixed grasslands at the base of mountains. Further land has been lost to coalbed methane extraction, solar farms and mining.

Many farmers and ranchers have only one large asset — their land. When they retire, they sell this asset for a retirement fund. When they die, the land can become involved in family disputes and horrendous estate taxes. Who will have the farm? It is easier to cash out and divide the money than divide the land and its assets. Even if the land can be divided, the farms become smaller and smaller and soon become too small to be profitable. The combination of difficult family finances and eager developers has been devastating.

The loss of New Mexico farmland has accelerated in part because water speculators and cities are willing to purchase water rights now and lease back the water for the remainder of a farmer's life, allow dryland farming or allow the farmer to buy water from an irrigation district. The State has bought the water rights for thousands of irrigated acres, and shut down the irrigation to keep the Pecos River flowing at a rate that meets its obligation to Texas.

Farms and ranches do not operate without farmers and ranchers. It's underpaid and hard work, and there are not many youngsters who see it as a future, especially as their main source of income. The lack of land, mainly affordable land, increases. Near-metro farmland, which can offer a good truck-farm market and better paying jobs to complement farming, is both pricey and scarce. In the U.S., the average age of a "beginning" farmer is 55 because would-be farmers and ranchers must first earn the capital to buy or rent land from off-farm jobs. The majority of new farms is below 1,200 acres, the U.S.D.A. minimum "standard" for most farms to become financially self-sufficient.

Finally, there must be enough farmland to generate enough local business that the agricultural value chain does not fragment. In most instances, sprawling development is a net drain on county and municipal coffers because of the cost of providing infrastructure and services. Farms, on the other hand, though they pay lower taxes, pay more in taxes than it costs the local government to provide services.

**DREAM** A statewide program to preserve all irrigated farmland especially lands on the best soils with both groundwater and surface

water irrigation potential. A statewide program to maintain and improve all high quality rangelands for cattle, sheep and goats.

New Mexico private citizens and groups such as the Malpai Group, federal (especially NCRS) and State government programs and passionate NGOs such as the Rio Grande Agricultural Land Trust have made efforts to preserve farms, ranches and old and new families for the next generations. New Mexico has just passed (2010) the New Mexico Farmland Preservation Act which, along with its tax credit (see below), frames a do-able dream for agricultural land preservation. The Act allows the State to seek matching funds from federal programs such as the USDA's Farm and Ranchland Protection.

**DREAM** New Mexico begins a comprehensive effort to save farms and ranches that includes provisions for matching funds from the federal government.

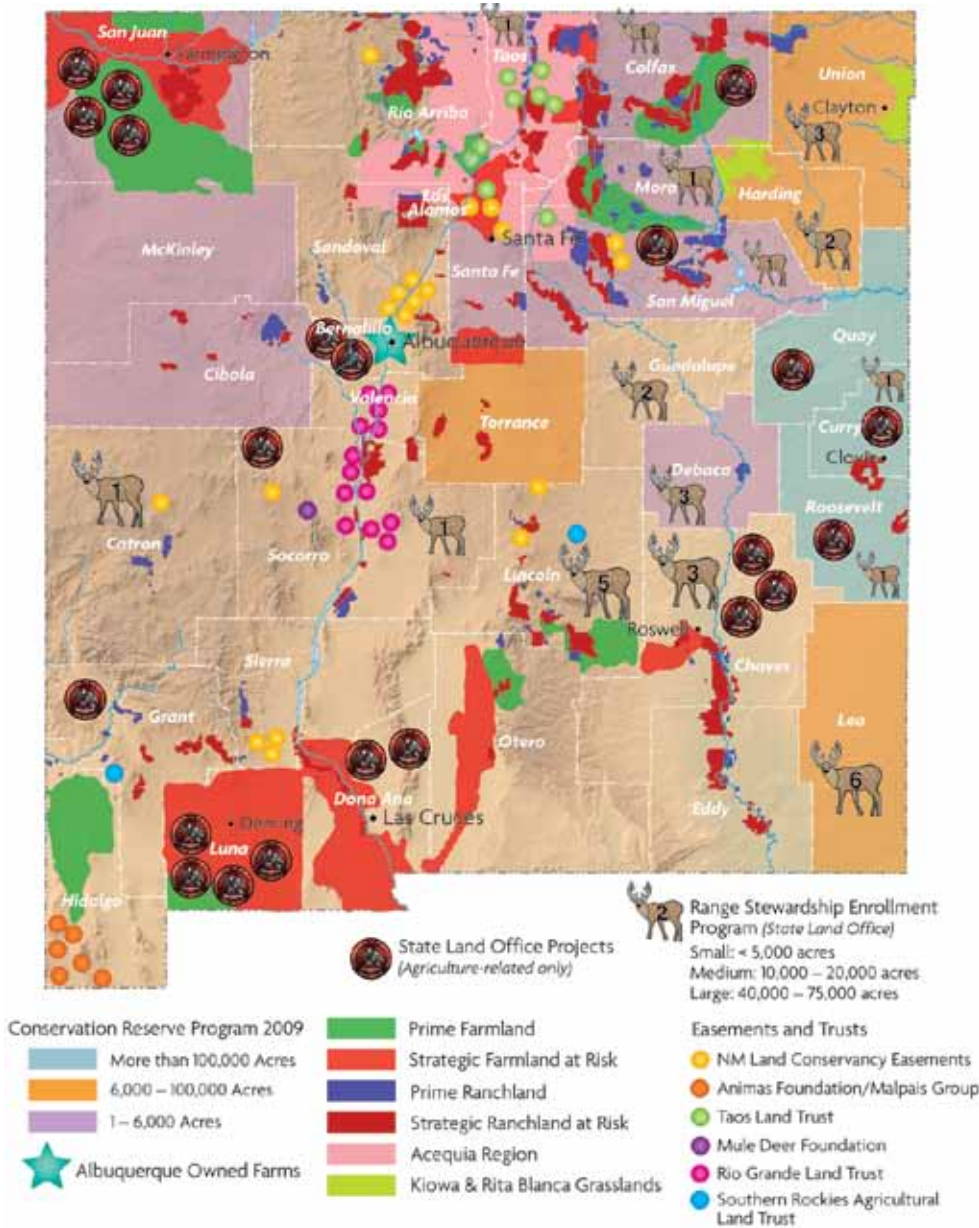
## BUYING AND LEASING LAND

Albuquerque is one of the few cities to float a bond issue to buy 12,000 hectares of farmland within its city limits. The city-owned land provides its dwellers with fresh milk from in-city pasture, walks in close-by farmland, and enjoyment of the thousands of geese, ducks and cranes that use the farm fields each autumn. The purchase has created "green jobs." The city must now manage and protect its farms, sustain a local economy, and pay for farm infrastructure improvements. It has brought its citizens a greater compassion for the hard work and fertile soils necessary to feed them.

The State Land Office oversees about 3,500 agricultural leases covering more than 8.5 million acres. These lands can be withdrawn from grazing and exchanged, sold or developed for other purposes. The SLO charges about 25% per animal unit of the fee charged by the private sector. Similarly, the federal government allows grazing on its holdings in the Central and High Plains (over 130,000 acres of the Kiowa grassland complex) and on Forest Service and BLM lands. The animal unit cost is about one-tenth the price of private leases. These private-public contracts preserve a scale that allows ranchers to continue earning a significant income from ranching, but must be reconciled with other goals of federal lands (page 60). It should be kept in mind that private citizens such as Ted Turner own substantial ranch lands with fine conservation practices in New Mexico. The long-term future of these lands cannot be known.

Unique to New Mexico, the 800 or so acequias protect agro-pastoral land as a commons. They try to maintain acequia lands in farms by tying





## < LAND PROTECTION

The map shows locations of New Mexico's prime ranch and farmland and the areas most at risk. Every agro-ecoregion has lands at risk, especially the Arid Lowlands, Southern Rockies and Colorado Plateau. The acequia region contains the majority of acequia groups that protect their own waters and agro-pastoral lands. The federal government protects native grassland grazing on the Kiowa and Rita Blanca grasslands. Holdings of the Forest Service, Bureau of Land Management, State Land Office and Valle Grande are not shown, but livestock leases help preserve private ranchland by providing increased areas for livestock.

Six non-profits listed on map hold the vast majority of conservation easements involved with farming and ranching in New Mexico. The Taos Land Trust has 34 agricultural trusts; each dot represents 3-4 smaller trusts. In terms of acreage, the upper and middle reaches of the Rio Grande and the grassland and mountains of New Mexico's southwest "boot heel" support the most farming and ranching conservation protection.

The two State Land Office programs shown enhance the productivity and biodiversity of agriculture. The number in the elk is the number of projects in the county.

water to the land and giving the mayordomo special powers. They seek to preserve family ownership in the face of gentrification and development pressures. Acequias have special legal recognition under State law and seek further protection under federal "traditional cultural properties" law.

**DREAM** Government agencies look for bargain sales and foreclosures. They have a fund ready to purchase high-quality farm/ranchlands for preservation. They use some of these lands as start-up "incubator" enterprises for new farmers and ranchers.

**DREAM** Each city mayor and county maps and conserves high priority farmland. State lands consider local food chains when leasing.

## LEGAL CONSTRAINTS ON LAND

The most popular tools to save farms and ranches have been conservation easements, land trusts, the transfer of development rights and the purchase of development rights. About 100,000 acres have

conservation easements and/or land trust protection. A conservation easement is an agreement with a landowner and a conservation organization (such as the Rio Grande Agricultural Land Trust) to restrict certain activities such as housing development on the land. Sometimes developers will agree to decrease or abandon development rights on a parcel in exchange for the ability to build in another location.

**DREAM** Private foundations and public entities in each agro-ecoregion create a fund to purchase conservation easements for agricultural goals in local foodsheds. Foundations, the State, credit unions and local banks use bridge funds to cover transaction costs to facilitate the purchase of conservation easements.

## TAX CREDITS

New Mexico's best tool for preserving farmland has been conservation tax credits. Farmers and ranchers who preserve their land receive a 50% tax credit (up to \$250,000 each year) for the difference

between fair market value and the value with the imposed preservation constraint (e.g. no housing development). It can be used for 20 years to offset State income taxes. Depending on the arrangement, the preservation can produce a one-time charitable deduction on federal taxes; reduce property taxes; and dramatically decrease estate taxes. If the farmer never pays taxes, he/she can sell the tax credit (in \$10,000 increments) to anyone who owes such a tax. This major addition to the law allows poorer farmers to pursue farm preservation. The downside, if any, is that an appraiser decides the difference between market price and the preservation price of the land. At times, conservation easements have made land more valuable to buyers who want open space but no crops or cattle. The combination of conservation easements and the tax credit has spurred farmland preservation, especially in the Rio Grande basin.

## LAND USE PLANNING

Land use planning is a weaker form of land protection because the smart growth zoning, buffer zone boundaries, cluster-housing regulations and differential assessment policies can always be changed. Land use plans are always political and depend on voters, elected officials, government agencies and lobbying. Nevertheless, once implemented, they can be hard to reverse. Perhaps most important to farm and ranchland preservation are urban growth boundaries and right-to-farm regulations. All too often, new subdivisions complain about cows knocking over their fences or the smell of fertilizer, or counties try to replace farms with subdivisions by calling them a nuisance. New Mexico has a right-to-farm law.

**DREAM** *Local foodsheds enter land-use planning and explicitly plan for local truck farms, farmers markets, local retailers and preservation of close-by farms and ranches.*

## HELPING START-UPS AND ELDERS

To overcome start-up costs and purchasing the first farm, various levels of government and the LandLinks NGO have begun to help start-up farmers and ranchers. New Mexico LandLinks helps farmers and ranchers who want to sell to new farmers and ranchers. The USDA's Farm Service Agency, the independent Farm Credit System and the Food, Conservation and Energy Act (2008) have provisions that increasingly support beginners. The loan pool has increased the amount of each loan for operating expenses, ownership and down payment; the interest rates have been lowered; and the time to pay back the loans increased. There is a tiny matching grant program called the New Farmer Individual Development Account. Technical and conservation assistance is provided by the Natural Resources Conservation Service (NCRS). There is even the prospect on the State level that graduate farmers would be given a farm on State land to begin to save the capital for private land purchase.

Elders who wish to remain on their farm can make special arrangements with beginner farmers. They can also reduce production and put land in the Conservation Reserve Program and receive benefits as a kind of annuity. The program is underfunded and oversubscribed, especially in the High Plains.

**DREAM** *New Mexico greatly expands its LandLink projects. New Mexico restarts its organic farmer apprenticeship program at NMSU and other locations. New Mexico lobbies for more funds in the CRP and a larger share to New Mexico.*



YELLOW-BILLED CUCKOO



APLOMADO FALCO



BEAUTIFUL SHINER



JAGUAR



RIO GRANDE CUTTHROAT TROUT



HORNSBILL CLAMS



RIDGENOSE RATTLESNAKE



GILA TROUT



RIO GRANDE SILVER MINNOW  
DUNES SAGEBRUSH LIZARD



LESSER PRAIRIE CHICKEN



MEXICAN LONGNOSE BAT



COLORADO PIKE MINNOW



KUENZLER CACTUS



NEW MEXICO WOLF





PECOS SUNFLOWER

BUFFALO GRASS

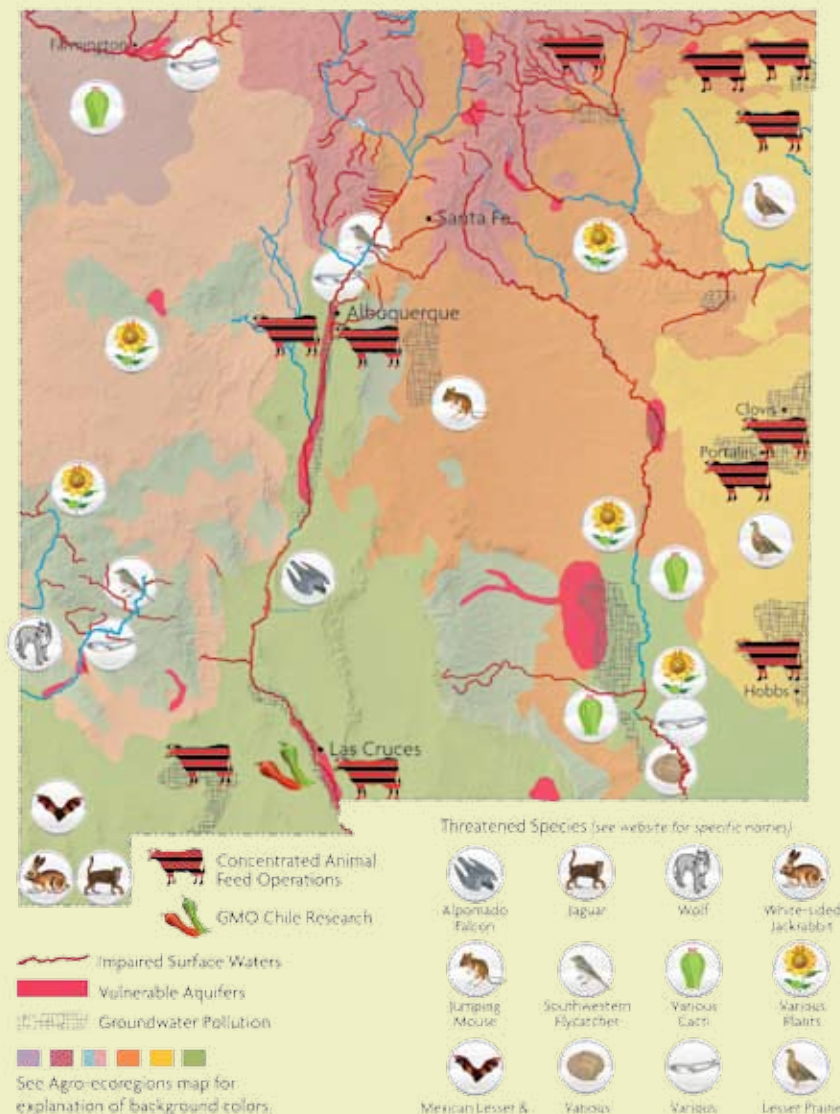
KNOWTON CACTUS

# WORKING LANDSCAPES Eco-friendly agriculture

ALTHOUGH PRECISE NUMBERS are difficult to come by, New Mexico has between 50 to 65 million acres of working landscapes: over 400,000 acres in field crops for all types of hay and feed grains; about 80,000 in edible crops; and the rest in grazing on private, State, federal and tribal lands. In addition, abandoned range and cropland acres have never been surveyed. To fulfill one long-term dream of food security, the water sources and fertility of the soils of these agricultural lands must be maintained and regenerated. Although precise acreages are difficult to come by, New Mexico has between 50 to 65 million acres of working landscapes: over 400,000 acres in field crops; about 80,000 in edible crops; and the rest in grazing on private, State, federal and tribal lands. Abandoned range and cropland acres have never been mapped. To maintain fertility and production, farmers and livestock raisers can be seen and see themselves as ecosystem managers. "Every day is Earth day," says the T-shirt of many ranchers. Climate change, regulatory pressures, older operators, increasingly diverse operator goals and poorer economic returns have made farm and ranch ecosystem management challenging. How do you keep up both production and ecological health of land, waters and life hurt by past and present practices?

**DREAM** Farming and ranching are viewed as a special form of ecosystem management and ranchers and farmers are rewarded for their ecological work.

A landowner does not just own land. He/she owns a piece of a watershed(s) that helps regulate: floods; fires; water flow and soil health; the spread of pathogens, pests and disease; biomass production (photosynthesis); food webs and biodiversity; and nutrient cycling. The



## ECO-FRIENDLY AGRICULTURE

In the dream, farms and ranches are a form of specialized ecosystem management. The map illustrates challenges to agricultural ecosystem management that have harmed the environment: impaired surface water include waters with excess nutrients, herbicides and salinity; vulnerable aquifers are losing their usefulness because water extraction exceeds water replenishment and/or the waters pumped have poor qualities; groundwater pollution

comes from seepage of fertilizers and other agro-chemicals into the water table; concentrated animal feeding operations have many issues of public health, environmental pollution (aerosols, wastewater), animal welfare and occupational safety; genetically engineered chiles are opposed by growers of traditional landraces; and threatened species all have conflicts with some aspect of cattle raising, farmland clearing or practices.

## < ENDANGERED

Over 15 fish, one clam and two birds are threatened by irrigation water withdrawals and return flows. Farming has contributed to habitat loss of about eight endangered plants. Two other birds, five mammals and a lizard have been impacted by agriculture to the point of endangerment.



## Agritourism

Agricultural tourism is a commercial enterprise at a working farm, ranch or agricultural plant conducted for the enjoyment or education of visitors, and that generates supplemental income for the owner. Agritourism can include farm stands, farmers markets or shops, U-pick, farm stays, tours, on-farm classes, fairs, festivals, pumpkin patches, Christmas tree farms, winery weddings, orchard dinners, youth camps, barn dances, hunting or fishing, guest ranches, and more. They are rapidly becoming a way to supplement farm income, another activity on the working landscape.

New Mexico has no coordinated agritourism program. Various locations sponsor their own web sites. New Mexico has a special niche of combining agritourism with biocultural foods, Native American and Hispanic food events, traditional gardening demonstrations, and nature and hunting guiding. They need State help to do market surveys to see how multi-destination tours can be most profitable.

## Eco-facts:

- Herbicide use is common in New Mexico. Four different herbicides have been approved for onions; nine for chiles and lettuce; between 11 and 18 for apples, potatoes, pecans and peanuts; 20 to 25 for grapes, grain sorghum and various rangeland treatments; over 30 for barley; over 45 for corn; and 50 for wheat.

- CAFOs (page 29) are major sources of water and air pollution. One 1,200 pound dairy cow produces the same amount of manure as 20-40 humans. A 2,000-head industrial dairy produces as much bodily waste each day as a human community of 40,000. Much of this waste is stored in lined, open air lagoons. About 90% is spread onto fields, where it can spill into rivers or playas or leach into groundwater.

- Erosion: New Mexico has the most highly erodible cropland in the nation (90%). It had the most severe and serious wind erosion of any state during the dust bowl. The CRP program has greatly reduced the risk of erosion in the High Plains.

- Programs: Conservation Reserve (CRP), State Acres For Wildlife Enhancement, NM Landowner Incentive, Agricultural Water Enhancement Program, Conservation of Private Grazing Land, Conservation Stewardship Program (CSP), Farm and Ranch Lands Protection, Grassland Reserve Program, NM Conservation Stewardship Program, NM Environmental Quality Incentives Program (EQIP), Wetlands Reserve and Wildlife Habitat Incentives Program, Grazing Lands Conservation Initiative (GLCI), Partners For Fish And Wildlife Program, Private Stewardship Grants Program; Federal Conservation Tax Incentives.

land carries memories of the family or beauty or spirit, and may provide space and time for recreation and refuge. Caring for these assets has rarely or adequately been rewarded.

"Eco-services" is the term given processes in which both nature and humans work together to maintain ecological integrity and productivity. Ecological services include: carbon sequestration; regenerating topsoil; providing habitat for sensitive species; providing cover/ food/ water for wildlife and game (especially wetlands and riparian habitats); increasing pollinators; stopping erosion; reducing harmful floods and invasive species; protecting endangered species; restoring fire regimes; removing toxics from nutrient cycles; and more.



*National Conservation Resources Service, U.S. Fish and Wildlife Service or a new agency provides participating farmers and ranchers with a portfolio of needed ecological services. The farmer/rancher receives grants, tax credits, payments or other forms of compensation when these services are performed.*

Each portfolio must be custom-designed for the individual property, local food webs, regulations and agro-ecoregion. The focus for the Middle Rio Grande and southern High Plains, for instance, should be CAFOs, clean water, bio-aerosols and methane. The lower Rio Grande and Pecos River farms need to focus on return irrigation flows, saline waters and riparian habitat. The priority of the Colorado Plateau and parts of the Southern Rockies will be on degradation of watersheds from low-quality water disposed on rangelands during coalbed methane extraction. The Central Plains might focus on abandoned farm/rangeland and how to prevent wind erosion.

There is no way to monetize all ecological services and some will be too expensive to verify (transaction costs), such as yearly changes in soil carbon or a grassland's composition of annuals, perennials and legumes. The portfolio works out a payment plan, just as a financial advisor helps with low-risk and high-risk investments. Eventually these payments for ecological services should replace or complement fees paid for extracting biomass (grazing) and price and subsidy supports.

### THE FOOD WEB

Custom-designing eco-service portfolios is very specific for fire management and sensitive and invasive species. For instance, the Transition Mountain area of the Gila focuses on wolves





# ECO-FRIENDLY AGRICULTURE

and cattle-raising. Each New Mexican river has different species of fish threatened by low flows and different invasive aquatic plants (e.g. the Pecos has been overtaken by the invasive salt cedar). The rangelands all have invasive weeds and grasses that reduce forage values (e.g. Lehmann's lovegrass in the Arid Lowlands).

Many farmers and ranchers have protected species because they feel ethically the species should have a chance to exist. The Malpai Group, Quivira, Valle Grande, the Turner bison ranches and the varied Milnesand complex to save the Lesser prairie chicken are all efforts to combine ecosystem management with conservation ranching and farming. Individual members of the Malpai group have protected the Chiricahua leopard frog, prairie dogs, and pronghorn populations. The group passed a resolution to protect jaguars. It has a joint fire program to reduce woody plants and protect sensitive species that includes both private and public lands and ranchers and multi-agency personnel. They need monetary help to improve protection. In areas with low populations, ranchers and ranch hands may be the only daily presence and the best protectors of sensitive species (e.g. protecting rare and endangered cacti from cactus poachers).

**DREAM** Ranchers work with government agencies whose land they lease to: rehabilitate forage and watersheds; increase cover, food and water for wildlife and game; and protect endangered species. They work with State and federal agencies on targeted grazing, predator-friendly herd management and patch/burn fire strategies that cross property boundaries. These tasks are included in an eco-services portfolio.

**DREAM** The State and USFWS fund a herd management study on the best cattle breeds, herd guardians and herd movements that reduce wolf predation.

**DREAM** State and/or Federal government fund a special school and certificate to train ranchhands and farm workers on ecological services.

**DREAM** Farmers and ranchers are "deputized" by New Mexico Fish and Game and, after appropriate training, receive compensation when they act as guardians of endangered plants and animals on their properties and on public lands they lease.

In-stream flows for sensitive fish are a particularly difficult issue for New Mexico. Irrigation diversions, dams and scheduling have damaged populations to near extinction.

**DREAM** Water rights rules for in-stream ecosystem management. They include compensation for any irrigator who returns good quality conveyance, leaching or return flows to a river or stream for conservation purposes. A State Water Trust that parallels land trusts to which farmers can donate or sell water rights for conservation purposes. Water Banks that can trade flows for stream enhancement.

The Water Bank trades point source pollution such as nitrates from urban wastewater or return flows from farmer fields. The urban polluter pays the farmer to reduce farm pollution by buffer strips, conservation tillage and cover crops, and receives credits for reducing in-stream pollution. The Water Bank brokers the urban offer with the farmer. The trading mechanism could provide funds for low-input, high-diversity farming.

## INVASIVES

New Mexico does not have a comprehensive statewide plan addressing all categories of invasive species. Invasive species can be animals such as bullfrogs, Asian tapeworm, zebra mussels, pecan weevils or starlings; plants such as Asian hydrilla, European rocksnot, Eurasian salt cedar, African buffle grass or microbes such as the protozoa of whirling disease that has impacted New Mexico trout. There are over 100 aquatic invasive species and hundreds more terrestrial invasives.

Well managed land is the best defense against the spread of invasive weeds. However, even well managed land in good condition is susceptible to invasion when natural disturbances (such as wind, water, fire) open niches. Once established, weeds can spread by vehicles, along highways, by wind, recreationists, waterways, animals and weed-contaminated hay. Invasive range plants are expected to increase with climate change. Hoary cress, Russian knapweed, Buffle grass and Lehmann's lovegrass have already reduced rangeland productive value. The costs of invasives to New Mexico have not been calculated.

In 2009, the State passed an aquatic invasive species act and has two coordinating bodies – one for invasive plants (New Mexico Interagency Weed Action Group) and one for noxious weeds (New Mexico Noxious Weed Advisory Group).

**DREAM** A State-level Invasive Species Coordinator position; a rapid-response system for detecting, investigating, and eradicating newly reported invasive species; and an official New Mexico Strategic Plan for Managing Noxious Weeds. A green jobs program to eliminate invasives that harm farms, ranches and food webs.



## INVASIVE SPECIES

New Mexico worries about the invasion of quagga mussels and zebra clams which can destroy or block irrigation works. In 2009, it passed the Aquatic Invasive Species Control Act. Salt cedar and Russian olive are exotic, invasive trees that have replaced miles of cottonwood and willow riparian.

PHOTO: ANNE THWAITES >



SALT CEDAR



ZEBRA CLAMS



RUSSIAN OLIVE



LEHMANN'S LOVEGRASS



# THE DREAM'S LEVER

# Regenerative governance



PHOTO: SETH ROFFMAN

THE GOVERNANCE OF FOOD SYSTEMS drives the viability of farms, the expansion of local foodshed economics, fair trade, healthy foods, poverty alleviation, eco-friendly agriculture, plant and animal disease, water management and on. It is the major complement to the market. When weather disasters hit, the government helps farms and ranches endure with emergency payments. When the price of a commodity plummets, the government tweaks the market with price supports. When civil society forces government agencies to take into account the quality of food children eat, the government begins to constrain the products the market can sell.

Almost every New Mexico department — from transportation to health, water and human services — works with agrifood governance. The fractured nature of responsibilities and vision (“silos”) has delayed a comprehensive plan. There is no clear legislative forum or process for crafting and passing comprehensive policy.

**DREAM** *New Mexico government authorizes a working group including civil society to re-organize the administrative framework to better coordinate agrifood policy, legislation and expenditures.*

**DREAM** *Each city and county writes its own food and farm policy including bonds, zoning and taxing incentives for “farm and ranch space” parallel to “open or green space.” Each town and city writes graywater ordinances to allow for fruit and specific vegetable gardens.*

A major barrier to this re-organization has been that Task Forces, Cabinets, Town Halls and Advisory Groups to the State have few teeth and have been discouraged from crafting legislation. There have been task forces on health, climate change, children, water and more. The lack of strong linkages between these civil society recommendations and the State planning process (including accountability and budgets) has discouraged public participation in government policy and decision-making. These groups do not have adequate authority and many times witness that their carefully researched ideas do not lead to actual change.

**DREAM** *All task forces, advisory groups or equivalent include personnel who write legislation from recommendations. A major deliverable becomes draft legislation or Executive Orders.*

To accelerate change requires budgetary funding and follow-through on projects within the budget. Programs have a way of disappearing or slowing down because agencies can move earmarked funds into their base budgets. By slowing implementation, the funding can return to the State’s general fund because it was not spent during the fiscal year. The slowest program has been water adjudication and clearing conjunctive use rights (surface and groundwater together). Other programs needing immediate attention are purchases of local and healthy food for State-funded institutions and rules to prevent school diets from contributing to nutritional diseases.

**DREAM** *A well informed public on agrifood concerns.*

Two more barriers hinder the accomplishment of do-able dreams: lack of local knowledge and inability to create public-private partnerships. Despite thorough and scholarly research by non-profits such as Farm to Table, the New Mexico agricultural and Policy Group and individuals within State agencies, there has been a tendency to use national data to make recommendations. National data limit the effectiveness of a New Mexico-centric agrifood strategy for cultivars, climate change, transport logistics, irrigation and other needs. In addition, labeling still does not help consumers to make healthy, local and fair trade choices in purchasing food.

Without public-private partnerships, the transition to organic agrifoods, grass-fed beef, place-of-origin labeling, pollination planting, control of invasives and more cannot be effectively accomplished.

**DREAM** *Land grant colleges and universities, State agencies, business associations, philanthropists and non-profits fund New Mexico-centric (local foodshed) strategic research on how to organize partnerships between the public and private sectors on critical agrifood issues.*



*There's no better place to see the opportunities and obstacles to localization than in New Mexico. Purplish in politics, diverse in constituents, rich in culture and history, and filled with world-renowned figures in arts, science and business, New Mexico is on almost everyone's short list of bellwether states. New Mexico is an important starting place for food localization for another reason — it is a State replete with human suffering, broken dreams and huge challenges. New Mexico leads nearly all 50 states in poverty. — MICHAEL SHUMAN*

## MONEY

Every consumer pays for food twice: first, at the checkout stand; second, through taxes. The spending of taxes on agrifood projects has been both immensely useful and destructive. Taxes have spurred: tracking of food-borne illnesses; nutrition programs; loans for new farmers; emergency food distribution; crop research; soil conservation; wetlands protection; disaster relief; combining habitat preservation with farming and ranching; and setting standards and labels for food health and organic foods. Some of the most successful programs have combined minimum price points for crops with limiting the number of acres that can be cultivated. This managed market has prevented “dumping” of low-priced foods and wild fluctuations in prices.

Federal funds have also directly transferred income from general taxpayers to farm owners. Justifying this transfer and its impacts has been controversial. New Mexico receives relatively little of these taxpayer subsidies because commodity crop acreage for grain corn, soybeans and wheat is relatively small. On the other hand, the subsidies for grain corn have pulled slaughter/packaging of beef from the State to the Midwest. This market distortion has promoted cheap, corn-fed beef at the expense of grass-fed beef and local processing of local beef in New Mexico. In addition, the subsidy program (until a few recent changes) has not been available for “specialty” crops — only for so-called “commodity field crops” (corn, soy, wheat and cotton). This has pulled New Mexico farmers away from diverse farming and toward subsidized, industrialized, big farm monocultures. New Mexico is still a land of small farms and diverse farms, yet continually challenged by funding going toward monocrops.

**DREAM** *Reform the Farm Bill on the federal level to level the playing field. Instead of income and most price supports, federal dollars match local investments in building an infrastructure for local food business clusters. Counter-cyclical payments should be for resident operators only.*

New Mexico Congressional representatives take the lead in: organizing a Western States Caucus to

gain an equitable distribution of Farm Bill subsidies; finding enough votes to break the definition of commodities that benefits mostly the Midwest; and expanding or restructuring subsidies to cover “specialty crops” and the regensis of a local food, low-input and eco-services farm economy. The change would restructure markets, infrastructure and commercial relationships for local and smaller farms that have been destroyed by commodity subsidy programs. It would help revitalize such operations as grass-fed beef and truck farms. These changes would level the playing field for economic efficiencies.

**DREAM** *No direct or indirect subsidies for “non-nutritious foods” as defined by federal or State departments of health (not USDA).*

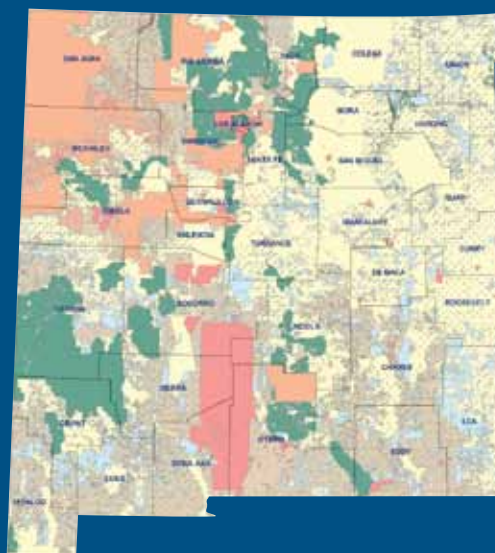
The subsidies for sugar (especially corn, but also sugar cane) have reduced the price of corn syrup, making high-sugar foods less expensive, and promoted the current epidemic of obesity and diabetes. The “benefits” of selling below market price ripple through the value chain. Foods such as corn syrup sugar end up lowering the price of non-nutritious foods to consumers. The impacts of subsidies have been “siloeed” to the production stage. It is crucial to limit subsidies by their impacts on the complete value chain, not just production. High sugar products cost the taxpayer twice: once to support their manufacture; once to handle the medical and support costs of those with nutritionally related diseases.

**DREAM** *The State's Congressional representatives lobby and vote to increase overall spending for the Conservation Reserve Program and similar programs.*

Government payments for land “retirement” started as a program to control supply and keep price points high. More recently, they have been incorporated into soil conservation practices. They are a good example of combining markets, economics and eco-services. They have also been a kind of retirement annuity for farmers who want to cut back on their annual workload. In New Mexico, the program is strong in the High Plains, but has always been underfunded.



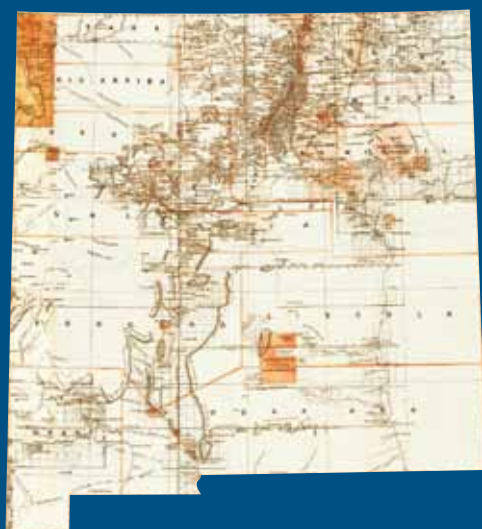
**DREAM:** *Every citizen has the experience of growing something.*



### < LAND OWNERSHIPS

New Mexico is 7.8 million acres. About 34% is federally owned, including military bases; about 44% is private; about 12% belong to the State Land Office; and about 10% belongs to tribes and Pueblos. Enclosure of native lands included land grants, Homestead act lands, railroads and State lands. All these lands still intersect with field crop and grazing land agriculture.

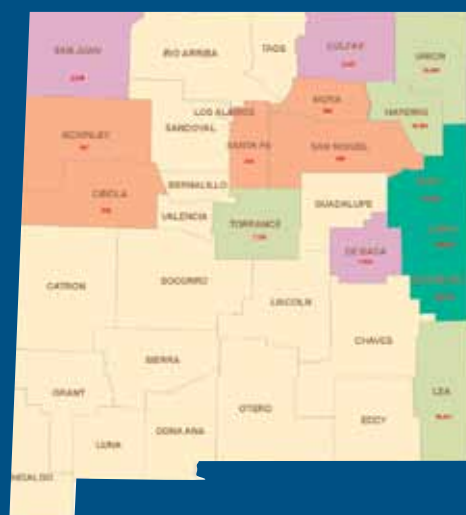
MAP COURTESY OF NCRS



### < LAND GRANTS

There were 154 grants by the Spanish and Mexican governments; 23 are Pueblo Indian grants and the remainder are called community grants. 131 consist of Spanish or Mexican grants. From the 131 there are 35 left today (not counting Pueblos). Land grants are indirectly tied in to farming issues. They may have one or more acequias or *parciantes* engaged but acequias are not the main focus. Land grants are mostly focused on common lands –grazing (ranching) and timbering.

MAP COURTESY OF MURRAY HUDSON, HALLS, TENN.



### < CONSERVATION RESERVE PROGRAM LANDS

A federal program to maintain abandoned or out-of-service farmlands that stops wind erosion and increases soil organic matter and water holding capacity. A long-term investment into “natural capital” for future generations. Underfunded. Dark and light greens show the most acreage in CRP — in areas of high wind erosion.

MAP COURTESY OF NCRS

## EDUCATION

Food and agriculture education can be experiential (by family; school field trips; internships or incubator businesses); formal in public/private schools; through media or the government. Today, agrifood education has come to mean agribusiness. The “second track” of local and small farming and value chain economics has been reduced to a miniscule part of the curriculum.

**DREAM** *The State land grant colleges and universities teach and provide degrees in agriculture that will benefit local foodsheds, local value chains and a fair trade state.*

The dream, for instance, would include 2-year degrees in sustainable agriculture technology at the community college level, with training in irrigation, greenhouses, solar applications, tractor operation and maintenance, farm equipment fabrication, food technology (canning, freezing, drying), business practices and the other pieces of the local foodshed puzzle.

At the university level, sustainable agriculture degrees at the BS, MS, and PhD level would offer students classes that include opportunities for experiential learning (on-farm) and Service Learning (in the community). Degrees would require an interdisciplinary mix. Entrepreneurship would be an important emphasis. Students from 4-year programs at other institutions in New Mexico and other states would look to graduate programs in sustainable agriculture to study small farm, organic, irrigated agriculture in a desert environment. NMSU in particular would spearhead sustainable crop rotation and diversification strategies statewide. The graduate program would include low-rent, leased “land grant farms” for new farmers to gain experience and earn enough income to purchase their own operation.

**DREAM** *Land grant colleges in a joint program with Jornada Experimental Station, NCRS, NMDA and other government agencies pursue the kinds of dreams described by this project: agro-ecoregional cultivars; biocultural cultivars for specialty markets; food business clusters on the town or county level for local food and food products; invasive species management; pest and pathogen management; greenhouse development; profitable crop substitutes for imports; adaptive cultivars for climate change; urban garden planning and development; food education at elementary and high schools; nutrition-related disease prevention; and many more.*

The dreams come together in a change of ethics and concerns about agrifood inequities. They ask: Who are the emerging leaders and organizations? How can they be supported to develop their capacity to steward effective change over the long haul? What kinds of resources do they need to fulfill their dreams? Funding for food and food system education at the State and local level is the crucial place to start.



# DREAMING NEW MEXICO

A BIONEERS PROJECT

Dreaming New Mexico / Bioneers

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## THE ZIA GARDEN

Urban, tribal and school gardens are crucial to revitalize the food system. They're the most local foodshed, uniquely offering neighborly gift exchange and barter. Gabriel Howearth designed this Zia Garden – the State symbol originating from a Pueblo sun glyph – to inspire gardens with cultivar diversity, high nutrition and teaching values for body and soul. See web site for detailed design of crops.

Gardens have started sprouting around the State. Santa Fe's Monte del Sol School has an edible kitchen garden program providing nutritious foods to students at \$3.50 per meal. The old Sanchez Farm in Bernalillo County is now the home of La Placita Community Garden with about ten "parcientes" — local schools, community members, herbalists and seed savers. They grow organic food and preserve wildlife habitat for Sandhill cranes. The Tesuque Pueblo Farm Project combines biodynamic with traditional farming, growing over 200 crops and saving seeds.

Dreaming the future can create the future



**BIONEERS**



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