

2013 Nevada Agriculture Analysis and Opportunities



This report will be available on the Governor's Office of Economic Development
and the Northern Nevada Development Authority websites:

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**“I have always said there is only one thing
that can bring our nation down - our dependence
on foreign countries for food and energy.
Agriculture is the backbone of our economy.”**

John Salazar



ACKNOWLEDGEMENTS

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“Nevada’s Agriculture Industry Sector is a major contributor to the overall economy of the state.”

Executive Summary



1. EXECUTIVE SUMMARY

Nevada's Agriculture Industry Sector is a major contributor to the overall economy of the state. Its contribution has not been fully articulated nor understood by the general business and state government communities within Nevada. This study has been undertaken to examine the sector in an organized fashion and to identify gaps and targets for future economic development efforts.

The study utilized primary and secondary research including interviews with industry stakeholders, surveys at all levels within the industry, and economic research and analysis to examine this critical industry.

Findings of the study are summarized below:

- The overall economic impact of the agricultural cluster on the State of Nevada is estimated at \$5.3 billion using 2010 data, including direct, indirect, and induced impacts. This impact varies by region; the study estimates impacts of the Northwestern, Northeastern, and Southern regions within the state.
- Nevada's agriculture production has a significant impact on the state and varies by county. Some counties focus more on agricultural production, while others prefer agri-tourism and operation businesses, depending on the county's strengths and assets.
- The location quotient analysis defines the agriculture production sector as Emerging, which indicates a sector that is not specialized compared to the nation, but growing in its specialization.
- The agriculture industry has numerous backward and forward linkages, including Wholesale Trade, Truck Transportation, Food Services, Hotels and Motels, and Real Estate. This means that logistic channels between these suppliers and customers are well established, which may make the state more attractive to businesses operating within these industries.
- The agriculture cluster has a number of gaps and disconnects, resulting in local businesses importing goods and services from outside of the area, which is the first step of import substitution, a practice of reducing the purchases of goods and services by local firms from outside of the state.
- The study shows a number of new crop opportunities given Nevada's physical and economic strengths, including saffron, hops, canola, and aquaculture.
- Expanded agricultural opportunities for the state include vertical farming, wine grapes and vineyards, potatoes, onions and alfalfa.
- The agriculture cluster also has a number of industries exporting large amounts of goods and services outside of the area. For a successful export substitution effort, these businesses should be encouraged to increase exports and new exporters should be identified and developed

- The employment impact of the agriculture cluster on the State of Nevada, using 2010 data, is estimated at 60,700 jobs, including direct, indirect, and induced impacts. The impacts of the Northwestern, Northeastern, and Southern regions are also estimated.
- Additionally, the study identified a number of gaps and resulting opportunities available for the Nevada agricultural sector, including the need for seed, dairy, and meat processing facilities as well as an agricultural equipment manufacturing facility.
- Agriculture, Forestry, Fishing and Hunting are emerging industries in Nevada, with a 7 percent growth from 2006-2011, showing industry growth and potential for future concentration.

Overall, the agriculture cluster has a positive and significant impact on the state and is well positioned for future growth, given its potential for export enhancement and import substitution, though much work remains in identifying the factors necessary for successful growth. This includes understanding the reasons for import gaps and disconnects, identifying export ready companies, and supporting existing operators.



**“Nevada ranks third in the nation
in ranch size, averaging 3,500 acres.”**

Agriculture in Nevada



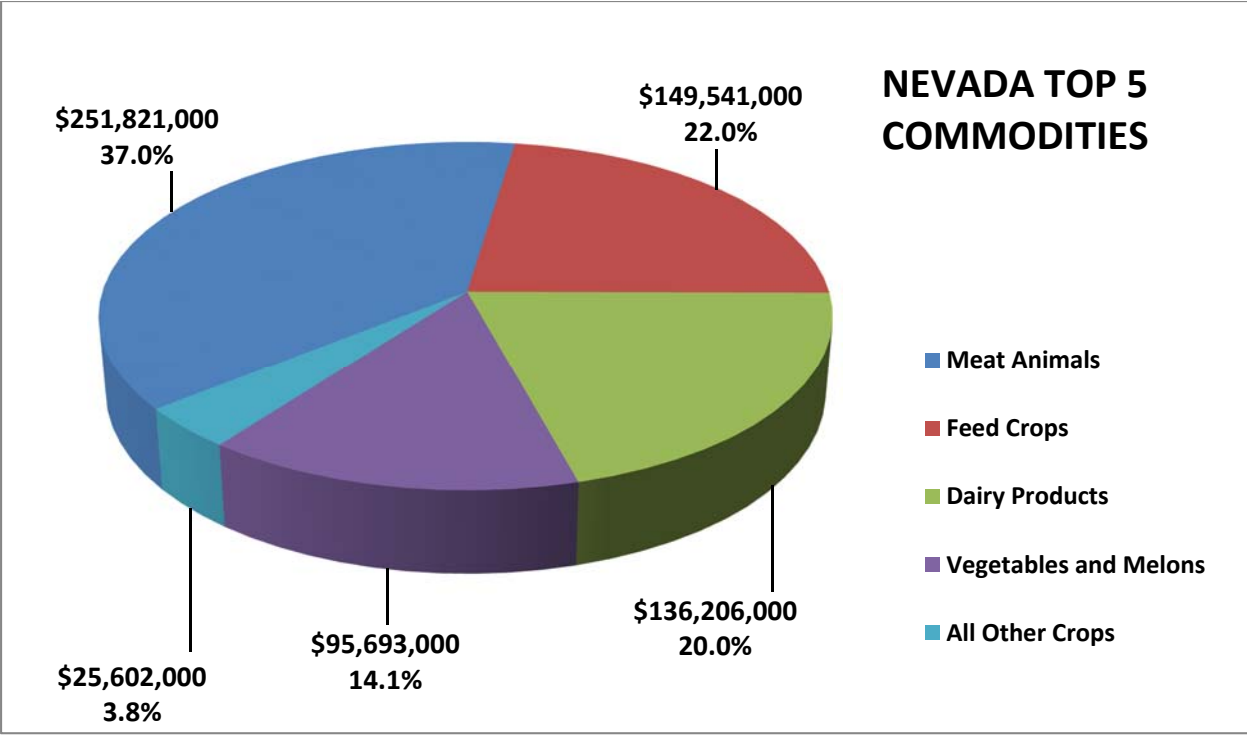
2. AGRICULTURE IN NEVADA

Overview

Agriculture is one of Nevada's most important industries, contributing significantly to the economies of rural communities and the state as a whole. Below is a summary of relevant facts regarding the agriculture industry in Nevada, and these facts are discussed in more detail throughout the report.

- Nevada's ranches rank third in the nation in size, averaging 3,500 acres.
- Nevada agriculture is directed primarily toward range livestock production. Cattle and calves are Nevada's leading agricultural industry, totaling \$732,883,000 or 62.5 percent of the farm receipts (Nevada Department of Agriculture, 2011). "Over eighty percent of meat producers (including cattle, lamb, etc.) sell their meat as live animals on the hoof, while approximately ten percent sell their meat as carcasses" (Curtis, Cowee, & Havercamp, 2007). One reason for this is the limited number of meat processing facilities in the state, which is a potential growth area for the agriculture sector. Cow-Calf Operations are most prevalent with a few stocker operators and feedlots.
- Dairy, sheep, lambs, and hogs are among Nevada's other livestock enterprises. The larger cattle and sheep ranches are in the northern half of the state. The greatest number of dairies is in northern Nevada, but the largest dairies are in the south.
- Despite Nevada's arid climate, irrigation allows for excellent crop growth. Alfalfa hay is the leading cash crop of the state, totaling \$232,100,000 (USDA, 2012). Much of the hay is sold to dairy operations in surrounding states. Significant quantities of alfalfa cubes and compressed bales are exported overseas each year. Alfalfa seed is another substantial crop.
- Additional crops produced in Nevada include potatoes, barley, winter and spring wheat, corn, oats, onions, garlic, and honey. Smaller acreages of mint, fruits and vegetables are grown throughout the state.

The chart below shows the top five commodities in the state as determined by the Nevada Agriculture Statistics Bulletin, 2012 (**USDA, National Agriculture Statistics Service, 2012**).



Graph 1. Nevada Top 5 Commodities

Nevada Agriculture Survey

The Nevada Agriculture Community was surveyed to better understand the industry and its needs. The survey was made available through CenterPoint Community website and agriculture-related agencies and associations. Organizations that focus on agriculture participated in the marketing of the survey. These organizations included the Nevada Dairy Commission, the Nevada Cattlemen’s Association, the Nevada Department of Agriculture, and the Nevada Future Farmers of America (FFA). These efforts resulted in 89 returned surveys.

The surveys collected general demographic information along with specific questions about projected employment, impediments to business growth, connections along the supply chain, feedback on government performance, growth opportunities, workforce skills assessment, taxes and regulations, expansion and exporting plans, the value of local products, and more. Detailed results of the survey can be viewed on www.centerpointcommunity.com.

Survey Results

The following is the summary of the survey results.

- Employment levels are projected to grow slightly over the next 12 months.
- 22.6% of respondents expect to add employees in the next 12 months, while 73.8% expect to keep staffing levels constant.
- The biggest impediments to business growth were identified as laws and regulations (23.0%), transportation costs (20.9%), cost or availability of goods or materials (15.3%), reduced consumer spending (10.2%), and financing (10.2%).
- Local consumers and processors purchase 40.5% of respondents' products. Regional consumers and processors purchase 29.8% of production. Broker/wholesalers purchase 25.0% of production, while only 5.7% is exported. It was noted that respondents to this survey were smaller farms, growers, processors, and ranches.
- 77.4% of all respondents purchase some equipment, raw materials, or administrative goods and services from local suppliers. Of total respondents, 57.1% purchase from regional suppliers, 34.5% of respondents purchase from national suppliers, and 7.1% purchase goods or services from foreign suppliers.
- When asked which tier of government costs the most time/money/problems, 65.5% of respondents pointed to the Federal government, 20.2% named the state, 6.0% named their county, and 4.8% named their local city/township.
- When asked which tier of government is the most helpful, 50.0% of respondents pointed to their county, 26.2% named the state, 10.7% named their city/township, and 4.8% named the Federal government.
- Respondents identified five areas that would help grow their business: lower transportation and/or fuel costs (25.5%), reduced government regulation (22.3%), marketing and promotion of their products or services (14.0%), financing (11.1%), and access to new markets (9.8%).
- Skills identified by respondents as lacking in the local workforce included industry specific skills and training (23.8%), honesty (16.3%), showing up as scheduled (15.8%), customer relations (14.8%), and punctuality (12.2%).
- When asked what laws cost the most in time and money, respondents answered most frequently with licenses, permits, penalties (30.8%), taxation (25.6%), and environmental laws (25.1%).
- Federal income taxes were considered by 28.9% of respondents to be the highest tax burdens, followed by payroll taxes with 24.4% of respondents, property taxes with 16.3% and annual business taxes with 11.9%.
- 34.5% of all respondents reported having plans to expand or to relocate.
- 29.8% of all respondents reported having an interest in exporting.
- 71.4% of all respondents value local products and 70.2% would pay more to support local businesses.
- 10.9% of producers reported producing crops in a hoop house. Of those not using hoop house technologies, 19.8% are interested in learning more.
- 20.0% of producers feel that food safety laws are an impediment.

- 56.4% of producers would grow other crops if there were a market demand.
- 15.5% of producers feel that their business would grow by having access to wholesale distribution.



Nevada Agricultural Counties

Nevada agriculture activities and their impact on the state economy differ by county as indicated by survey results. A survey was sent to county representatives to gather information that would provide a better understanding of the contribution of the county to the state agriculture industry. The information received per county reported total agriculture assessed acres, agriculture related activities, agri-tourism, agriculture related businesses, water rights acreage, hoop house operations, economic development challenges, and commercial real estate inventories for agriculture relocation or expansion purposes.

Based on the primary research findings, a continuation of the survey is recommended to monitor trends that require action. An action plan is in place used by county and state agencies and associations that can administer the survey at annual events and conferences. The survey will be present at the Nevada Association of County Offices and the Cattleman’s Association annual conference in the fall of 2012. NNDA will have computers set up and available, helping individuals and companies easily navigate through the survey.



Examples of Existing Agriculture Company Successes

In describing existing agriculture in Nevada, it is also important to identify successful companies that have helped sustain the foundation of agriculture. Longevity is the consistent factor with all of the following

successful agriculture companies. Their ability to withstand the ups and downs of local and national economies has proven these companies to be mainstays in the Nevada agriculture industry and the state economy.

Anderson Dairy

This company is privately owned and has been operating in southern Nevada since 1907, starting out with 10-15 milk cows. Today they are the largest, most advanced dairy processing and bottling plant in the southwest, employing 135 people and grossing annual revenue of approximately \$45 million. Their 37,000 square foot facility has the most up-to-date equipment and technology available. Anderson processes milk, sour cream, cottage cheese, ice cream, buttermilk, whipping cream and much more. The Barn Buddies Tour has been toured by thousands of school age children and adults, showing how they process and package the dairy products and the importance of the health benefits of dairy.



Peri and Sons

This company started in 1979 growing 20 acres of distinctive, superior-quality, pesticide-free products and today has approximately 8,000 acres under production, with annual gross revenue over \$53 million. Crops are 2,500 acres in white, yellow, red, and sweet onions, 1,500 acres in leafy greens and the remainder is rotational forage crops. During peak season they ship 60-70 truckloads per day and employ over 1,200



people, with a year-round, full-time employment base of 250-300. They have been consistent in growth and expansion, with another expansion planned for 2013. In the last 15 years, Peri and Sons have implemented water-conservation systems, improved pest management practices, reduced resource consumption and implemented efficient waste-management practices as part of their on-going “green” efforts.

Snyder Livestock

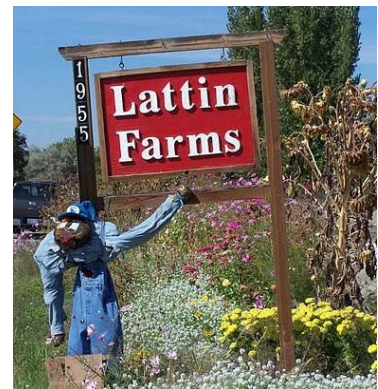
This privately held company started fattening cattle for market at the 4,000-head feedlot in Yerington in the 1960's. A secondary part of the cattle operation custom-feeds and breeds stock for purebred cattle

producers and Snyder is considered to raise the best bulls on the west coast which are sold at the annual “Bulls for the 21st Century” auction. Snyder produces a diversity of product including, onions, alfalfa, oat and grass hays and is one of the few garlic producers in the U.S. In an effort to remain on the cutting edge, a state-of-the-art electronic feed measuring system was installed in 2006, coupled with radio ID tags and individual feed bunks mounted on scales. The company has 150 employees and grosses approximately \$29 million in revenues.



Lattin Farms

Dating back to the 1860's, Lattin Farms has adapted to the changing times by expanding the company beyond alfalfa to producing 300 acres in traditional Nevada crops to include alfalfa, small grains, and corn silage. Another 90 acres is in intensive row crop production, with over 25 crops and 50 varieties. The major crops by income are cantaloupe, pumpkins, tomatoes, summer and winter squash. The farm has a commercial kitchen, education barn, growers' market, community supporting agriculture assembly area, and a cold storage unit. Agri-tourism is a consistent part of Lattin Farms, with one of the largest corn mazes in the USA, pumpkin patch, pick-your-own produce, educational tours, on-farm catering, farm-chef events, and farm tours. The company employs 3-8 people year round and up to 22 during the peak season, with an annual gross revenue over \$4 million.



Winnemucca Farms

Winnemucca Farms has been part of the agriculture industry since the 1960's and today produces 16,000 acres of potatoes with a 20,000 square foot on-site processing plant. The company currently employs 140

people, with annual gross revenue of \$34 million. The plan for 2013 includes a company expansion, resulting in job generation. 96% of the product is sold nationally, 3% internationally, and 1% sold at the local level.



“Products and services are often imported into the economy when similar products and services are available locally, creating a disconnect.”

Economic Analysis of Agriculture



3. ECONOMIC ANALYSIS OF AGRICULTURE SECTOR

Agriculture Sector Definition

To understand the impact of the agriculture sector on the State of Nevada, it is important to realize that the agriculture sector is more than farming, ranching, fishing, and forestry activities. The sector provides products and services to, and purchases products and services from, other industries. To understand the impact of the agriculture sector, therefore, we must understand the connections of this sector to its suppliers and customers, also known as an industrial cluster.

An industrial cluster is a geographically bound collection of similar and/or related firms that together create competitive advantages for member firms and the local economy. Clusters generally include firms with significant horizontal and/or vertical linkages, or firms with similar resource and/or labor needs. Firms in a cluster may interact through purchase-sale relationships; inter-firm collaboration in product development; marketing or research, or a shared reliance on specialized services and labor markets.

Industries making up the agriculture cluster were defined using data provided by similar studies, specifically the “Environmental Scan, Agriculture Value Chain: California” dated June 2011, by the Center of Excellence at Modesto Junior College. This study provided a comprehensive list of agriculture-related industries using the North American Industry Classification System (NAICS). Each NAICS code is referred to as an industry, as defined by the Office of Management & Budget. Resulting industries were defined using four areas: 1) Production; 2) Support; 3) Processing and Packaging; 4) Distribution.

The analysis describes each of the four agricultural areas below. It should be noted that while all relevant NAICS codes are included in the below definition of the agriculture cluster, some of these industries may have no activities in the state and may be excluded from subsequent analyses and tables. They are included in the below tables to provide a full overview of the agriculture cluster.

Agriculture Production Industries

This area includes the direct activities of the agriculture cluster, including the creation of food, feed, and other agriculture products. The table below provides a list of the NAICS codes corresponding to this economic area.

Table 1. Agriculture Production Industries

NAICS Code	NAICS Definition
1111	Oilseed and Grain Farming
1112	Vegetable and Melon Farming
1113	Fruit and Tree Nut Farming
1114	Greenhouse, Nursery, and Floriculture Production
1119	Other Crop Farming
1121	Cattle Ranching and Farming
1122	Hog and Pig Farming
1123	Poultry and Egg Production
1124	Sheep and Goat Farming
1125	Aquaculture
1129	Other Animal Production
1131	Timber Tract Operations
1132	Forest Nurseries and Gathering of Forest Products
1133	Logging
1141	Fishing
1142	Hunting and Trapping
1151	Support Activities for Crop Production
1152	Support Activities for Animal Production
1153	Support Activities for Forestry

It should also be noted that only a four-digit NAICS code is provided for the above area, while all other areas are defined by six-digit codes. This is because the agriculture sector is made up of 64 six-digit NAICS codes and including all is unnecessary, given that the entire NAICS 11-Agriculture, Forestry, Fishing and Hunting is represented in this area.

Agriculture Support Industries

The agriculture support area industries provide support services essential to agricultural operations. These support activities range from farm machinery and fertilizer manufacturing, to landscaping and pest control. Table 2 below provides a summary of the industries within this area.

Table 2. Agriculture Support Industries

NAICS Code	NAICS Definition
325199	All Other Basic Organic Chemical Manufacturing
325311	Nitrogenous Fertilizer Manufacturing
325314	Fertilizer (Mixing Only) Manufacturing
325320	Pesticide & Other Agricultural Chemical Mfg
333111	Farm Machinery & Equipment Manufacturing
333241	Food Product Machinery Manufacturing
423820	Farm & Garden Machinery & Equip Merchant Whlsrs
424910	Farm Supplies Merchant Wholesalers
493120	Refrigerated Warehousing & Storage
541320	Landscape Architectural Services
541370	Surveying & Mapping (Except Geophysical) Services
541940	Veterinary Services
561710	Exterminating & Pest Control Services
561730	Landscaping Services

It should be noted that only those industries that provide the majority of its products and services or purchase the majority of its products and services from the agriculture sector are included. These industries are included on the assumption that the industries may not exist if it were not for the agriculture activities.

The agriculture sector also employs the services of employment agencies, marketing and accounting firms, construction companies, and more, as will be discussed in the “Agriculture Cluster Economic Development” section of this report. However, as these industries provide services to a wide range of other industries, it is difficult to determine the portion of sales attributed to the agriculture sector.

Agriculture Processing and Packaging Industries

The agriculture processing and packaging area is the changing of products of the agriculture production industries into processed forms for consumers. This area includes breweries, bakeries, meat processing and other industries as summarized in Table 3.

Table 3. Agriculture Processing and Packaging Industries

NAICS Code	NAICS Definition
311111	Dog and Cat Food Manufacturing
311119	Other Animal Food Manufacturing
311211	Flour Milling
311212	Rice Milling
311213	Malt Manufacturing
311221	Wet Corn Milling
311224	Soybean and Other Oilseed Processing
311225	Fats & Oils Refining & Blending
311230	Breakfast Cereal Manufacturing
311351	Chocolate/Confectionery Mfg From Cacao Beans
311352	Confectionery Mfg From Purchased Chocolate
311411	Frozen Fruit Juice & Vegetable Manufacturing
311412	Frozen Specialty Food Manufacturing
311421	Fruit & Vegetable Canning
311423	Dried & Dehydrated Food Manufacturing
311511	Fluid Milk Manufacturing
311520	Ice Cream & Frozen Dessert Manufacturing
311611	Animal (Except Poultry) Slaughtering
311612	Meat Processed From Carcasses
311613	Rendering & Meat Byproduct Processing
311811	Retail Bakeries
311812	Commercial Bakeries
311824	Dry Pasta Dough/Flour Mixes Mfg-Purchased Flour
311911	Roasted Nuts & Peanut Butter Manufacturing
311919	Other Snack Food Manufacturing
311920	Coffee & Tea Manufacturing
311942	Spice & Extract Manufacturing
311999	All Other Miscellaneous Food Manufacturing
312111	Soft Drink Manufacturing
312113	Ice Manufacturing
312120	Breweries
312130	Wineries
312140	Distilleries
312230	Tobacco Manufacturing
316998	All Other Leather Good & Allied Product Mfg

As with agriculture support industries, these industries may not exist if not for the agriculture production industries.

Agriculture Distribution Industries

The agriculture distribution area includes the trade industries related to agriculture culture as summarized in Table 4 below. It may also include logistics, warehousing, and transportation activities associated with the agriculture sector. However, as these activities are also conducted for industries outside of the agriculture sector, these activities are not included in the definition of an agriculture cluster.

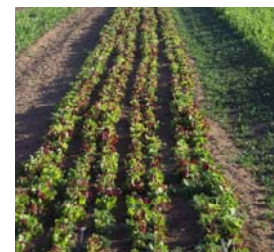
Table 4. Agriculture Distribution Industries

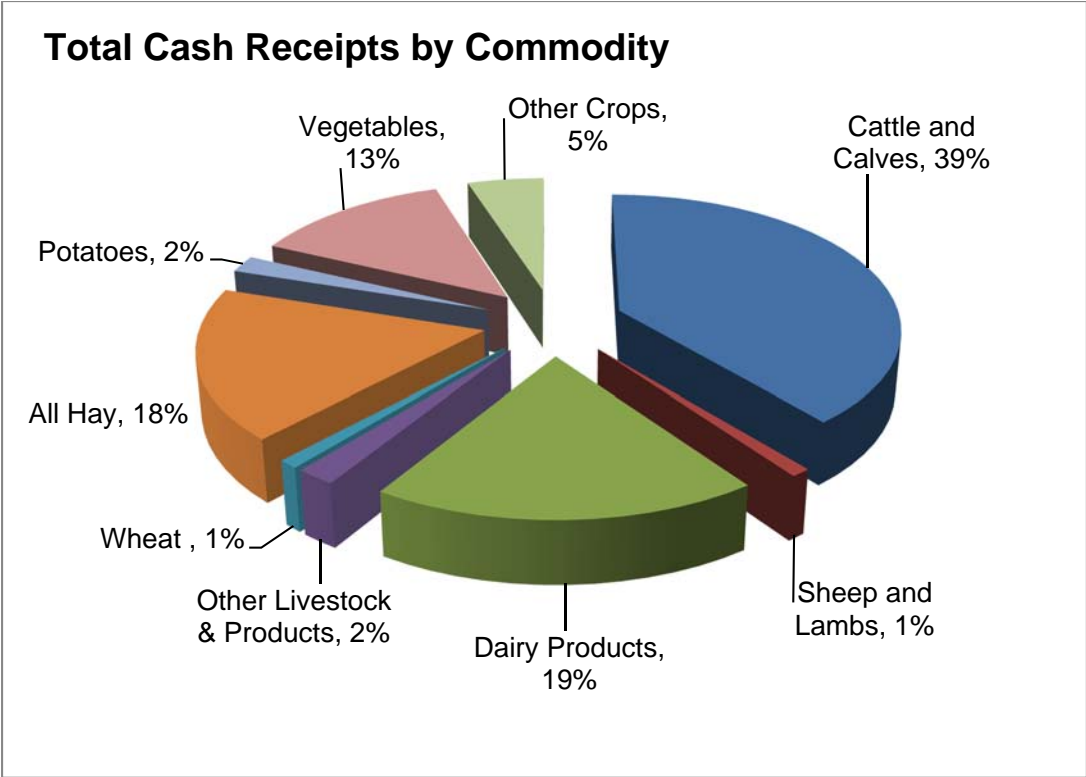
NAICS Code	NAICS Definition
424410	General Line Grocery Merchant Wholesalers
424420	Packaged Frozen Food Merchant Wholesalers
424430	Dairy Product (Exc Dried Or Canned) Mrchnt Whlsrs
424440	Poultry & Poultry Product Merchant Wholesalers
424450	Confectionery Merchant Wholesalers
424460	Fish & Seafood Merchant Wholesalers
424470	Meat & Meat Product Merchant Wholesalers
424480	Fresh Fruit & Vegetable Merchant Wholesalers
424490	Other Grocery & Related Products Merchant Whlsrs
424510	Grain & Field Bean Merchant Wholesalers
424520	Livestock Merchant Wholesalers
424590	Other Farm Product Raw Material Merchant Whlsrs
424720	Other Petroleum Merchant Wholesale
424810	Beer & Ale Merchant Wholesalers
424820	Wine & Distilled Alcoholic Beverage Mrchnt Whlsrs
424930	Flower, Nursery Stock/Florists Supls Mrchnt Whlsrs
444220	Nursery, Garden Center & Farm Supply Stores

Agriculture Sector Performance

Industry Overview

The agriculture sector is an important component of the Nevada economy. The agriculture production sector (classified as NAICS 11 and traditionally considered the main agriculture sector) not only compares favorably to national agriculture trends, it performs well compared to other economic activities in Nevada. The sector is composed primary of livestock and crop production, with a detailed breakdown by commodity provided in Graph 2.





Graph 2. Total Cash Receipts, by Commodity, Nevada-2010 (Nevada Agricultural Statistics, 2011)

Nevada’s agriculture production is not evenly distributed across the 17 counties. Table 5 below shows the number of farms, land in farms and average farm size for each of the counties in the state.

The table shows that Churchill County has the highest number of farms with 529 farms. Elko County has the highest amount of land in farms with 2.1 million acres. Eureka County has the biggest average farms with an average land per farm of over 9,000 acres.



Table 5. Farm Data by County, 2007 (Nevada Agricultural Statistics, 2011)

County	Number of Farms	Land in Farms (acres)	Average Farm Size (acres)
Carson City	21	2,756	131
Churchill	529	131,448	248
Clark	193	88,381	458
Douglas	179	91,046	509
Elko	456	2,085,135	4,573
Esmeralda	19	24,943	1,313
Eureka	86	783,440	9,110
Humboldt	254	756,313	2,978
Lander	84	339,091	4,037
Lincoln	98	46,271	472
Lyon	325	260,660	802
Mineral	84	(D)	(D)
Nye	173	90,868	525
Pershing	135	244,249	1,809
Storey	5	(D)	(D)
Washoe	393	485,893	1,236
White Pine	97	(D)	(D)
Total	3,131	5,865,392	1,873

(D) amount withheld to avoid disclosing data for individual operators

Not only is there a size difference among Nevada counties, but counties tend to specialize in certain commodities. For example, 18.6 percent of Alfalfa Hay, part of the third biggest commodity produced in the state, is produced in Humboldt County, another 17.1 percent in Lyon County, 11.5 percent in Lander County, and 9.7 percent in Pershing County. In total, 57.0 percent of all alfalfa production takes place in these four counties, as shown below.



Table 6. Alfalfa Hay Production Data by County, 2010 (Nevada Agricultural Statistics, 2011)

County	Acres	Yield (tons/acre)	Production (tons)	Production % of Total
Churchill	22,000	5.00	110,000	9.1%
Douglas	10,000	4.10	41,000	3.4%
Elko	17,000	3.05	52,000	4.3%
Esmeralda	13,000	5.45	71,000	5.9%
Eureka	18,000	4.05	73,000	6.1%
Humboldt	52,000	4.30	224,000	18.6%
Lander	28,000	4.95	139,000	11.5%
Lincoln	14,000	4.00	56,000	4.7%
Lyon	44,000	4.70	206,000	17.1%
Pershing	31,000	3.75	117,000	9.7%
White Pine	14,000	3.50	49,000	4.1%
Other Counties	17,000	3.88	66,000	5.5%
Total	280,000	4.30	1,204,000	

Cattle and calves production, the largest agricultural commodity produced in the state, is similarly concentrated within a few counties. Elko County is the biggest producer of the Cattle and Calves commodity with 29.3 percent of total state production, followed by Humboldt County with 14.1 percent of state total and Churchill County with 8.3 percent. Overall, over 51.7 percent of total cattle production occurs in the three counties.

Table 7. Cattle and Calves Inventory Data by County, 2011 (Nevada Agricultural Statistics, 2011)

County	Inventory (number of head)	Inventory as % of Total
Carson City	1,000	0.2%
Churchill	38,000	8.3%
Clark	5,000	1.1%
Douglas	14,500	3.2%
Elko	135,000	29.3%
Esmeralda	1,500	0.3%
Eureka	25,500	5.5%
Humboldt	65,000	14.1%
Lander	23,500	5.1%
Lincoln	17,000	3.7%
Lyon	38,000	8.3%
Mineral	3,000	0.7%
Nye	30,500	6.6%
Pershing	24,000	5.2%
Storey	-	0.0%
Washoe	15,500	3.4%
White Pine	23,000	5.0%
Total	460,000	

Comparison to US

In 2007 (latest state data from the US Department of Agriculture-USDA), Nevada had a total of 3,131 farms with over 5.8 million acres dedicated to farming. The average size of Nevada farms of 1,873 acres was considerably larger than the average US farm size of 418 acres. The average estimated market value of land and buildings in Nevada was \$1.1 million per farm, compared to \$791,138 for the US average. The average market value of Nevada agricultural products sold in 2007 was \$163,931 per farm, compared to \$134,807 for the US average.

Additionally, in 2007 the agriculture production sector employed approximately 4,428 farm workers with a total payroll of \$65.1 million. The resulting payroll per worker amount was estimated at \$14,710. Nationally, a total of 2.6 million farm workers were employed in 2007, with total payroll of \$21.9 billion, or a payroll per worker of \$8,298. Additionally, Nevada hired farm labor per farm of 5.36 compared closely to national hired farm labor per farm of 5.46 (USDA, 2012).

Comparison to Other Nevada Sectors

Not only did the agriculture production sector outperform or match the national average, it compares favorably to other economic sectors in Nevada. Using data by economic sector provided by the IMPLAN (Impact Analysis for Planning) model, the agriculture sector can be compared to other Nevada economic sectors in terms of output, labor income, total exports, total imports, and location quotient.

The IMPLAN model is a valuable tool in determining the impacts of economic sectors and is used throughout this report. As a result, it is important to understand more about the model. The IMPLAN model enables the construction of regional input-output models for any county or state in the United States. It is a technique built around quantifying the interaction between industries and industry sub-sectors within an economy.

The model is based on the theory that when new money enters a region through investments, revenue or expenditures, some of it is re-spent one or more times in the regional economy, creating additional impacts. IMPLAN estimates these impacts using specific data on what inputs are needed to produce the goods and services for all identified industries. Data in the IMPLAN database is based on the US Department of Commerce, Bureau of Economic Analysis (BEA) Covered Employment and Wages (CEW) program, the County Business Pattern data provided by the US Census, and the Regional Economic Information System data provided by the BEA. The IMPLAN model database also draws from secondary economic data at the state and local level from a variety of public sources.

Data in the IMPLAN model is coded differently than the NAICS code system, though a bridge exists to allow for the comparison of the two classification systems. Industries within the agriculture cluster correspond to the following IMPLAN codes:

Table 8. IMPLAN Codes

Agriculture Production Industries		Agriculture Processing and Packaging Industries	
IMPLAN Code	IMPLAN Definition	IMPLAN Code	IMPLAN Definition
1	Oilseed farming	41	Dog and cat food manufacturing
2	Grain farming	42	Other animal food manufacturing
3	Vegetable and melon farming	43	Flour milling and malt manufacturing
4	Fruit farming	44	Wet corn milling
5	Tree nut farming	45	Soybean and other oilseed processing
6	Greenhouse, nursery, and floriculture production	46	Fats and oils refining and blending
7	Tobacco farming	47	Breakfast cereal manufacturing
8	Cotton farming	48	Sugar cane mills and refining
9	Sugarcane and sugar beet farming	49	Beet sugar manufacturing
10	All other crop farming	50	Chocolate and confectionery manufacturing from cacao beans
11	Cattle ranching and farming	51	Confectionery manufacturing from purchased chocolate
12	Dairy cattle and milk production	52	Nonchocolate confectionery manufacturing
13	Poultry and egg production	53	Frozen food manufacturing
14	Animal production, except cattle and poultry and eggs	54	Fruit and vegetable canning, pickling, and drying
15	Forest nurseries, forest products, and timber tracts	55	Fluid milk and butter manufacturing
16	Logging	56	Cheese manufacturing
17	Fishing	57	Dry, condensed, and evaporated dairy product manufacturing
18	Hunting and trapping	58	Ice cream and frozen dessert manufacturing
19	Support activities for agriculture and forestry	59	Animal (except poultry) slaughtering, rendering, and processing
Agriculture Distribution Industries		60	Poultry processing
319	Wholesale trade	61	Seafood product preparation and packaging
323	Retail - Building material and garden supply	62	Bread and bakery product manufacturing
Agriculture Support Industries		63	Cookie, cracker, and pasta manufacturing
126	Other basic organic chemical manufacturing	64	Tortilla manufacturing
130	Fertilizer manufacturing	65	Snack food manufacturing
131	Pesticide and other agricultural chemical manufacturing	66	Coffee and tea manufacturing
203	Farm machinery and equipment manufacturing	67	Flavoring syrup and concentrate manufacturing
207	Other industrial machinery manufacturing	68	Seasoning and dressing manufacturing
319	Wholesale trade	69	All other food manufacturing
340	Warehousing and storage	70	Soft drink and ice manufacturing
369	Architectural, engineering, and related services	71	Breweries
379	Veterinary services	72	Wineries
388	Services to buildings and dwellings	73	Distilleries
		74	Tobacco product manufacturing
		94	Other leather and allied product manufacturing

Using data provided by the State of Nevada for the 2010 IMPLAN model, Tables 8 through 13 compare the performance of the industries within the agriculture cluster to other industries within the state.

Output per Employee

Table 9 shows the top 25 Nevada industries by output per employee. Output per employee data for all industries in the state is summarized in the appendices at the end of this report. Output is defined by IMPLAN as “the value of industry production. In IMPLAN these are annual production estimates for the year of the data set and are in producer prices. For manufacturers this would be sales plus/minus change

in inventory. For service sectors production = sales. For Retail and wholesale trade, output = gross margin and not gross sales.” (IMPLAN, 2012) Output per employee is often referred to as “employee productivity.”

Table 9. Top 25 Industries by Output per Employee-Nevada

Industry Code	Description	Output	Employment	Output per Employee
0	Total	\$ 183,729,971,997	1,487,063	\$ 123,552
115	Petroleum refineries	415,060,608	57	7,278,542
45	Soybean and other oilseed processing	214,797,888	53	4,071,994
67	Flavoring syrup and concentrate manufacturing	31,377,938	10	3,003,314
337	Transport by pipeline	40,879,392	23	1,764,894
130	Fertilizer manufacturing	55,208,900	42	1,303,678
117	Asphalt shingle and coating materials manufacturing	111,441,424	89	1,251,471
276	Automobile manufacturing	136,509,680	109	1,250,526
127	Plastics material and resin manufacturing	7,558,801	6	1,237,267
41	Dog and cat food manufacturing	139,940,048	114	1,230,409
42	Other animal food manufacturing	28,209,424	24	1,181,031
234	Electronic computer manufacturing	55,018,568	48	1,140,706
126	Other basic organic chemical manufacturing	30,889,744	27	1,138,591
138	Soap and cleaning compound manufacturing	26,777,138	24	1,131,889
366	Lessors of nonfinancial intangible assets	777,665,728	736	1,057,171
133	Pharmaceutical preparation manufacturing	529,497,184	516	1,025,845
32	Natural gas distribution	1,282,179,840	1,327	966,478
123	Alkalies and chlorine manufacturing	124,019,920	129	959,235
121	Industrial gas manufacturing	24,079,696	26	931,345
111	Sanitary paper product manufacturing	388,610,656	464	838,242
47	Breakfast cereal manufacturing	124,184,952	150	826,135
347	Sound recording industries	239,300,688	304	786,662
176	Primary smelting and refining of nonferrous metal	52,928,572	69	763,588
116	Asphalt paving mixture and block manufacturing	16,360,722	21	761,532
125	All other basic inorganic chemical manufacturing	110,914,504	147	752,587
118	Petroleum lubricating oil and grease manufacturing	23,916,728	32	746,774

The table shows that seven of the agriculture cluster industries are included in the top 25 Nevada industries in terms of output per employee (highlighted in yellow). This includes a number of food manufacturing industries, including Soybean and Other Oilseed Processing, Flavoring Syrup and Concentrate Manufacturing, and Fertilizer Manufacturing industries. All of these industries are considerably more productive than the state average output per employee of \$123,552.

Table 10. Agriculture Cluster Output per Employee-Nevada

Industry Code	Description	Output	Employ	Output
45	Soybean and other oilseed processing	\$ 214,797,888	53	\$ 4,071,994
67	Flavoring syrup and concentrate	31,377,938	10	3,003,314
130	Fertilizer manufacturing	55,208,900	42	1,303,678
41	Dog and cat food manufacturing	139,940,048	114	1,230,409
42	Other animal food manufacturing	28,209,424	24	1,181,031
126	Other basic organic chemical	30,889,744	27	1,138,591
47	Breakfast cereal manufacturing	124,184,952	150	826,135
13	Poultry and egg production	383,668	1	732,726
70	Soft drink and ice manufacturing	170,303,056	247	688,428
71	Breweries	4,870,839	7	673,351
66	Coffee and tea manufacturing	136,665,920	209	654,227
55	Fluid milk and butter manufacturing	276,041,824	446	619,209
68	Seasoning and dressing manufacturing	177,234,176	325	545,366
65	Snack food manufacturing	11,731,769	22	538,580
54	Fruit and vegetable canning etc	139,187,808	261	533,664
73	Distilleries	2,493,586	5	513,573
59	Animal (no poultry) processing	57,270,696	128	445,830
58	Ice cream and frozen dessert	189,487,552	437	433,600
63	Cookie, cracker, and pasta manufacturing	16,720,385	44	379,680
51	Confectionery from purchased chocolate	66,802,576	196	341,070
61	Seafood product preparation / packaging	10,068,521	30	335,985
52	Nonchocolate confectionery	29,799,682	89	334,027
53	Frozen food manufacturing	93,487,496	304	307,423
69	All other food manufacturing	84,740,000	287	295,036
10	All other crop farming	395,312,448	1,389	284,680
3	Vegetable and melon farming	85,862,304	325	264,471
4	Fruit farming	1,168,816	5	218,569
64	Tortilla manufacturing	13,577,219	67	201,978
207	Other industrial machinery	9,254,150	47	196,364
12	Dairy cattle and milk production	106,081,312	542	195,559
6	Greenhouse, nursery, and floriculture	11,682,558	67	174,790
11	Cattle ranching and farming	217,091,408	1,263	171,940
319	Wholesale trade businesses	5,859,927,040	36,427	160,868
62	Bread and bakery product	206,969,408	1,326	156,055
0	Total	183,729,971,997	1,487,063	123,552
5	Tree nut farming	219,984	2	112,909
16	Commercial logging	4,548,193	41	110,317
369	Architectural, engineering services	1,704,675,712	15,946	106,905
94	Other leather and allied product	2,250,697	25	91,163
323	Retail Stores - Building and garden supply	609,654,464	7,731	78,862
2	Grain farming	6,999,957	97	72,324
388	Services to buildings and dwellings	1,387,577,728	24,408	56,850
379	Veterinary services	211,920,544	3,730	56,812
17	Commercial Fishing	24,687,964	438	56,393
14	Animal production, no cattle - poultry	15,846,335	287	55,230
19	Support activities for agriculture and forestry	39,497,184	1,242	31,808

Table 10 compares output per employee for the agriculture cluster industries to the average amount for the state (highlighted in green). Those industries above the Total line have output higher than state average, and those below are lower. The table shows that 34 of 45 agriculture cluster industries (76 percent) have employee productivity greater than the state average.

Labor Income per Employee

Table 11 shows the top 25 Nevada industries by labor income per employee. Labor income per employee data for all industries in the state is summarized in the appendices at the end of this report. Labor income is the sum of employee compensation and proprietor income, since many farms are owner operated.

IMPLAN defines employee compensation as “the total payroll cost of the employee paid by the employer. This includes, wage and salary, all benefits (health, retirement, etc.) and employer paid payroll taxes (e.g. employer side of social security, unemployment taxes, etc.)” Proprietor income is defined by IMPLAN as “payments received by self-employed individuals and unincorporated business owners. This income also includes the capital consumption allowance and is recorded on Federal Tax form 1040C.”

Table 11. Top 25 Industries by Labor Income per Employee-Nevada

Industry Code	Industry Description	Employee Compensation	Proprietor Income	Labor Income	Employment	Labor Income per Employee
0	Total	\$ 61,110,889,368	\$ 6,922,144,558	\$ 68,033,033,926	1,487,063	\$ 45,750
337	Transport by pipeline	1,362,891	25,247,192	26,610,083	23	1,148,843
115	Petroleum refineries	6,303,051	4,558,390	10,861,440	57	190,467
117	Asphalt shingle and coating materials manufacturing	9,629,990	6,100,553	15,730,543	89	176,652
67	Flavoring syrup and concentrate manufacturing	1,509,185	21,745	1,530,930	10	146,532
123	Alkalies and chlorine manufacturing	12,358,741	4,582,379	16,941,120	129	131,031
127	Plastics material and resin manufacturing	542,298	255,343	797,640	6	130,562
116	Asphalt paving mixture and block manufacturing	2,137,605	665,425	2,803,030	21	130,471
31	Electric power generation, transmission, and distribution	362,066,304	7,147,269	369,213,573	2,930	126,027
141	All other chemical product and preparation manufacturing	15,033,395	6,008,202	21,041,597	167	126,019
287	Guided missile and space vehicle manufacturing	25,434,684	12,006,194	37,440,878	302	124,176
32	Natural gas distribution	158,659,760	2,595,077	161,254,837	1,327	121,550
125	All other basic inorganic chemical manufacturing	12,760,418	4,799,927	17,560,345	147	119,152
140	Printing ink manufacturing	4,271,082	2,338,072	6,609,154	57	116,300
181	All other forging, stamping, and sintering	5,784,705	59,332	5,844,037	54	107,947
24	Mining gold, silver, and other metal ore	978,599,872	64,871,468	1,043,471,340	9,799	106,489
334	Transport by water	6,730,247	6,367,789	13,098,036	123	106,374
160	Cement manufacturing	6,380,445	85,255	6,465,699	61	105,942
275	All other miscellaneous electrical equipment and component manufacturing	29,421,924	(159,815)	29,262,109	277	105,587
284	Aircraft manufacturing	785,682	413,064	1,198,747	11	105,240
381	Management of companies and enterprises	2,252,079,360	(167,666,864)	2,084,412,496	20,106	103,673
111	Sanitary paper product manufacturing	33,399,684	14,297,798	47,697,482	464	102,885
333	Transport by rail	60,919,760	2,103,707	63,023,467	616	102,390
121	Industrial gas manufacturing	1,893,802	718,837	2,612,639	26	101,051
432	Other state and local government enterprises	688,108,352	0	688,108,352	6,816	100,949
317	All other miscellaneous manufacturing	583,561,280	7,360,215	590,921,495	5,869	100,686

Table 11 shows only one agriculture cluster industry falls in the top 25 industries in Nevada by labor income per employee (highlighted in yellow). However, approximately 47 percent of all agriculture cluster industries (21 out of 45) have labor income per employee greater than the state average of \$45,750 as summarized in the table below.

Table 12. Agriculture Cluster Labor Income per Employee-Nevada

Description	Employee Compensation	Proprietor Income	Labor Income	Employment	Labor Income per
Flavoring syrup and concentrate manufacturing	1,509,185	21,745	1,530,930	10	146,532
Greenhouse, nursery, and floriculture production	3,135,575	2,124,825	5,260,400	67	78,704
Fertilizer manufacturing	2,538,425	624,184	3,162,610	42	74,680
Other basic organic chemical manufacturing	1,360,644	569,435	1,930,080	27	71,142
Wholesale trade businesses	2,295,387,136	266,693,296	2,562,080,432	36,427	70,335
Fluid milk and butter manufacturing	30,399,710	379,863	30,779,573	446	69,044
Vegetable and melon farming	10,445,844	11,968,357	22,414,201	325	69,040
Breakfast cereal manufacturing	10,040,317	172,800	10,213,117	150	67,942
Soybean and other oilseed processing	3,508,380	52,710	3,561,090	53	67,509
Dog and cat food manufacturing	7,316,658	101,101	7,417,758	114	65,220
Architectural, engineering, and related services	814,101,760	198,979,440	1,013,081,200	15,946	63,533
Fruit and vegetable canning, pickling, and drying	15,667,290	196,694	15,863,984	261	60,825
Ice cream and frozen dessert manufacturing	25,380,744	355,050	25,735,794	437	58,891
Fruit farming	133,709	180,041	313,749	5	58,671
Poultry and egg production	22,634	7,077	29,711	1	56,742
Seasoning and dressing manufacturing	16,946,936	259,576	17,206,512	325	52,946
Commercial logging	1,634,101	524,496	2,158,597	41	52,357
Soft drink and ice manufacturing	12,023,499	878,322	12,901,821	247	52,154
Coffee and tea manufacturing	10,676,673	144,338	10,821,011	209	51,801
Other animal food manufacturing	1,206,877	17,188	1,224,064	24	51,247
Other industrial machinery manufacturing	2,201,518	16,793	2,218,311	47	47,070
Total	61,110,889,368	6,922,144,558	68,033,033,926	1,487,063	45,750
Animal (except poultry) slaughtering, rendering, and processing	5,611,503	70,569	5,682,071	128	44,233
All other crop farming	28,902,958	28,503,746	57,406,704	1,389	41,341
Seafood product preparation and packaging	1,190,170	23,837	1,214,007	30	40,511
Breweries	258,498	28,542	287,039	7	39,681
Retail Stores - Building material and garden supply	271,752,768	18,285,626	290,038,394	7,731	37,518
Confectionery manufacturing from purchased chocolate	6,781,971	108,412	6,890,383	196	35,180
Veterinary services	98,721,984	30,791,846	129,513,830	3,730	34,720
Tree nut farming	53,134	13,865	66,999	2	34,388
Frozen food manufacturing	10,293,411	142,614	10,436,025	304	34,318
Tortilla manufacturing	2,178,131	17,594	2,195,726	67	32,664
Nonchocolate confectionery manufacturing	2,845,936	43,295	2,889,231	89	32,386
Bread and bakery product manufacturing	41,049,544	545,866	41,595,410	1,326	31,363
All other food manufacturing	8,515,761	112,176	8,627,937	287	30,040
Support activities for agriculture and forestry	21,363,508	8,899,203	30,262,711	1,242	24,371
Cookie, cracker, and pasta manufacturing	1,042,307	17,587	1,059,894	44	24,068
Services to buildings and dwellings	502,095,136	52,711,172	554,806,308	24,408	22,731
Commercial Fishing	6,480,706	2,271,730	8,752,436	438	19,992
Other leather and allied product manufacturing	382,881	81,515	464,396	25	18,810
Snack food manufacturing	402,358	5,073	407,431	22	18,704
Distilleries	72,050	6,476	78,527	5	16,173
Cattle ranching and farming	12,379,557	400,015	12,779,572	1,263	10,122
Dairy cattle and milk production	4,587,248	289,511	4,876,759	542	8,990
Animal production, except cattle and poultry and eggs	1,801,480	220,650	2,022,130	287	7,048
Grain farming	181,863	264,680	446,543	97	4,614

Value of Imports

In an open economy, economic sectors trade outside of the local economy, purchasing goods and services from outside of the region (imports) and selling goods and services to other sectors outside of the region (exports). Industries importing goods and services from outside of the region are important to economic development entities as importing creates an outflow of money that could otherwise be spent within the economy. It is the goal of economic development to reduce the amount of imports into a region by attracting or starting companies to produce the imported goods and services locally.

Table 13 compares the top 25 industries in Nevada by value of imports by industry. The table shows Nevada businesses imported a total of \$29.9 billion in 2010. Of the top 25 industries by imports, two are part of the agriculture cluster.

Table 13. Top 25 Industries by Value of Imports –Nevada

Industry Code	Description	Value of Imports
0	Total	\$ 29,852,733,104
24	Mining gold, silver, and other metal ore	942,744,163
32	Natural gas distribution	698,768,918
34	Construction of new nonresidential commercial and health care structures	891,873,466
36	Construction of other new nonresidential structures	976,595,283
37	Construction of new residential permanent site single- and multi-family structures	553,451,750
38	Construction of other new residential structures	372,334,818
39	Maintenance and repair construction of nonresidential structures	290,084,968
115	Petroleum refineries	342,705,517
317	All other miscellaneous manufacturing	495,031,350
319	Wholesale trade businesses	480,753,791
332	Transport by air	517,265,715
335	Transport by truck	257,863,626
351	Telecommunications	496,312,122
354	Monetary authorities and depository credit intermediation activities	373,881,426
355	Nondepository credit intermediation and related activities	311,126,443
356	Securities, commodity contracts, investments, and related activities	1,994,828,797
361	Imputed rental activity for owner-occupied dwellings	376,954,582
381	Management of companies and enterprises	505,001,212
388	Services to buildings and dwellings	392,289,079
394	Offices of physicians, dentists, and other health practitioners	652,247,596
397	Private hospitals	478,398,379
409	Amusement parks, arcades, and gambling industries	517,929,479
411	Hotels and motels, including casino hotels	2,455,858,530
413	Food services and drinking places	1,799,595,706
432	Other state and local government enterprises	530,864,243

Overall, Agriculture Production sectors (defined above) imported approximately \$354 million in goods and services into Nevada, which was 1.2 percent of all imports into the state. Agriculture Processing and Packaging sectors imported another \$1.2 billion in goods and services, 4.1 percent of total state imports. Imports by other agriculture areas are not shown as they include imports for industries other than those directly related to agricultural activities.

The above table is used to compare agricultural cluster industries to other state industries only; the “Agriculture Cluster Economic Development” section of this report discusses the state’s import substitution opportunities in further detail.

Value of Exports

Export enhancement attempts to increase export sales to buyers outside the region. Export sales by Nevada’s industries bring dollars into the economy to provide growth for future economic expansion. Economic strategy seeks to expand the exports of specific sectors which could enhance future economic development in the state.



Table 14 compares the top 25 industries in Nevada by value of exports, both domestic and foreign, by industry. The table shows Nevada businesses exported a total of \$61.1 billion in 2010. Of the top 25 industries by value of imports, two are part of the agriculture cluster, including All Other Crop Farming, a direct agricultural industry.



Table 14. Top 25 Industries by Value of Exports -Nevada

Industry Code	Description	Value of Domestic Exports	Value of Foreign Exports	Total Value of Exports
0	Total	\$ 53,625,927,091	\$7,482,201,383	\$61,108,128,475
411	Hotels and motels, including casino hotels	15,803,472,321	1,262,098	15,804,734,419
24	Mining gold, silver, and other metal ore	3,758,039,604	543,697,582	4,301,737,186
413	Food services and drinking places	3,364,281,665	11,642,664	3,375,924,330
409	Amusement parks, arcades, and gambling industries	3,236,173,340	-	3,236,173,340
360	Real estate establishments	2,684,992,432	10,832,452	2,695,824,883
381	Management of companies and enterprises	1,237,786,499	624,394,348	1,862,180,847
356	Securities, commodity contracts, investments, and related activities	1,397,723,598	253,462,509	1,651,186,107
319	Wholesale trade businesses	519,256,836	937,763,123	1,457,019,958
317	All other miscellaneous manufacturing	1,195,887,859	236,094,319	1,431,982,179
332	Transport by air	643,441,345	442,959,137	1,086,400,482
389	Other support services	777,925,892	4,364,326	782,290,218
359	Funds, trusts, and other financial vehicles	699,554,443	-	699,554,443
355	Nondepository credit intermediation and related activities	578,143,741	63,204,220	641,347,960
327	Retail Stores - Clothing and clothing accessories	611,199,890	-	611,199,890
32	Natural gas distribution	549,369,559	835,170	550,204,729
336	Transit and ground passenger transportation	534,418,091	-	534,418,091
30	Support activities for other mining	508,949,502	58,128	509,007,630
34	Construction of new nonresidential commercial and health care structures	490,461,182	-	490,461,182
133	Pharmaceutical preparation manufacturing	407,660,370	39,871,485	447,531,855
331	Retail Nonstores - Direct and electronic sales	445,286,377	-	445,286,377
178	Nonferrous metal (except copper and aluminum) rolling, drawing, extruding	267,622,536	163,385,920	431,008,456
115	Petroleum refineries	362,054,664	35,395,360	397,450,024
10	All other crop farming	362,836,591	19,911,869	382,748,460
365	Commercial and industrial machinery and equipment rental and leasing	301,013,809	79,051,518	380,065,327
20	Extraction of oil and natural gas	318,487,399	15,432,447	333,919,847

Overall, Agriculture Production sectors (defined above) exported approximately \$681 million in goods and services from Nevada, which was 1.1 percent of all state exports. Agriculture Processing and Packaging sectors export another \$1.3 billion in goods and services, 2.1 percent of total state exports. As before, exports by other agriculture areas are not shown as they include exports from industries other than those directly related to agricultural activities.

The above table is used to compare agricultural cluster industries to other state industries only; the “Agriculture Cluster Economic Development” section of this report discusses the state’s export enhancement opportunities in further detail.

Location Quotient

A location quotient (LQ) analysis identifies industries within a region that are specialized compared to the nation. An industry’s location quotient greater than 1.0 indicates the region is more specialized in that industry than the nation and is likely producing for export as well as local consumption. The greater the LQ value the greater the specialization of the industry in the region compared to the nation.

Changes in industry specialization are measured by comparing five-year trends of location quotients. The specialization of industries changes over time and it is possible that highly specialized industries may be actually decreasing in their specialization. Likewise, non-specialized industries may become more specialized over time. Table 15 below summarizes the location quotient results by 2-digit NAICS code for all major industry sectors in Nevada.

Table 15. Location Quotient by Major Industry, Nevada-2011 (DETR, 2011),¹

NAICS Code	Definition	County Employment by Sector (Eir)	Total County Employment (Er)	National Employment by Sector (Ein)	Total National Employment (En)	Location Quotient (Eir/Er)/(Ein/En)	% Change from 2006
11	Agriculture, Forestry, Fishing and Hunting	2,262	1,108,882	1,179,871	129,673,330	0.22	6.76%
21	Mining, Quarrying, and Oil and Gas Extraction	13,582	1,108,882	717,288	129,673,330	2.21	11.65%
22	Utilities	5,553	1,108,882	807,027	129,673,330	0.80	-3.06%
23	Construction	51,229	1,108,882	5,669,141	129,673,330	1.06	-45.81%
31 to 33	Manufacturing	37,972	1,108,882	11,710,267	129,673,330	0.38	1.23%
42	Wholesale Trade	31,596	1,108,882	5,541,939	129,673,330	0.67	0.04%
44 to 45	Retail Trade	127,578	1,108,882	14,617,096	129,673,330	1.02	8.61%
48 to 49	Transportation and Warehousing	49,728	1,108,882	4,964,304	129,673,330	1.17	18.11%
51	Information	13,311	1,108,882	2,691,241	129,673,330	0.58	9.41%
52	Finance and Insurance	29,603	1,108,882	5,516,496	129,673,330	0.63	-7.14%
53	Real Estate and Rental and Leasing	21,581	1,108,882	1,955,709	129,673,330	1.29	2.10%
54	Professional, Scientific, and Technical Services	47,131	1,108,882	7,732,536	129,673,330	0.71	-6.13%
55	Management of Companies and Enterprises	17,574	1,108,882	1,910,527	129,673,330	1.08	35.88%
56	Administrative Support, Waste Management and Remediation Services	71,337	1,108,882	7,793,025	129,673,330	1.07	-4.17%
61	Educational Services	76,208	1,108,882	12,518,219	129,673,330	0.71	13.77%
62	Health Care and Social Assistance	104,146	1,108,882	18,333,814	129,673,330	0.66	13.07%
71	Arts, Entertainment, and Recreation	26,801	1,108,882	2,410,092	129,673,330	1.30	-6.42%
72	Accommodation and Food Services	292,348	1,108,882	11,587,280	129,673,330	2.95	1.51%
81	Other Services (except Public Administration)	27,965	1,108,882	4,457,781	129,673,330	0.73	8.06%
92	Public Administration	60,692	1,108,882	7,359,028	129,673,330	0.96	8.01%
99	Unclassified	685	1,108,882	200,649	129,673,330	0.40	-20.45%

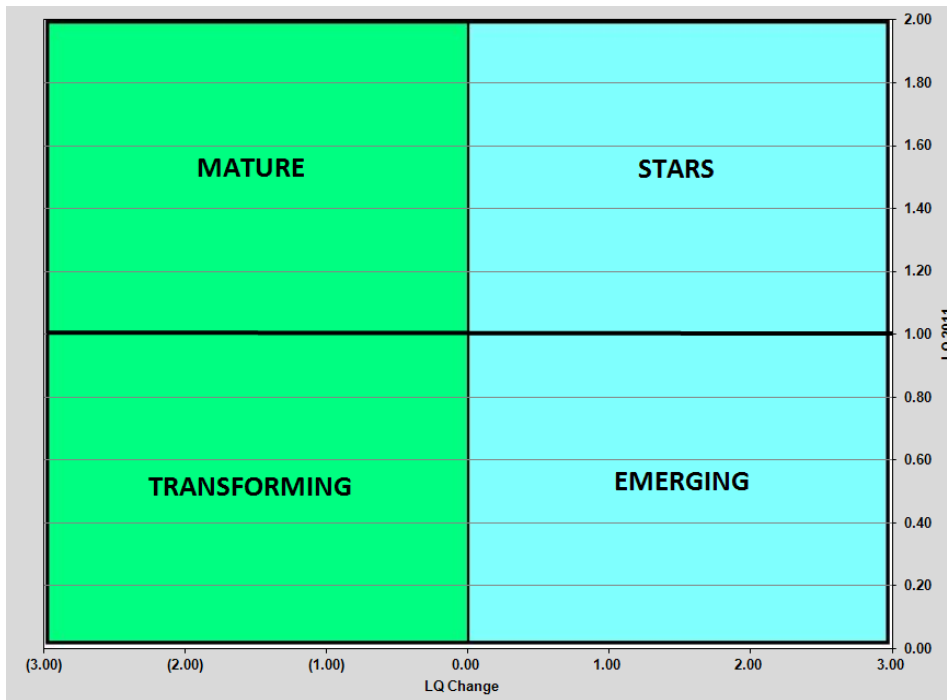
Using location quotient data, a location quotient matrix can be developed to show whether industries are more specialized than the nation and whether they are increasing or decreasing in their degree of specialization. A location quotient matrix divides industries into four categories:

- **Stars**-Star industries are those whose ratio of employment in the region is larger than that in the nation and whose ratio of employment has increased over the five year period relative to the nation. Star industries are specialized compared to the nation and are becoming more specialized.

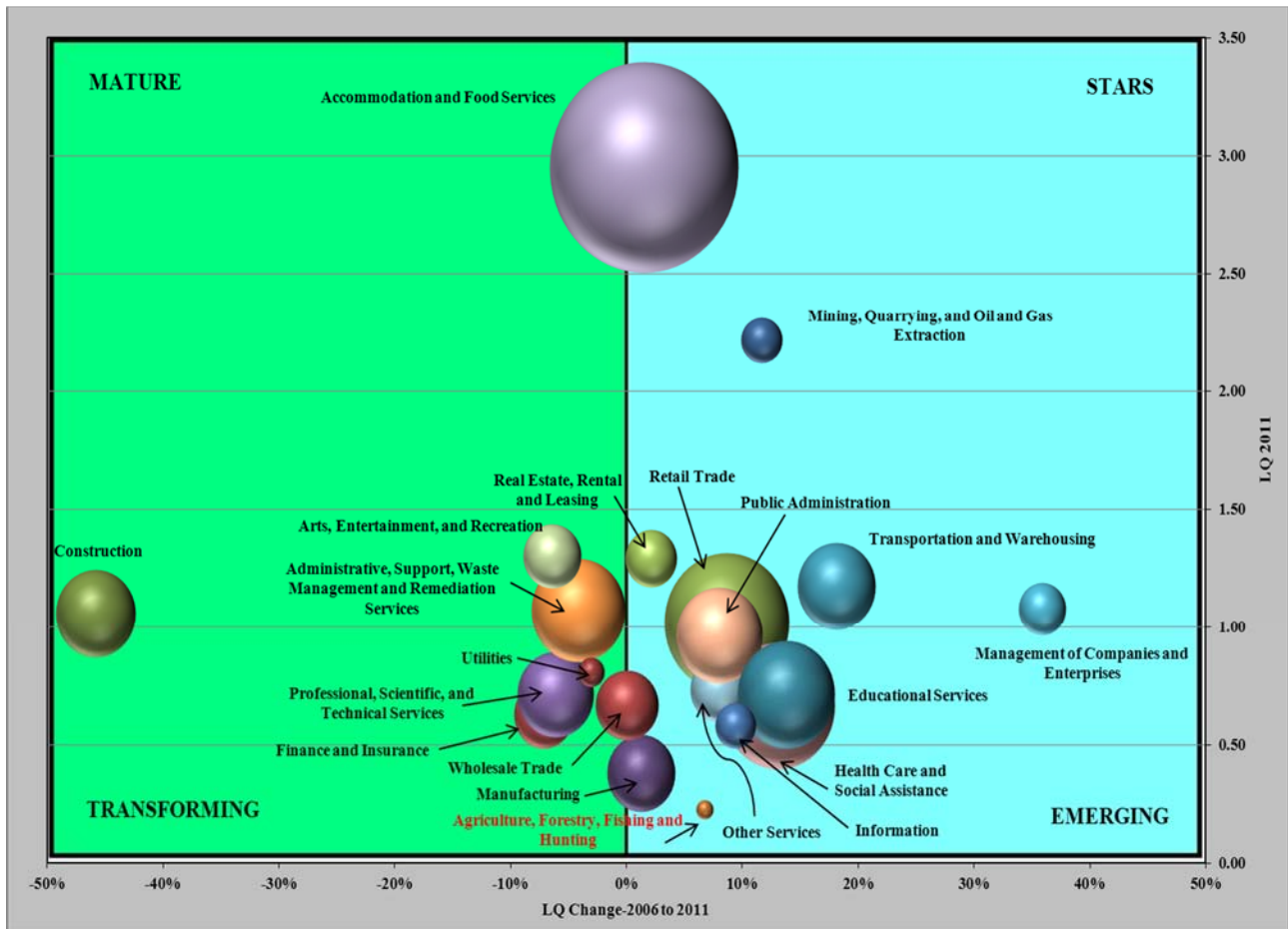
¹ Employment data available from DETR may not match employment data from IMPLAN shown later in the report due to differences in data collection for the two sources. DETR data may exclude sole proprietor data and include differences due to classification of businesses between IMPLAN and NAICS codes.

- **Mature**-Mature industries are those whose ratio of employment in the region is larger than that in the nation and whose ratio of employment has decreased over the five year period relative to the nation. Mature industries are still specialized compared to the nation, but are becoming less specialized.
- **Emerging**-Emerging industries are those whose ratio of employment in the region is less than that in the nation, but whose ratio of employment has increased over the five year period relative to the nation. These clusters are less specialized compared to the nation, but some of the emerging industries may become specialized in the future.
- **Transforming**-Transforming industries are those whose ratio of employment in the region is less than that in the nation and whose ratio of employment has decreased over the five year period relative to the nation. These clusters are less specialized in the region, and are unlikely to become specialized in the future.

These categories are shown on the sample location quotient matrix below. On the x-axis (LQ Change), the dividing line between Mature/Transforming and Stars/Emerging sectors is the zero line. On the y-axis (LQ 2011), the dividing line between Mature/Stars and Transforming/Emerging sectors is the 1.0 line.



The location quotient matrix for Nevada industries is shown below. The size of each bubble is determined by the industry's 2011 employment, allowing for the comparison of the size of the industry, as well as its specialization and change in specialization between 2006 and 2011



Graph 3. Location Quotient Matrix for Major Industries-Nevada

The matrix shows that the Agriculture, Forestry, Fishing and Hunting industry is one of the Emerging industries in Nevada. Though it does not have a high level of concentration with a 2011 LQ score of 0.22, or a large number of employees, its LQ score grew by almost 7 percent between 2006 and 2011, showing industry growth and potential for future concentration.

Summary

Overall, the agriculture cluster has an important impact on the state, supplying jobs, income, exports, and spending in the state economy. The sector compares favorably to the national agriculture sector statistics

and to other sectors in the Nevada economy. The total impact of the sector will be discussed in the “Agriculture Cluster Economic Impact Analysis” section of the report. The industry has some potential for growth through additional economic development, as will be discussed in the following section.

Agriculture Cluster Economic Development

Cluster Value Chains

Industrial sectors supplying inputs to or purchasing outputs from the agriculture cluster may be good candidates for targeting and recruitment. Sectors linked to the agriculture cluster may find Nevada a preferred location if proximity to input supplies and products market is desired.

The IMPLAN database is used to identify any forward or backward linkages to and from the agriculture cluster. A backward link to the agriculture cluster is a sector that supplies the cluster with products and services. Backward links are counted if a sector supplies at least 2 percent of the total value of purchases by the cluster. A forward link to the agriculture cluster is a sector that purchases the cluster’s output. Forward links are counted if a sector purchases more than 1 percent of the total value of intermediates sales of the cluster.

Using the IMPLAN database, top-input suppliers and customers for the agriculture cluster are identified as summarized in Table 16 below. The table summarizes the top 25 sectors by total linkages. Data for all sectors linked to the agriculture cluster is summarized in the appendices at the end of this report.

Many of these sectors fall within the Transportation and Business/Professional Services sectors. The sector with the highest amount of linkages to the agriculture cluster is the Wholesale Trade sector, with a total of 47 backward and forward linkages. This sector’s close relationship to agriculture is the reason it is included in the agriculture cluster. This is followed by truck transportation and food services and drinking places, with 41 and 38 linkages respectively. These sectors could also be included in the agriculture cluster, though their relationship to the cluster is more difficult to quantify.

Table 16. Top 25 Backward and Forward Linkages for Agriculture Cluster-Nevada

IMPLAN Code	Definitions	Backward Linkages	Forward Linkages	Total Linkages
319	Wholesale trade	43	4	47
335	Truck transportation	40	1	41
413	Food services and drinking places	5	33	38
411	Hotels and motels, including casino hotels	8	29	37
360	Real estate	30	3	33
381	Management of companies and enterprises	32	1	33
31	Electric power generation, transmission, and distribution	29		29
354	Monetary authorities and depository credit intermediation	26	1	27
409	Amusement parks, arcades, and gambling industries		26	26
39	Maintenance and repair construction of nonresidential maintenance and repair	18	4	22
32	Natural gas distribution	19		19
397	Hospitals		16	16
68	Seasoning and dressing manufacturing	3	12	15
333	Rail transportation	15		15
432	Other state and local government enterprises	9	6	15
388	Services to buildings and dwellings	11	3	14
54	Fruit and vegetable canning, pickling, and drying		13	13
58	Ice cream and frozen dessert manufacturing	1	12	13
62	Bread and bakery product manufacturing		13	13
19	Support activities for agriculture and forestry	9	3	12
67	Flavoring syrup and concentrate manufacturing	5	7	12
369	Architectural, engineering, and related services	11	1	12
10	All other crop farming	4	7	11
55	Fluid milk and butter manufacturing	4	7	11
376	Scientific research and development services	6	5	11

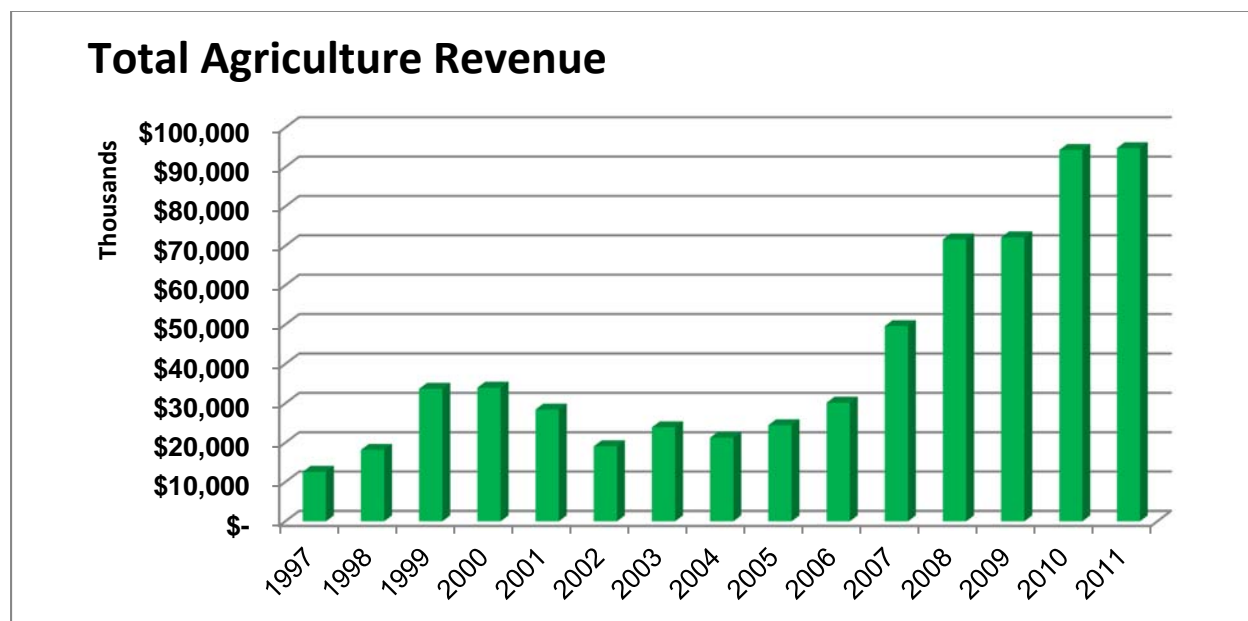
The expansion of the existing agriculture cluster could make Nevada a more attractive location for linked economic sectors, thus reducing the efforts and incentives required to attract establishments in the linked sectors.

Export Enhancement

As discussed above, export enhancement attempts to increase export sales to buyers outside the region. The goal of economic development entities is to identify those sectors that export their products and services outside of the state and encourage additional growth within these sectors.

Exports are an important and growing component of the agriculture cluster and the state economy. According to data provided by the Nevada Governor’s Office of Economic Development, Nevada’s

agricultural exports (classified as Miscellaneous Edible Preparations) grew by over 650 percent between 1997 and 2011, an average of 47 percent per year.



Graph 4. Agriculture Exports, Nevada 1997-2011 (GOED, 2012)

The total value of domestic and foreign exports for all agriculture cluster industries in Nevada is \$3,696,204,330. Not all of the exports can be attributed to the agriculture sector; for example, the Wholesale Trade businesses sell products other than agriculture products and services, so the entire value of exports cannot be attributed to the agriculture cluster. However, it does show that the agriculture cluster exports its products and services outside of the state and provides a magnitude of these by sector.

Table 17 below shows commodities exported by agriculture cluster industries within Nevada. As noted above, not all of these exports can be attributed to the agriculture sector.

According to the table, the agriculture cluster made up 6.05 percent of all Nevada exports in 2010. All other crop farming provided 0.63 percent of all exports made in the state. Another high exporting industry was Soybean and Other Oilseed Processing, with 0.341 percent of all state exports, followed by Seasoning and Dressing manufacturing with 0.23 percent of exports.

Table 17. Agriculture Cluster Value of Exports-Nevada

Description	Value of Domestic Exports	Value of Foreign Exports	Total Value of Exports	% of Total
Total all Nevada industries	\$ 53,625,927,091	\$ 7,482,201,383	\$ 61,108,128,475	100.000%
Total all agriculture cluster industries	2,532,339,053	1,163,865,277	3,696,204,330	6.049%
Wholesale trade businesses	519,256,836	937,763,123	1,457,019,958	2.384%
All other crop farming	362,836,591	19,911,869	382,748,460	0.626%
Soybean and other oilseed processing	176,588,725	31,808,381	208,397,106	0.341%
Seasoning and dressing manufacturing	136,318,032	7,283,339	143,601,371	0.235%
Cattle ranching and farming	143,382,908	2,107	143,385,014	0.235%
Coffee and tea manufacturing	117,430,131	11,268,676	128,698,807	0.211%
Fruit and vegetable canning	107,314,953	7,148,357	114,463,310	0.187%
Ice cream and frozen dessert	110,759,974	1,841,529	112,601,503	0.184%
Breakfast cereal manufacturing	93,902,228	4,870,539	98,772,767	0.162%
Bread and bakery	71,757,357	4,667,512	76,424,869	0.125%
Architectural, engineering	9,018,148	66,002,810	75,020,957	0.123%
Fluid milk and butter	66,157,399	2,363,307	68,520,705	0.112%
All other food	51,121,188	9,812,262	60,933,450	0.100%
Frozen food	52,214,267	3,633,087	55,847,354	0.091%
Dog and cat food	50,755,978	4,667,167	55,423,144	0.091%
Dairy cattle and milk production	54,619,371	595	54,619,965	0.089%
Fertilizer manufacturing	47,575,094	6,143,962	53,719,057	0.088%
Confectionery from purchased chocolate	45,158,800	1,625,843	46,784,643	0.077%
Animal (except poultry) processing	40,684,553	4,708,925	45,393,477	0.074%
Services to buildings and dwellings	35,949,707	433,936	36,383,643	0.060%
Other basic organic chemical	27,114,891	3,297,342	30,412,233	0.050%
Support for agriculture forestry	28,834,564	43,658	28,878,222	0.047%
Retail Stores	26,350,685	-	26,350,685	0.043%
Other animal food	25,461,049	758,500	26,219,549	0.043%
Nonchocolate confectionery	23,360,145	1,427,787	24,787,932	0.041%
Commercial Fishing	9,850,063	14,023,172	23,873,236	0.039%
Veterinary services	23,315,460	244,858	23,560,319	0.039%
Vegetable and melon farming	13,808,540	9,714,217	23,522,758	0.038%
Cookie, cracker, and pasta	9,064,447	271,394	9,335,842	0.015%
Other industrial machinery	7,482,991	1,587,373	9,070,364	0.015%
Seafood product prep and packaging	8,794,837	212,701	9,007,538	0.015%
Greenhouse, nursery, and floriculture	8,337,842	257,543	8,595,385	0.014%
Grain farming	5,102,308	1,771,631	6,873,939	0.011%
Animal production, except cattle / poultry	5,910,306	362,063	6,272,369	0.010%
Snack food manufacturing	5,894,863	138,833	6,033,696	0.010%
Soft drink and ice manufacturing	2,700,486	1,320,508	4,020,994	0.007%
Breweries	2,780,885	260,039	3,040,924	0.005%
Other leather and allied product	1,282,981	904,132	2,187,114	0.004%
Commercial logging	1,593,876	370,749	1,964,625	0.003%
Flavoring syrup and concentrate	828,122	355,126	1,183,248	0.002%
Tortilla manufacturing	828,261	77,531	905,792	0.001%
Distilleries	402,441	214,416	616,857	0.001%
Poultry and egg production	349,710	-	349,710	0.001%
Fruit farming	43,812	169,773	213,584	0.0003%
Tree nut farming	43,250	124,603	167,853	0.0003%

Understanding the industries within the agriculture sector cluster best positioned for exporting is the first step in the export substitution strategy. This is followed by identifying the individual companies, within these industries, that are interested in beginning or growing their exports.

Directory of “Best Case” Exporters

Staff at the Global Trade and Investment office of the Governor's Office of Economic Development (GOED) determined not only a list of many agriculture related industries that currently export, but also a list of potential and interested best-case agriculture exporters in Nevada. This list will be used to create other opportunities to expand already exporting companies, and to work with the companies interested in exporting to understand and expedite the process. As this study is meant to be a living document, this list is a beginning to help provide assistance to those that want to start exporting and those that want to export more product and services.

It must be understood that this list is by no means representative of changing business strategies, information sources, or influence of this or other reports. It is the desire to provide a starting point for all support organizations and agencies to provide training and assistance to those that show an interest.

The recommendation to help link producers to export markets is to utilize the Nevada Investment and Trade Organization (NITRO). A strategic initiative by the state of Nevada in cooperation with the Small Business Administration (SBA), NITRO's objective is to get more companies, particularly small and medium-sized enterprises, to export. Through its export expertise, this organization is properly positioned to help with the export information and training needs of the agriculture industry.

Import Substitution

Import substitution is another important aspect of economic development as it attempts to stop the outflow of money from the state and provides information necessary to attract companies producing imported goods and services. An important location consideration for many industries is the size of the local market for the industry's products. One measure of potential local market size is the dollar value of imports of an industry's product to Nevada. The potential to substitute for Nevada's imports may make the region an attractive location for companies.

Import information provided by the IMPLAN model can be used to identify potential “gaps” and “disconnects” in the local economy that can serve as a starting point for economic development strategies. These “gaps” and “disconnects” can occur for two reasons. First, a given industry in Nevada may demand a certain good or service as an input into its production process. For some

industries, certain inputs may not be available in the Nevada economy and must be imported into the state. This type of imports can be classified as a “gap” in a local economy.

Second, the good or service that a given industry may demand is produced in Nevada, but is also imported for some reason. This type of import is often referred to as a “disconnect” in the local economy. An import substitution analysis can identify these disconnects, providing information for the economic development entities to investigate its causes.

It should be noted that while methods outlined in this report serve as a starting point to identify specific industries, some gaps and disconnects are logical once they are further explored. In some instances because of governmental, physical or other limitations, a gap cannot be addressed. A disconnect may not be overcome, for example, if the quality of input required by a local business cannot be produced by the local input supplier. Additional research and analysis must be performed for the individual industries to determine the actual causes of the gaps and disconnects in the economy.

Non-Competitive Imports

The IMPLAN software estimates two types of imports. Non-competitive imports are imports for which there is no production in the Nevada economy. Competitive imports are imports of goods and services that are also produced locally.

Table 18 shows all non-competitive imports for Nevada, also known as “gaps”. Many of these are agriculture-related products, including Wine and Brandies, Oilseeds, Refined Sugar, Cotton, Tanned and Finished Leather and Hides, and Sugarcane and Sugar Beets. These are products for which no local production is available and provide the first steps in identifying companies suitable for import substitution efforts. The amount of imports for each product indicates the level of locally unmet demand for this product, an important piece of information for producers of these products considering locating in the state.

Table 18. Non-Competitive Commodity Imports for Nevada ²

Commodity Code	Description	Intermediate Imports	Institutional Imports	Total Imports
3433	Used and secondhand goods	\$ 33,402,008	\$ 462,374,969	\$ 495,776,978
3074	Cigarettes, cigars, smoking and chewing tobacco	-	357,063,934	357,063,934
3072	Wine and brandies	29,918,909	178,325,943	208,244,852
3001	Oilseeds	130,612,946	-	130,612,946
3021	Coal	99,163,162	1,590,067	100,753,229
3259	Electric lamp bulbs and parts	4,304,288	28,509,789	32,814,077
3104	Wood pulp	32,558,617	-	32,558,617
3048	Raw and refined sugar from sugar cane	16,201,170	14,846,523	31,047,693
3265	Other major household appliances	13,696,751	14,503,319	28,200,069
3018	Wild game products, pelts, and furs	-	26,891,727	26,891,727
3049	Refined sugar from sugar beets	8,677,026	16,237,404	24,914,430
3165	Abrasive products	12,092,935	4,940,117	17,033,051
3158	Glass containers	15,322,420	1,431,496	16,753,916
3175	Copper	11,066,666	495,445	11,562,110
3156	Flat glass	10,515,334	-	10,515,334
3274	Carbon and graphite products	6,138,038	18,482	6,156,520
3124	Carbon black	4,093,062	-	4,093,062
3092	Tanned and finished leather and hides	3,820,908	217,249	4,038,157
3221	Rolling mills and other metalworking machinery	3,693,717	-	3,693,717
3008	Cotton	2,990,581	244,142	3,234,724
3022	Iron ore	1,353,131	-	1,353,131
3009	Sugarcane and sugar beets	175,997	-	175,997

Competitive Imports

Products and services are often imported into the economy when similar products and services are available locally, creating a disconnect. Some of these disconnects may be permanent and impossible to fix, others provide an opportunity for import substitution. Table 19 provides a summary of the top 25 competitive imports for Nevada. Data for all statewide competitive imports is summarized in the appendices at the end of this report. These goods and services are purchased outside of the state even though some amount of these goods is produced locally.

² IMPLAN defines “intermediate imports” as the value of production purchased by industries within the study area. “Institutional imports” are defined as imports made by households and government entities.

Table 19. Top 25 Competitive Commodity Imports for Nevada

Commodity Code	Description	Local Commodity Production	Intermediate Imports	Institutional Imports	Total Imports
3000	Total	\$ 183,729,974,078	\$ 29,852,732,930	\$ 37,824,773,281	\$ 67,677,506,256
3115	Refined petroleum products	434,748,260	1,466,685,425	2,421,682,129	3,888,367,676
3357	Insurance	1,385,110,107	1,428,656,494	1,863,382,324	3,292,038,818
3133	Pharmaceutical preparations	505,919,647	259,230,438	2,083,356,445	2,342,586,914
3351	Telecommunications	2,261,397,949	1,053,639,771	626,910,461	1,680,550,293
3377	Advertising and related services	1,412,126,831	1,556,190,430	75,732,079	1,631,922,485
3319	Wholesale trade distribution services	5,859,927,246	365,180,695	968,043,701	1,333,224,365
3024	Gold, silver, and other metal ore	5,661,059,082	348,001,465	876,289,429	1,224,290,894
3031	Electricity, and distribution services	1,688,693,848	691,044,373	499,670,288	1,190,714,600
3397	Private hospital services	2,985,351,563	815,689	1,134,048,340	1,134,864,014
3020	Oil and natural gas	293,221,161	1,045,781,494	-	1,045,781,494
3374	Management, scientific, and technical consulting services	533,828,796	861,189,880	131,602,585	992,792,480
3398	Nursing and residential care services	703,032,471	-	859,905,640	859,905,640
3283	Motor vehicle parts	156,593,857	668,735,596	138,632,385	807,367,981
3059	Processed animal (except poultry) meat and rendered byproducts	58,612,110	210,017,365	570,386,658	780,404,053
3392	Education from private junior colleges, colleges, universities	156,864,365	14,841,932	740,123,840	754,965,759
3276	Automobiles	113,749,825	92,906	746,960,815	747,053,711
3354	Monetary authorities and depository credit intermediation services	3,707,124,268	381,917,542	338,314,941	720,232,483
3411	Hotels and motel services, including casino hotels	15,724,279,297	257,436,096	420,331,787	677,767,883
3277	Light trucks and utility vehicles	25,073,933	415,501	609,647,827	610,063,354
3352	Data processing- hosting- ISP- web search portals	214,036,209	97,239,738	480,088,715	577,328,430
3234	Electronic computers	67,816,559	4,773,818	528,989,563	533,763,367
3394	Offices of physicians, dentists, and other health practitioners	4,211,644,531	-	511,154,297	511,154,297
3359	Funds, trusts, and other financial services	1,159,851,563	53,411,003	443,106,293	496,517,303
3433	Used and secondhand goods	-	33,402,008	462,374,969	495,776,978
3425	Civic, social, and professional services	776,103,271	155,831,833	336,414,551	492,246,399

The table shows the Processed Animal (except poultry) Meat and Rendered Byproducts animal commodity is the only directly-related agriculture commodity included in the top 25 range for the state. The table shows approximately \$780 million of Processed Animal (except poultry) Meat and Rendered Byproducts goods and services were imported into Nevada in 2010. Local Nevada industries produced only \$58.6 million worth of this commodity, indicating underproduction of this commodity locally, which may make Nevada an attractive market for a company supplying this commodity and bears further discussion.

According to the IMPLAN database, the majority (98 percent) of the processed animal commodity is produced by the animal (except poultry) slaughtering, rendering and processing industry (IMPLAN code 59). The industry shows annual sales of \$57.3 million and employs 128 people with \$5.6 million in employee compensation (average of \$43,683 per employee). What is also interesting is that \$45.4 million worth of the goods and services produced by this industry (79% of total production) is exported outside of Nevada. There is a significant disconnect in this industry, with over \$780 million of this industry's product being imported from outside the state and the majority of the industry's local production exported outside the state.

Further research must be conducted to understand the reason for this disconnect. There may be locational, physical, governmental or other constraints that may be precluding companies in this industry from locating and operating in Nevada to meet the demand of local companies. If these constraints can be overcome and production increased in existing companies or new companies are started or relocated to produce the demanded commodity locally, the impact on the state can be significant.

For example, if 25 percent of the \$780 million that is currently produced outside of Nevada and imported into the state can be produced locally, it can have a direct increase on Nevada's output of \$195 million. Applying indirect and induced multipliers for this industry (as supplied by IMPLAN), the total impact of a 25 percent increase in production in this industry can have a statewide effect of \$360 million (including direct, indirect and induced effects). Using existing employee productivity for the animal processing industry, an increase in sales of \$195 million is estimated to generate approximately 430 employees. Applying employment multipliers for the animal processing industry will result in a total employment impact of approximately 1,600 employees, including direct, indirect, and induced impacts.

Above is a basic example of the potential for growth that can be found in import substitution. It should be noted, however, that the analysis is based on existing industry averages and does not take into account the specifics that will accompany new or expanded companies within this industry. For more information on the economic impact methodology, please see the "Agriculture Cluster Economic Impact Analysis" section below.

Imports by Industry

The first part of the import substitution analysis discussed commodities that are imported by Nevada industries. In order to reduce imports, Nevada economic development decision-makers need to know which agriculture cluster industries are the largest importers in Nevada and the commodities these industries import. Identifying these importers may provide some information as to why and what they import and how their purchases can be transferred to local sources.

Table 20. Value of Agriculture Cluster Imports-Nevada

IMPLAN Code	Definition	Value of Imports
319	Wholesale trade	\$ 480,753,791
388	Services to buildings and dwellings	392,289,079
369	Architectural, engineering, and related services	248,608,274
45	Soybean and other oilseed processing	177,237,549
10	All other crop farming	163,950,065
55	Fluid milk and butter manufacturing	117,264,241
70	Soft drink and ice manufacturing	112,909,333
68	Seasoning and dressing manufacturing	103,887,309
62	Bread and bakery product manufacturing	86,871,099
58	Ice cream and frozen dessert manufacturing	84,707,937
11	Cattle ranching and farming	83,494,976
41	Dog and cat food manufacturing	81,575,395
66	Coffee and tea manufacturing	80,076,331
54	Fruit and vegetable canning, pickling, and drying	73,020,949
323	Retail - Building material and garden supply	61,212,807
47	Breakfast cereal manufacturing	54,168,243
53	Frozen food manufacturing	52,308,761
12	Dairy cattle and milk production	49,927,670
69	All other food manufacturing	43,187,194
379	Veterinary services	41,977,220
51	Confectionery manufacturing from purchased chocolate	34,937,571
130	Fertilizer manufacturing	30,625,227
3	Vegetable and melon farming	25,651,097
59	Animal (except poultry) slaughtering, rendering, and processing	23,952,142
126	Other basic organic chemical manufacturing	22,134,082
42	Other animal food manufacturing	20,271,030
52	Nonchocolate confectionery manufacturing	17,414,482
67	Flavoring syrup and concentrate manufacturing	12,285,460
63	Cookie, cracker, and pasta manufacturing	9,917,322
17	Fishing	9,713,990
19	Support activities for agriculture and forestry	7,720,782
65	Snack food manufacturing	7,201,845
61	Seafood product preparation and packaging	6,104,801
64	Tortilla manufacturing	6,068,673
14	Animal production, except cattle and poultry and eggs	5,677,647
207	Other industrial machinery manufacturing	4,608,097
2	Grain farming	3,189,965
6	Greenhouse, nursery, and floriculture production	3,076,858
71	Breweries	2,843,855
73	Distilleries	1,275,880
94	Other leather and allied product manufacturing	1,023,475
16	Logging	965,385
4	Fruit farming	371,284
13	Poultry and egg production	272,703
5	Tree nut farming	64,209

Table 20 shows the value of all agriculture cluster imports into Nevada. The Wholesale Trade sector is the largest importer, followed by Services to Buildings and Dwellings and Architectural, Engineering and Related Services. Table 21 shows top ten importers for Nevada and their top five imported commodities.

Interviews with industry representatives regarding their purchases of these commodities can help identify the reasons why these commodities are imported rather than purchased locally and provide information regarding the types of companies which could be attracted to the area to meet the unmet local demand.

Table 21. Top 10 Agriculture Cluster Importers and Their Five Most Imported Commodities-Nevada

Industry	Commodity Sector	Value of Imports
<i>319-Wholesale trade</i>		
	3377-Advertising and related services	\$ 52,893,124
	3357-Insurance	39,894,182
	3374-Management, scientific, and technical consulting services	27,663,209
	3115-Refined petroleum products	25,826,266
	3319-Wholesale trade distribution services	23,089,694
<i>388-Services to buildings and dwellings</i>		
	3115-Refined petroleum products	\$ 207,796,334
	3357-Insurance	26,706,580
	3351-Telecommunications	21,813,351
	3374-Management, scientific, and technical consulting services	14,659,607
	3283-Motor vehicle parts	10,561,469
<i>369-Architectural, engineering, and related services</i>		
	3357-Insurance	\$ 33,023,180
	3374-Management, scientific, and technical consulting services	26,526,689
	3382-Employment services	13,317,830
	3373-Other computer related services, including facilities management	12,159,185
	3384-Office administrative services	11,580,742
<i>45-Soybean and other oilseed processing</i>		
	3001-Oilseeds	\$ 130,174,186
	3045-Soybean oil and cakes and other oilseed products	24,718,102
	3008-Cotton	2,265,918
	3002-Grains	2,231,327
	3319-Wholesale trade distribution services	1,920,881
<i>10-All other crop farming</i>		
	3019-Agriculture and forestry support services	\$ 40,436,669
	3115-Refined petroleum products	33,179,947
	3131-Pesticides and other agricultural chemicals	21,895,133
	3130-Fertilizer	18,462,372
	3002-Grains	12,294,203
<i>55-Fluid milk and butter manufacturing</i>		
	3012-Dairy cattle and milk products	\$ 60,202,852
	3055-Fluid milk and butter	8,783,254
	3127-Plastics materials and resins	6,349,501
	3107-Paperboard containers	5,989,668
	3149-Other plastics products	4,251,474
<i>70-Soft drink and ice manufacturing</i>		
	3067-Flavoring syrups and concentrates	\$ 32,478,541
	3174-Aluminum products from purchased aluminum	17,602,671
	3044-Corn sweeteners, corn oils, and corn starches	14,087,384
	3148-Plastics bottles	12,814,472
	3107-Paperboard containers	8,353,708

Industry	Commodity Sector	Value of Imports
<i>68-Seasoning and dressing manufacturing</i>		
	3010-All other crop farming products	\$ 13,829,871
	3067-Flavoring syrups and concentrates	13,484,787
	3068-Seasonings and dressings	10,336,600
	3046-Shortening and margarine and other fats and oils products	7,163,107
	3044-Corn sweeteners, corn oils, and corn starches	5,043,577
<i>62-Bread and bakery product manufacturing</i>		
	3043-Flour and malt	\$ 19,823,832
	3044-Corn sweeteners, corn oils, and corn starches	14,693,413
	3046-Shortening and margarine and other fats and oils products	3,928,568
	3107-Paperboard containers	3,797,866
	3063-Cookies, crackers, and pasta	3,354,889
<i>58-Ice cream and frozen dessert manufacturing</i>		
	3107-Paperboard containers	\$ 13,449,886
	3057-Dry, condensed, and evaporated dairy products	8,571,997
	3055-Fluid milk and butter	5,888,016
	3012-Dairy cattle and milk products	5,112,285
	3044-Corn sweeteners, corn oils, and corn starches	4,685,947

Agriculture Cluster Economic Impact Analysis

The objective of the economic impact analysis is to estimate the total economic impact of the agriculture cluster in Nevada in terms of dollar output, and jobs created and supported by the cluster.

The economic impacts of the agriculture cluster are analyzed through the use of an industry input-output model (IMPLAN). Through this economic modeling software, the total economic and employment impact of the agriculture cluster on the state is estimated. The following definitions of economic impact terms are important to understand, as they are widely used in this analysis.

Employment:	Represents the total people (full-time equivalents) employed by the agriculture cluster and the additional jobs in the regional economy supported by the cluster's economic activity.
Direct Economic Impact:	Represents the expenditure amounts from the agriculture cluster that directly impacts the regional economy. The direct impact includes operating and payroll expenditures.
Indirect Economic Impact:	After expenditures are made by the agriculture cluster (direct impacts), the indirect impacts represent the further iterations of expenditures from local vendors who purchase goods and services from supplying vendors to restock inventory and fulfill non-commodity needs. These purchases are also commonly referred to as the "ripple effect".

Induced Economic Impact:	The direct and indirect impacts from expenditures generate and support employment and wages in the region, leading to a tertiary level of economic impact through household expenditures on goods and services. The induced impacts reflect the local spending from households that benefit from the direct and indirect expenditures.
Total Economic Impact:	Represents the sum of the direct, indirect, and induced economic impacts on the economy in the area of study.
Multipliers:	Multipliers are used by the economic impact model to calculate the indirect and induced effects. Multipliers are based on federal surveys of each industrial sector, quantifying the cause and effect of industries purchasing from other industries.

The IMPLAN model provides data for each industry within the model, including employment, output, employee compensation, proprietor income and more. This data is collected for all of the industries within the agriculture cluster to estimate the impact of the cluster on the output and employment in Nevada.

Output data provided by IMPLAN for each industry was adjusted for the value of imports purchased by that industry from outside of the region. This was done to exclude any portion of the industry's output leaving the state, allowing for only the "local" impact of each industry to be considered.

The difficulty in estimating the impact of multiple related industries is that the impact of the purchases made by each industry from other industries within the cluster is included in the impact of both industries, thus double-counting the impact on the state. As a result, the purchases of industries from other industries within the agriculture cluster were adjusted to avoid overestimating the impact of the cluster.

Finally, because of the difference between the NAICS and IMPLAN classifications of industries, some industries directly related to the agriculture cluster by their 6-digit NAICS code definition are included in an IMPLAN code with other non-agriculture related industries. To estimate the impact of only the agriculture-related industries, data for the entire IMPLAN industry was adjusted based on the percent of agriculture cluster employment in the 6-digit NAICS sectors associated with the single IMPLAN sector.

For example, agriculture related employment makes up approximately 26 percent of the total Wholesale Trade (IMPLAN sector 319) employment. As a result, IMPLAN data for employment and output in that sector was adjusted to 26 percent. This was also done for the Retail, Building Material and Garden Supply (IMPLAN 323), Warehousing and Storage (IMPLAN 340), Architectural Services (IMPLAN 369), and Services to Buildings (IMPLAN 388) sectors.

Economic impacts are estimated for the state of Nevada and for each of the three regions defined below. It should be noted that because of trade patterns between regions, total state impact cannot be calculated by the addition of the impacts of the three regions, it can only be estimated as a separate entity incorporating all counties within the region. The three regions are defined as follows:

Northeast Region	Northwest Region	Southern Region
Elko	Carson City	Clark
Eureka	Churchill	Esmeralda
Lander	Douglas	Lincoln
White Pine	Humboldt	Nye
	Lyon	
	Mineral	
	Pershing	
	Storey	
	Washoe	

Economic Impacts of Agriculture Cluster Output

The combined local output of the agriculture cluster’s industries, adjusted as discussed above, is estimated at \$3.3 billion. This is the direct impact of the agriculture cluster on the State of Nevada.

The statewide indirect impact of the agriculture cluster is calculated by multiplying the direct impact by the indirect multiplier for each industry. The indirect impact generated by the secondary spending from companies directly impacted by the agriculture cluster is estimated at \$835 million.

The induced impact of the agriculture cluster is also calculated by multiplying the direct impact by the induced multiplier for each industry. The induced impact generated from the household spending of wages as a result of industry expenditures is estimated at \$1.1 billion for the state.

The total economic impact of the agriculture cluster on Nevada is estimated at \$5.3 billion. This is summarized in the table below, by agriculture sector. Economic impacts of the agriculture cluster on the Northwest, Northeast, and Southern regions are also summarized below.

Table 22. Economic Impacts of the Agriculture Cluster Output-Nevada

Agriculture Sectors	Direct Impact	Indirect Impact	Induced Impact	Total Impact
Agriculture Production	\$ 461,182,816	\$ 156,763,876	\$ 102,142,342	\$ 720,089,034
Agriculture Processing and Packaging	769,039,911	260,620,365	137,706,227	1,167,366,503
Agriculture Support	649,161,916	161,112,719	283,444,219	1,093,718,855
Agriculture Distribution	1,438,369,071	256,557,126	596,690,258	2,291,616,455
Total Agriculture Cluster	\$ 3,317,753,714	\$ 835,054,087	\$ 1,119,983,046	\$5,272,790,847

Table 23. Economic Impacts of the Agriculture Cluster Output-Northwest Region

Agriculture Sectors	Direct Impact	Indirect Impact	Induced Impact	Total Impact
Agriculture Production	\$ 245,545,329	\$ 81,154,895	\$ 61,952,742	\$ 388,652,966
Agriculture Processing and Packaging	513,687,567	216,615,105	85,040,235	815,342,908
Agriculture Support	188,051,023	50,084,123	79,326,971	317,462,116
Agriculture Distribution	347,568,945	68,743,786	142,211,139	558,523,869
Total Agriculture Cluster	\$ 1,294,852,864	\$ 416,597,908	\$ 368,531,088	\$2,079,981,860

Table 24. Economic Impacts of the Agriculture Cluster Output-Northeast Region

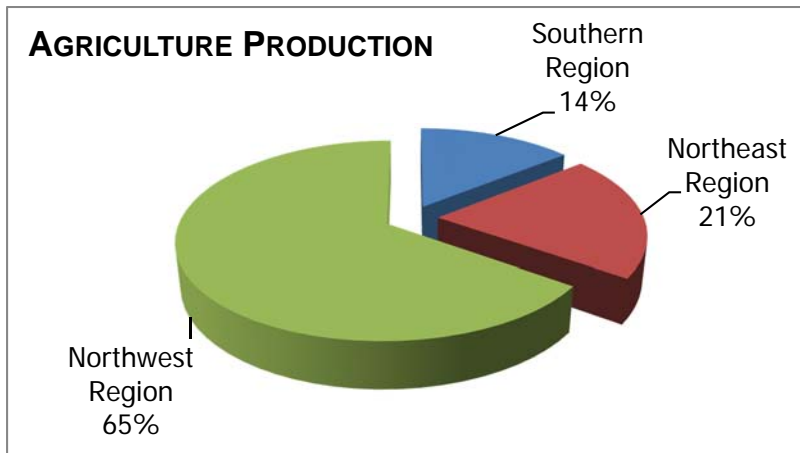
Agriculture Sectors	Direct Impact	Indirect Impact	Induced Impact	Total Impact
Agriculture Production	\$ 91,071,752	\$ 24,611,730	\$ 6,739,921	\$ 122,423,404
Agriculture Processing and Packaging	2,464,149	277,357	96,502	2,838,007
Agriculture Support	8,030,735	1,100,457	1,291,696	10,422,888
Agriculture Distribution	78,143,018	5,694,192	15,530,777	99,367,987
Total Agriculture Cluster	\$ 179,709,653	\$ 31,683,736	\$ 23,658,896	\$ 235,052,286

Table 25. Economic Impacts of the Agriculture Cluster Output-Southern Region

Agriculture Sectors	Direct Impact	Indirect Impact	Induced Impact	Total Impact
Agriculture Production	\$ 54,882,836	\$ 16,404,500	\$ 13,708,629	\$ 84,754,165
Agriculture Processing and Packaging	433,394,959	143,268,475	88,777,658	512,656,451
Agriculture Support	533,534,082	129,468,085	239,989,612	902,991,779
Agriculture Distribution	966,223,083	169,333,061	408,154,452	1,543,710,596
Total Agriculture Cluster	\$ 1,988,034,960	\$ 458,474,121	\$ 750,630,350	\$3,044,112,991

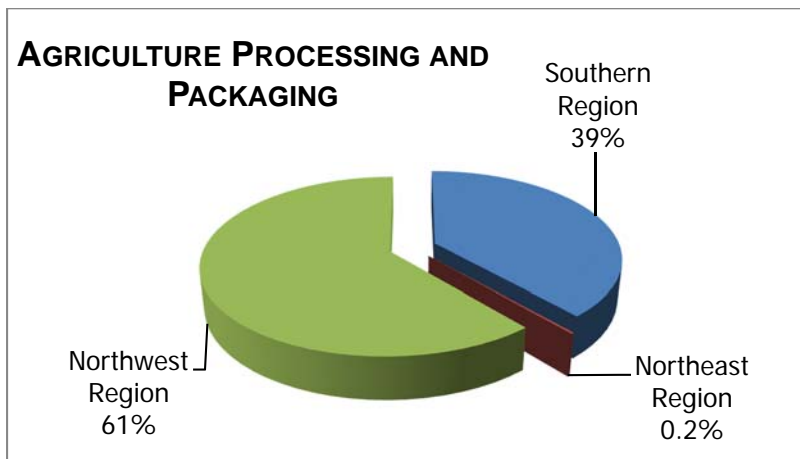
Graphs 5-8 below show the percentage of the three regions' impacts on each of the agriculture sectors. The graphs show total impacts (direct, indirect and induced) of each sector's operations.

Graph 5 shows that the Northwest Region generates the largest percentage of all Agriculture Production impacts in the state at 65 percent of total. This is followed the Northeast Region with 21 percent of total Agriculture Production impact, and Southern Region with 14 percent.



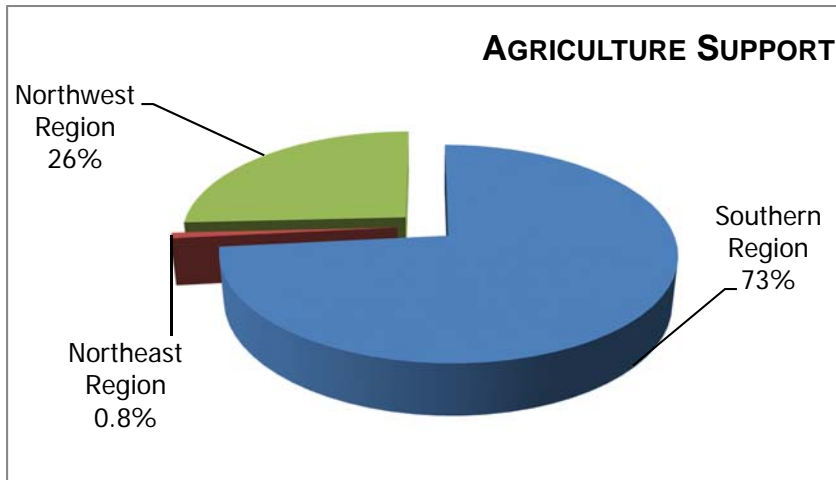
Graph 5: Agriculture Production Impacts, by Region

Graph 6 shows the total impacts of the Agriculture Processing and Packaging activities, by region. The Northwest Region, again, has the highest impact in this area, with 61 percent of total statewide impact. This is followed by the Southern Region with 39 percent of total and the Northeast region with 0.2 percent of total.



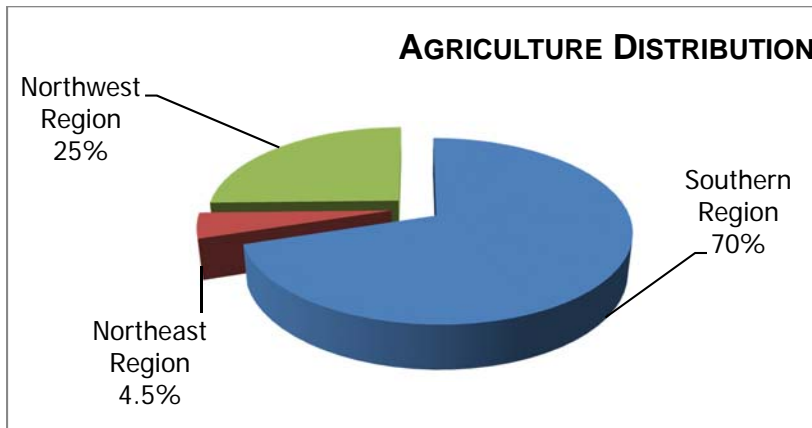
Graph 6: Agriculture Processing and Packaging Impacts, by Region

Graph 7 shows the Southern Region provides the majority of impacts of Agriculture Support with 73 percent, followed by the Northwest Region with 26 percent of total and the Northeast Region with 0.8 percent of total.



Graph 7: Agriculture Support Impacts, by Region

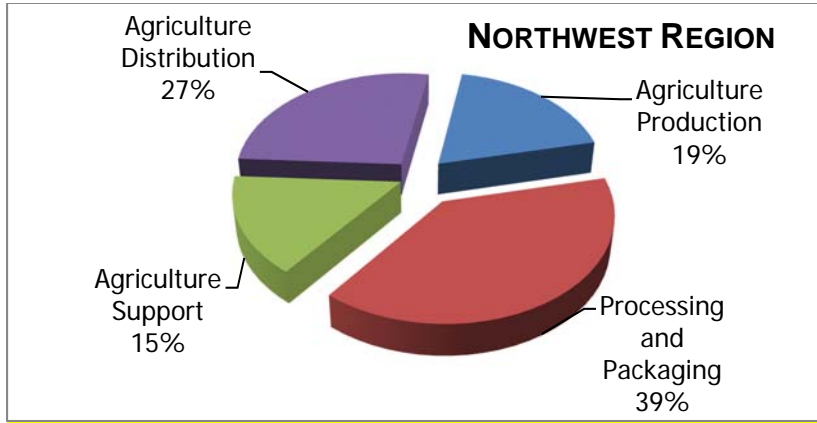
Graph 8 shows the Southern Region again provides the majority of impacts of Agriculture Distribution with 70 percent of total impact generated by this activity. This is followed by the Northwest Region with 25 percent of total and the Northeast Region with 4.5 percent of total.



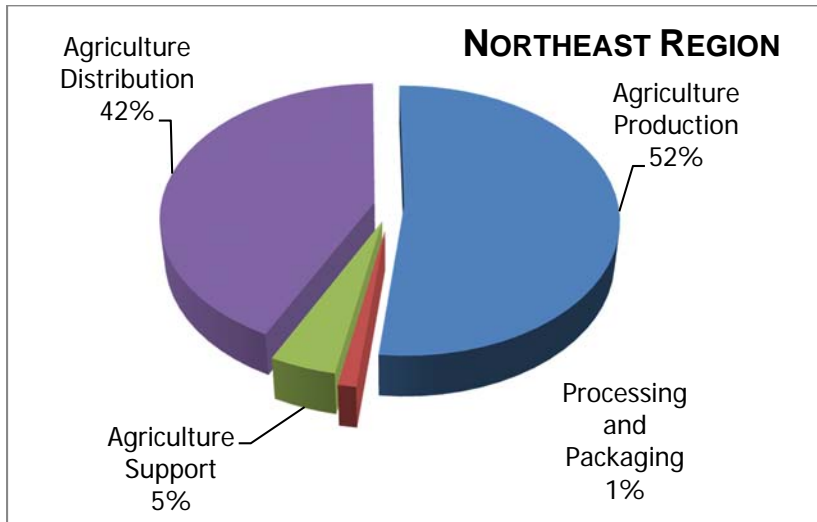
Graph 8: Agriculture Distribution Impacts, by Region

The above graphs show that regions are specialized, with the Northwest and Northeast regions providing the majority of agriculture production, the Northwest Region also providing the majority of processing and packaging services, and the Southern Region focusing on support and distribution activities within the state.

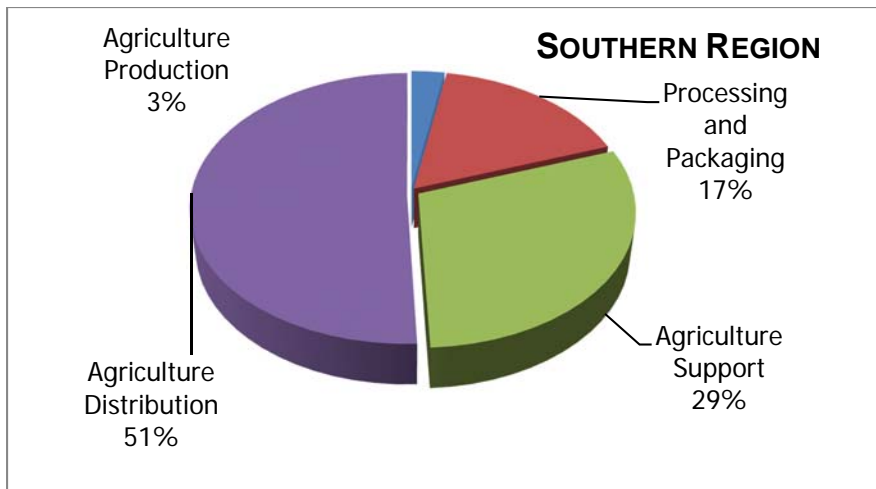
The next set of graphs provides the same information for each region, by agriculture area. Graph 9 shows the portion of the impact of each agriculture area on the State of Nevada. Graphs 10 through 12 show the portion of the impact of each agriculture area on each region within the state. Graph 13 provides a comparison of the size of the impact of each agriculture area on the state, by geographic region.



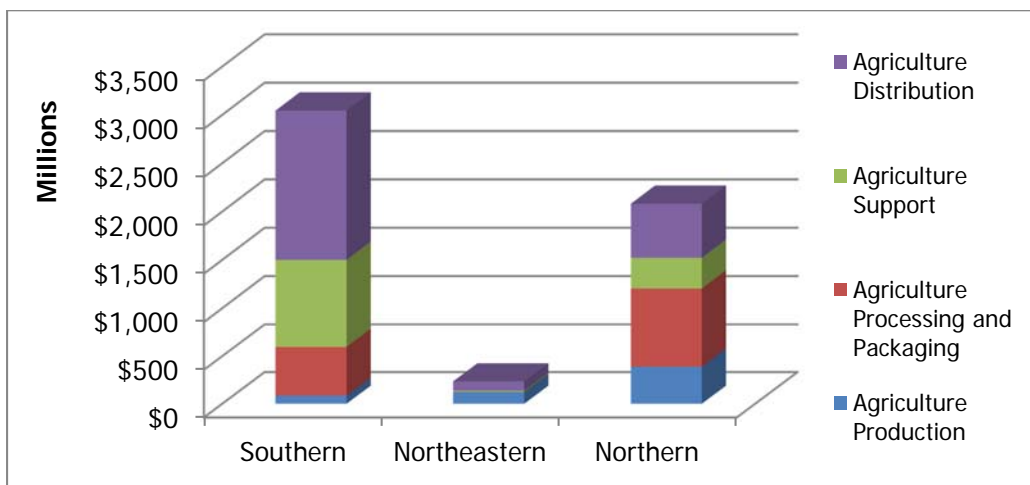
Graph 9: Economic Impact of Northwest Region, by Agriculture Area



Graph 10: Economic Impact of Northeast Region, by Agriculture Area



Graph 11: Economic Impact of Southern Region, by Agriculture Area



Graph 12: Economic Impact by Region and Agriculture Area

Employment Impacts of Agriculture Cluster Output

The direct statewide employment impact of the agriculture cluster is represented by the number of employees employed by the cluster: 35,600 employees. Within the state’s agriculture cluster, there are an estimated 5,700 employees in the agriculture production sector, 4,800 employees in the agriculture processing and production sector, 14,600 employees in the agriculture support sector, and 10,400 employees in the agriculture distribution sector.

When the agriculture industry purchases goods and services from its vendors, those vendors hire new employees to meet the new level of demand or retain jobs which may otherwise be eliminated. This is the indirect employment impact; the agriculture cluster has an estimated indirect employment impact on the state of 11,500 employees.

The employment impacts from the spending of household wages created by the direct and indirect expenditures support an estimated 13,600 jobs in Nevada.

The total employment impact of the agriculture cluster on Nevada is estimated at 60,700. This is summarized in the table below, by the agriculture area. Impacts of the agriculture cluster on the Northwest, Northeast, and Southern regions in Nevada are also summarized below.

Table 26. Employment Impacts of the Agriculture Cluster Output-Nevada

Agriculture Sectors	Direct Impact	Indirect Impact	Induced Impact	Total Impact
Agriculture Production	5,697	2,425	1,540	9,663
Agriculture Processing and Packaging	4,807	4,572	3,123	12,502
Agriculture Support	14,645	1,979	3,335	19,959
Agriculture Distribution	10,428	2,492	5,630	18,550
Total Agriculture Cluster	35,577	11,468	13,628	60,673

Table 27. Employment Impacts of the Agriculture Cluster Output-Northern Region

Agriculture Sectors	Direct Impact	Indirect Impact	Induced Impact	Total Impact
Agriculture Production	3,675	1,449	1,030	6,155
Agriculture Processing and Packaging	1,930	2,726	1,548	6,204
Agriculture Support	4,651	690	1,006	6,347
Agriculture Distribution	2,784	705	1,420	4,910
Total Agriculture Cluster	13,040	5,571	5,004	23,615

Table 28. Employment Impacts of the Agriculture Cluster Output-Northeast Region

Agriculture Sectors	Direct Impact	Indirect Impact	Induced Impact	Total Impact
Agriculture Production	1,063	422	136	1,622
Agriculture Processing and Packaging	31	11	5	47
Agriculture Support	182	23	22	226
Agriculture Distribution	571	66	169	806
Total Agriculture Cluster	1,846	522	332	2,701

Table 29. Employment Impacts of the Agriculture Cluster Output-Southern Region

Agriculture Sectors	Direct Impact	Indirect Impact	Induced Impact	Total Impact
Agriculture Production	959	277	207	1,442
Agriculture Processing and Packaging	2,846	2,049	1,640	6,536
Agriculture Support	11,842	1,550	2,760	16,151
Agriculture Distribution	6,872	1,626	3,797	12,294
Total Agriculture Cluster	22,519	5,501	8,404	36,424

**“Anyone who travels through Nevada can see the vast, open spaces
... some of the world’s richest gold mines, highest quality hay,
finest cow-calf operations and even world renowned onion production”**

Future Economic Possibilities



4. FUTURE AGRICULTURE OPPORTUNITIES

Nevada's unique climate, marked by vast temperature swings and arid and semi-arid landscapes, allows many crops to grow well in Nevada. "Anyone who travels through Nevada can see the vast, open spaces that are such an important part of the state's persona. Within that vastness are some of the world's richest gold mines, highest quality hay, finest cow-calf operations and even world renowned onion production" (Singletary & Smith, 2006).

For the past 10 to 15 years, Nevada has been looking for the "silver dollar agriculture opportunity," according to Jay Davison of University of Nevada Cooperative Extension (UNCE). This report highlights a few possible "silver dollar" agriculture opportunities in Nevada. These opportunities are by no means definitive. Nevada farms may see increased success by offering tourist elements to farming operations (Curtis & Johnson, 2005), for example, but it is impossible to cover in this report every feasible way for operations to expand. Moreover, new and alternative crops carry inherent risks to producers. "Being successful in growing and marketing an alternative crop is not easy. If it were, Nevada agriculture would be much more diverse" (Davison, 2002).

The following are potential areas for the state's agricultural producers to consider for further development, expansion, or diversification:

- **Hoop House or High Tunnel Technology**
- **New Crops**
- **Alternative Crops**
- **Expansion Opportunities**
- **Aquaculture**

Hoop House or High Tunnel Technology

Recent university studies have tested the feasibility of hoop houses in the production of vegetables, fruits and flowers in areas where growing seasons are short or limited by temperatures, rainfall, snowfall, pests, and winds. The three universities used in this study for their hoop house or high tunnel success are University of Nevada, Michigan State University, and Utah State University. Each university has produced multiple studies focusing on style of construction, materials, soil preparation, crop choice, and documented cost and return.

University of Nevada, Reno (UNR), has been growing in hoop houses in southeastern Nevada for several years and plans to start hoop house growing in northern Nevada in the fall of 2012, through the High Desert Farming Initiative, in which \$500,000 was funded by U.S. Department of Housing and Urban Development.

Conservative Cost and Return, Cost Summary and Monthly Cash Flow reports for UNR hoop houses are available (Appendix A).

The Michigan State University (MSU) has one of the greatest success models and has been growing in high tunnels since 2006. MSU is most noted for their Business Plan Model (Appendix B).

The Utah State University (USU) has had great success in growing berries, tomatoes, and salad greens. They are most noted for their Low Cost Construction of High Tunnels that has been widely publicized. UNR has followed USU Low Cost Construction method when constructing the high tunnels in southeastern Nevada. Berry and tomato cost and returns are included in this study as well as the Low Cost Construction publication (Appendix C).

The key studies conducted by the universities applied local conditions, materials, labor costs and overhead in a formula to determine the feasibility of hoop house growing. In each study, variables at each construction location contributed to the varying levels of success. Since many of the studies have been conducted in small farming operations, the results are based on getting more product to market over a longer harvesting period.

Crops for hoop houses are chosen by profitability, marketability, cold hardiness, and the appropriate growing season and climate. Crops currently being tested or that have been tested are:

- Tomatoes – multiple varieties
- Strawberries
- Herbs
- Peppers
- Eggplant
- Lettuce and Baby Greens
- Squash
- Golden Zucchini
- Mustards
- Kale
- Spinach
- Cucumbers

Hoop House Technology Advantages:

- Applies to both small and large scale production operations.
- Can be used on existing lands to expand use– highly recommended to farmers already producing with additional space available to cultivate with water availability and existing soil testing data. No additional insurance is usually required, since the farmer/owner already pays property and liability insurance.

- Lengthens growing seasons – reduces heat in southern Nevada and increases heating in northern Nevada, therefore extending the growing season and type of crops that can be grown.
- Environmental Damage Protection – temperature, rain, hail, and wind resistant.
- Lower Establishment Cost - hoop houses are less expensive than permanent structures or green houses of comparable size.
- Lower Cost of Irrigation – hoop houses are typically very water friendly. UNR reported that the total start-up cost for installation of an irrigation system for a 14 x 90 hoop house was \$1,303.74.
- Large crop selection.

Access to financing is critical in today’s economic environment. Listed below are a few of the loan programs available for hoop house construction.

- Agriculture and Food and Research Initiative
- Beginning Farmers and Ranchers
- Community Facilities
- Community Food Project
- Environmental Quality Incentives program
- Sustainable Agriculture Research and Education

A complete list of Federal Loans, Grants, and Incentives with descriptions and loan features, can be found on pages 83-87.

New Crop Opportunities

There have been numerous crops tested in both northern and southern Nevada, but due to various reasons (climate, temperature, soil, water requirements, and others) not all have been deemed as a prospect for Nevada. Therefore, these crops have not been considered viable, cost effective opportunities for growers. This report focuses on agriculture crops that are presently being tested or have documented results. This is not to say others do not have potential, but they do lack the study results that can positively identify these crops as a viable source at this time.

The crops tested in the northern part of the state to determine the potential have included:

- soybeans
- poplars, and poplars as biofuels
- warm season grass forages
- perennial grasses as biofuels

- trees and shrubs for landscape use (nursery crops)
- amaranth
- millets
- malting barley
- wine grapes
- teff
- buckwheat
- native crop seed production
- canola
- seaberries

The crops tested in the southern part of the state to determine the potential have included:

- numerous orchard crops
- wine grapes
- numerous vegetables and varieties
- saffron
- hops
- perennial grasses as biofuels

Each crop is similarly tested, focusing on these areas: Yield/Harvest, Water Consumption, Cold Hardiness, Disease, Demand, Cost and Return, and Pest Management.

The following are good candidates as new crop and new farming opportunities for Nevada.

- **Saffron**
- **Hops**
- **Canola**
- **Aquaculture**

Saffron

Saffron, one of the most expensive spices in the world, is successfully being grown by Leslie Doyle in the Rodale test garden in Las Vegas with great success. The test crop is showing a very promising organic opportunity. Doyle, author of three gardening books, owner and operator of Sweet Tomato Test Garden, and writer and tester for *Organic Gardening Magazine*, stated that southern Nevada is a perfect climate to grow saffron, due to the dry, hot summers and the resistance to frost and cold in the winter. The price per pound varies according to the grade of saffron being grown, but typically high grade saffron sells for more \$120 per ounce retail. Growing saffron is considered labor intensive because it grows close to the ground. "But the bulbs are cheap," Doyle said (Doyle, L., 2008).



What is a Rodale Test Garden?

Rodale is considered to be the pioneer of organic farming. Rodale Institute is dedicated to organic farming through research and outreach. For over sixty years, Institute researchers have been researching the best



practices of organic agriculture and sharing their findings with farmers and scientists throughout the world, advocating for policies that support farmers, and educating consumers about how going organic is the healthiest option for people and the planet. To be considered and named a Rodale test garden is one of the highest accreditations a grower can obtain.

Hops

University of Nevada, Reno, Cooperative Extension planted Hops in the northern Nevada, in 2012, therefore yielding no results to be reviewed until 2013. Doug Taylor, colleague of Mario Batali and Joe Bastianich, founders of *Bet on the Farm Initiative* (www.betonthefarm.com) in Las Vegas, started growing hops in southern Nevada in the UNCE Orchard in 2011. This was in response to the need for hops by the breweries throughout the state. Research determined that of the 14 local micro-breweries or brew pubs, almost 80 percent had problems with the supply of hops. Taylor reported that nearly 100 percent of the microbreweries in the state would prefer to buy locally grown hops, rather than importing from another state.



According to the American Organic Hops Growing Association (AOHGA), the United States grows over 30,000 acres of hops and increased the acreage of organic hops by 125 additional acres in the spring of 2012. That does not include non-organic, conventional hops. AOHGA recommends a “farmer to brewer” process to create more effective locally-based grower and user economies. In this system, the brewer calculates their hops needs for three years and communicates the need to the grower. Growing for the specific needs of the buyer, not only the quantity but the variety, guarantees production to the brewer and income to the farmer.

The five varieties being grown and tested for Nevada are:

1. Chinook
2. Willamette
3. Cascade - highly recommended, tripling their yield from 1st harvest to 2nd harvest
4. Nugget
5. Mt. Hood - highly recommended, tripling their yield from 1st harvest to 2nd harvest
6. Centennial - NOT recommended due to soil and heat (Jay Davison, UNR and Doug Taylor, *Bet on the Farm*, 2012 source)

Each year, 55 to 60 million pounds of hops are grown in the United States and the majority of the hops are still used for beer. However, hops are now being recognized for antimicrobial benefits and are being used for livestock production, processed sugar, and animal feed, particularly poultry feed since it is a great alternative to antibiotics, therefore, raising the demand for hops.

NEW CROP	PROS	CONS
	Can be grown outdoors with no shade	Not all varieties are successful
	Water friendly – 20 gallons per week per plant	Takes 3-5 years for full root to build up
HOPS	Can be grown in hoop houses to lengthen growing season	Unknown life of hop plant in Nevada
	Profitable - \$18.99-\$20.99 per lb.	
	Little to no pest management	

Canola

According to the University of Nevada’s College of Agriculture, Biotechnology and Natural Resources, “biofuels are receiving increasing interest due to the increasing cost of energy, as well as concerns about the global warming impacts from use of fossil fuels. Nevada’s arid lands can potentially contribute to biofuels production, particularly for crops that have relatively low water requirements, and are adapted to Nevada’s Great Basin growing conditions” (CABNR, 2012). Canola is a high seed oil crop used for food oil, biofuel oil and industrial oil and there are presently five varieties being grown in Fallon, Lovelock, and Reno. Canola is also used to produce ethanol and bio-diesel fuel.



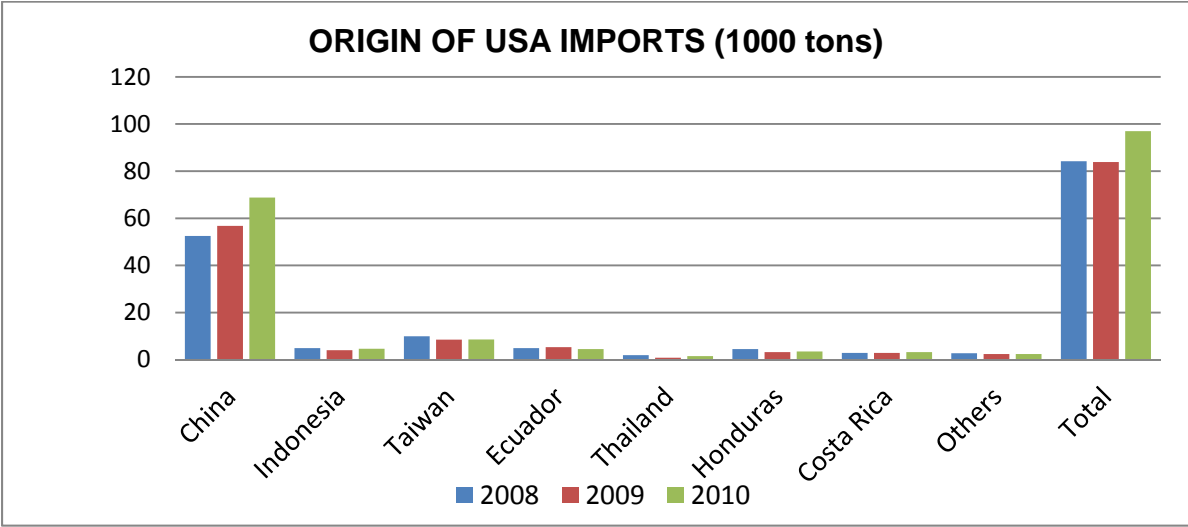
Canola is getting more recognition as a biofuel. Nevada Soy Products, in Lovelock, Nevada, processes the canola seed and has potential for much more production. Having an in-state processor means all of the dollars stay in Nevada. Canola is a fairly new crop for the University of Nevada, Reno, but will have full reports available in 2013. Jay Davison, of UNR Cooperative Extension (UNCE), reported at the Agriculture Expo in Fallon, NV, to keep canola at the top of any crop list.

NEW CROP	PROS	CONS
CANOLA	Excellent rotation crop, particularly wheat	Not water efficient – does best in medium to high rainfall
	+40% in wheat gross margin after 2 years as rotation crop	High weed and insect management
	Fast growth rate	Does not grow well in high clay top soils
	Grown with conventional grain crop equipment	Must be processed out of state
	Same price subsidies as other commodity crops	

Aquaculture Farming

Tilapia Farms

Demand for tilapia continues to grow in the U.S., the single largest market for tilapia. In the first ten months of 2010, a 15% growth in total tilapia imports was recorded, compared with the year before. The chart below shows the total imports into the US for 2008, 2009, and 2010, by supplying country (AMRC).³



Graph 13. Total Imports per country in the United States

³ Agricultural Marketing Resource Center

In the US, imports are growing, demand is high and 96 percent of the supply is coming from imports. The popularity of this fish in the US remained unaffected during the economic recession, even though overall consumption of fish products fell by 1.25 percent. During the same time, tilapia consumption increased slightly (UOA).

The U.S. is the single greatest importer of tilapia, but is the smallest tilapia farmer. China is the largest tilapia producer with the greatest number of “*Do not buy*” food warnings due to not being farmed in closed, inland systems, raising contamination and impurity risks. As of 2005, 156 farms in United States cultured tilapia, reporting total sales of \$31.3 million (Census of Aquaculture). According to the Department of Commerce, tilapia imports to the United States in 2011 totaled \$838.4 million. Despite the tilapia farms in the US, the current demand heavily outweighs what is farmed in this country, forcing international imports to be remarkably high and revenues positively impacting other countries.



While the largest number of tilapia farms are located in Hawaii (19 farms) and Florida (18 farms), California (15 farms) ranked first with sales over \$8.1 million. Idaho ranked second, reporting over \$1.5 million in sales from seven farms. Data from some states with very high production but very few operations were not available due to reporting concerns related to confidentiality.

The majority of the tilapia farms in the United States are closed inland systems that guard against escapes and pollution. Many of these farms conserve resources by re-circulating the water and because they are indoors, re-circulating systems are carefully controlled. Tilapia producers in the United States rarely use antibiotics or chemicals. Open systems, utilized by other countries, have more pollution, more disease, a greater chance of escape, and lower management systems, resulting in a significant lack of quality control standards.



The advantages of tilapia farming in closed inland systems are:

- High growth rates
- Adaptable to a wide range of environment conditions
- Thrives on plant-based diets; their feed does not require wild fish as an ingredient
- Important source of protein, making tilapia a good candidate for farming, as it provides more protein than it takes to raise it
- Tolerates a wide range of water conditions, making it easy to farm
- Ability to grow and reproduce in captivity

- Nutritious, low in sodium, low in calories and carbohydrates, low levels of mercury, high protein, and contains phosphorus, niacin, selenium, vitamin B-12, and potassium

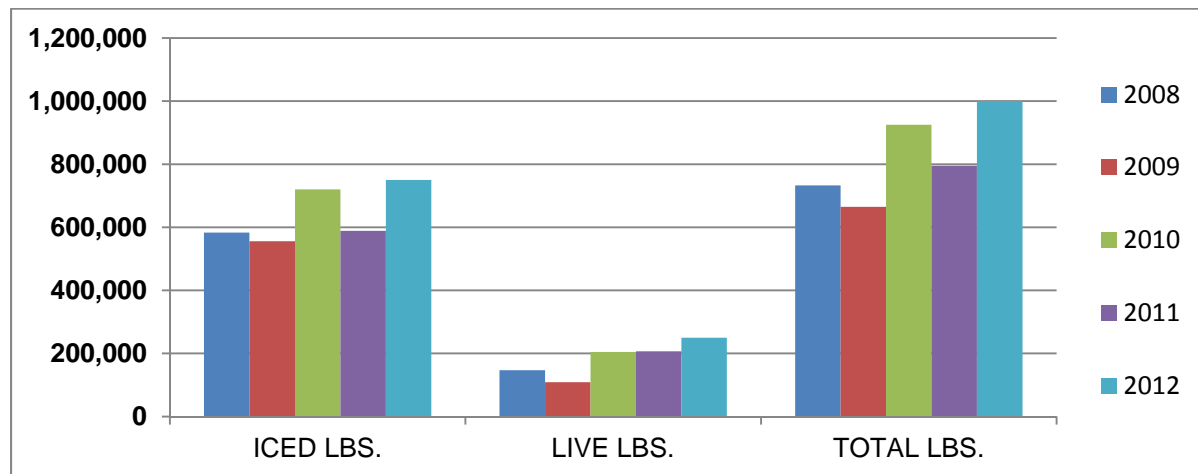
Nevada is an ideal location for tilapia farming, when coupled with Integrated Farming - systems that integrate livestock and crop production.

The advantages of integration are obvious for four reasons.

1. As far as fish production is concerned, it serves the major purpose of providing cheap feedstuffs and organic manure for the fish ponds, thereby reducing the cost and need for providing compounded fish feeds and chemical fertilizers. By reducing the cost of fertilizers and feedstuffs the overall cost of fish production is reduced and profits increased. The profit from fish culture is often increased 30 to 40 percent as a result of integration.
2. The overall income is increased by adding pig, goat, or poultry raising, grain and vegetable farming, etc., which supplement the income from fish farming.
3. By producing grain, vegetables, fish and livestock products, the community becomes self-sufficient in regard to food and this contributes to a high degree of self-reliance.
4. The silt from the ponds, which is used to fertilize crops, increases the yield of crops at a lower cost and the need to buy chemical fertilizer is greatly reduced. It is estimated that about one third of all the fertilizer required for farming in the country comes from fish ponds (AIB) (AMRC).

A comparable Tilapia Farm model for Nevada, considering climate, temperatures, livestock and crop production, and has integrated farming, is the Desert Springs Tilapia Farm in Hyder, Arizona. Durkee McGloster, farm operator, has seen increases in the tilapia farm since 2008, except for 2011. So far, 2012 is a record year, with an estimated 1,000,000 pounds to be sold.

The chart below shows the total pounds sold, both iced and alive.



Graph 14. Total pounds of tilapia shipped live and iced (Desert Springs Farm)

Desert Springs Farm has integrated Bermuda and Alfalfa fields that are watered from the water of the tilapia ponds, which is baled and sold, adding another tier of income to the farm. Due to the integration of goats, 2012 is the last year for this process. The hay fields will still be watered by the tilapia farm, but will be grazing fields for 700 goats, with future expansion up to 10,000 head.

Desert Springs Farm sells primarily to California, Arizona, Las Vegas, and most recently signed a very large contract with Canada. The facility has room to grow and the potential to double their capacity.

Alternative Recommendation

- Shrimp has similar economic and production characteristics as tilapia: high US imports, but low US production. Shrimp is the number one product in seafood imports. In 2010, the US imported 1.2 billion pounds, 22.2 million pounds more than the quantity imported in 2009. Valued at \$4.3 billion, shrimp imports account for 28.9 percent of the value of total edible imports (NOAA, 2010).

Shrimp farming can be generated in Nevada the same as tilapia using closed inland systems.

Other Possibilities

Nevada's natural resource challenges – particularly pervasive wildfire and invasive species – may also present opportunities for producers or land managers to capitalize on landscape needs. The University of Nevada, Reno's 2008 Great Basin Wildfire Forum report identified significant problems facing Nevada in terms of the health of its rangelands. Healthy rangelands are critical to urban and rural communities because such lands provide access to recreation, support wildlife habitat and grazing mammals, and are required for healthy watersheds. However, the state's rangelands were described as being in peril with the wholesale change occurring to the state's vegetation types.

“The Great Basin landscape is now characterized by three major vegetation/wildfire fuel complexes: 1) large expanses of monotypic, highly flammable, annual grassland; 2) overly dense sagebrush stands with a meager understory of perennial grasses and forbs or annual exotics; and 3) greatly expanded pinyon-juniper woodlands with a rapidly closing crown canopy and non-existent understory of perennial grasses and forbs.

No longer is the natural force of fire characterized by frequent, low intensity burns that ensure the persistence of diverse, resilient, fire-adapted plant communities. Rather, the current fuel complexes are prone to large, catastrophic, high intensity burns that destroy the vegetation, degrade the soil and create conditions for the establishment of highly undesirable invasive weed species that defy efforts to rehabilitate the damaged sites” (Great Basin Wildfire Forum, 2008).

The prevalence of invasive species such as cheat grass in the north and red brome in the southern part of the state, in addition to pinyon-juniper woodlands encroaching into sagebrush ecosystems (in many cases,

valuable sage-grouse habitat) – may open up market potential for both land treatments and new, small-scale industries.

Early indications show that bio-charcoal, made from pinyon-juniper, can be used productively. “Pinyon-juniper has encroached onto productive rangelands and can be a severe fire hazard. Charcoal made from pinyon-juniper is being used as a soil amendment, which enhances wildlife habitat and rejuvenates soils at mine sites. The bio-char may also be used for energy-crop production in the future” (Nevada State Office of Energy, 2012).

Similarly, land restoration after fires requires a reliable source of seeds and plant materials. A UNCE study found market demand for locally grown native plant products. “Growers provided plants and seeds primarily to government agencies, such as the Bureau of Land Management (BLM). However, agency demand for these products is determined primarily by the current fire restoration efforts, resulting in large fluctuations in demand from year to year” (Curtis & Cowee, 2008). Non-native plants, such as forage kochia, crested wheatgrass, and Russian wildrye, were identified in the Great Basin Wildfire Forum report for post-fire land restoration where cheat grass infestation was likely and perennial grasses were minimal. Should these recommendations be adopted, these plants and seeds could have a market potential in areas where land rehabilitation is needed.

Lastly, one entrepreneurial effort has successfully made beer from cheat grass. And, recently, Lake Tahoe opened up its waters to crawdad fishing, potentially opening up a new, niche market for the edible while reducing the negative impacts crayfish have on the lake. These kinds of possibilities show that, in some cases, the state’s natural resource problems may have small-scale solutions that can be capitalized upon by agriculture producers and entrepreneurs.

Alternative Crops

Alternative crops in Nevada have been tested for decades to determine the growing feasibility in the state’s climate, as well as profitability for the state’s farmers. According to Jay Davison of University of Nevada Cooperative Extension (UNCE), “a producer is advised to start on small acreages with any alternative crop. They must develop skills related to production, pest control, harvesting, and marketing of the crop. Keeping good records on associated costs and selling prices are also a must” (Davison, 2002). The success of alternative crops increases as growers increase their knowledge and experience with the crops.

Two potential alternative crops are

1. Perennial grasses for biomass
2. Teff

Perennial grasses are less promising as a biofuel source, while teff may be a suitable Nevada crop to be used as forage and as a source of gluten-free flour.

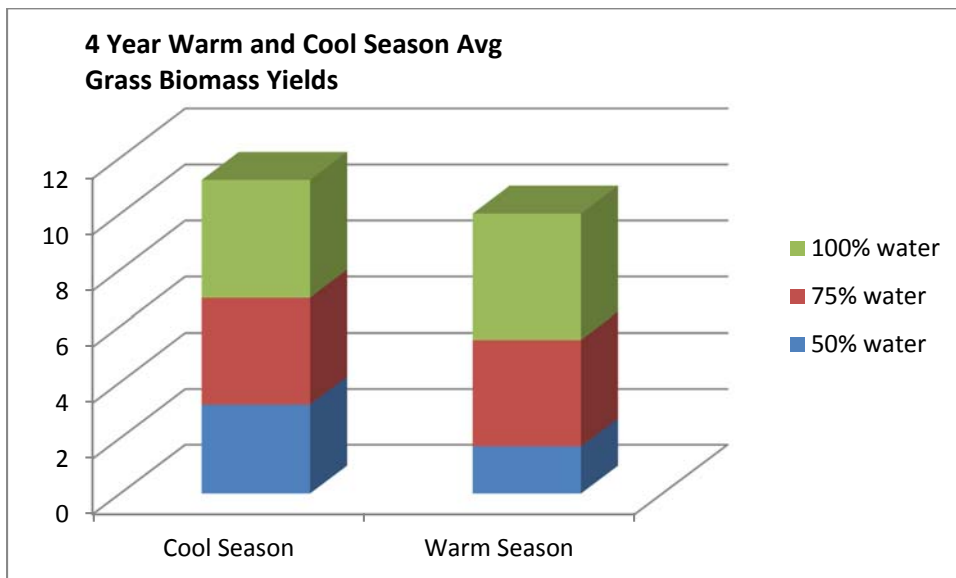
Perennial Grasses

University of Nevada, Reno, first started identifying the perennial cool and warm season grasses almost a decade ago and seeded for the first time in 2008. Reports being followed for alternative crops are through Jay Davison, a plant scientist for University of Nevada, Reno, Cooperative Extension. The results have been calculated from a 4 year average yield. The evaluation objectives are:

1. Identify biofuel candidates from both warm and cool season grasses
2. Determine production potential
3. Determine economic potential

The charts below show grasses given three irrigation treatments.

- 50%(2ac ft/acre)
- 75%(3ac ft/acre)
- 100%(4ac ft/acre)



Graph 15. 4-Year Average Yield (University of Nevada, Reno, Cooperative Extension)

Increased watering of perennial grasses grew larger yields for cool and warm season grasses, indicating that more water consumption led to higher yields. These results suggest that these grasses may be produced in commercial quantities; however, the economic feasibility of these crops comes with the following caveats:

- All biomass crops have failed to equal or exceed the income from alfalfa production.
- Neither warm nor cool season grass biomass yields adequate production or value to replace alfalfa.
- Currently, biomass production is not recommended as an alternate crop in some areas of Nevada, particularly western Nevada.

Teff (Tiffany Hay)

Hay is increasing in demand and price, pushing teff into fast becoming a new warm season annual grass alternative for forage producers across the U.S. Originating in Africa, its introduction into the U.S. initially was as an alternative grain source and also as a gluten-free flour source and is beneficial to those suffering from Celiac’s Disease (Gluten Intolerance).

Recent popularity of teff however is not as a grain, but as an alternative Summer Forage Grass. The main advantages of new forage type teffs are their ability to produce high yields combined with high quality in the summer months in contrast to cool season perennial grasses that lack adequate forage production during the “summer slump period”. After planting, first cutting is in approximately 45 to 50 days and most farmers get 5 cuttings from a crop in one season.

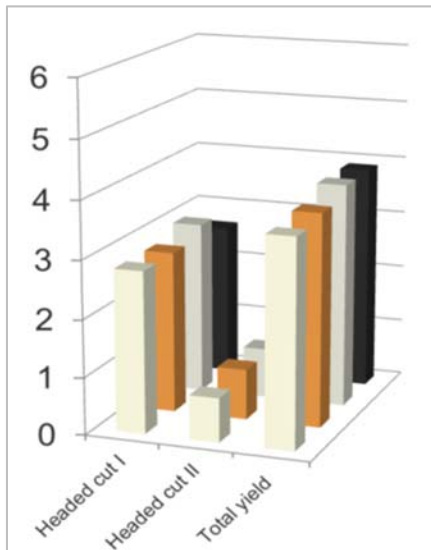


Teff is considered similar to timothy hay and the Nevada climate is proving to be a perfect match for this crop.

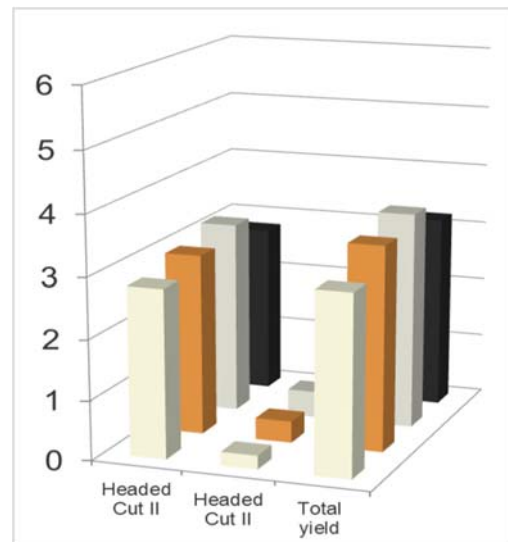
ALTERNATIVE CROP	PROS	CONS
TEFF	Grows very fast, high yields, with minimal water consumption due to short production season	Conventional crop equipment challenges due to tiny seed size
	Very disease and pest free	Limited teff processors
	Equal quality to Timothy, but better intake, 10% less sugar, higher digestibility, and stand-alone supplement	Annual, not a perennial and must be ground each year
	Drought resistant	Limited pest control availability at this time
	Minimal field maintenance, keeping equipment and fuel cost down	Can have significant weed competition issues
	Excellent rotation crop, especially with timothy hay or rye.	

The four charts below show yields from Yerington, Nevada and Kaysville, Utah (Davison). Utah is known

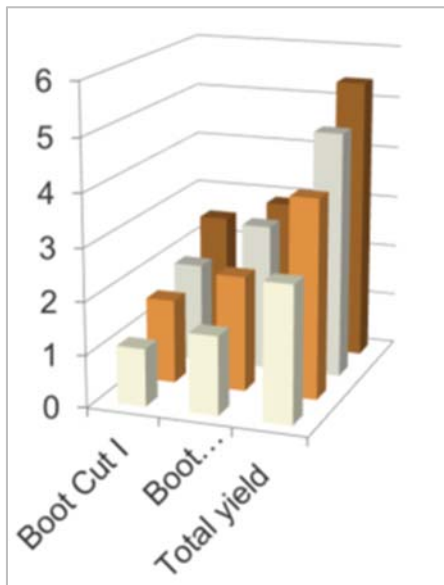
to be a hay growing state and in the examples below, the yield in Nevada was equal to, if not greater than, the Utah yield, suggesting Nevada is an ideal state to grow teff.



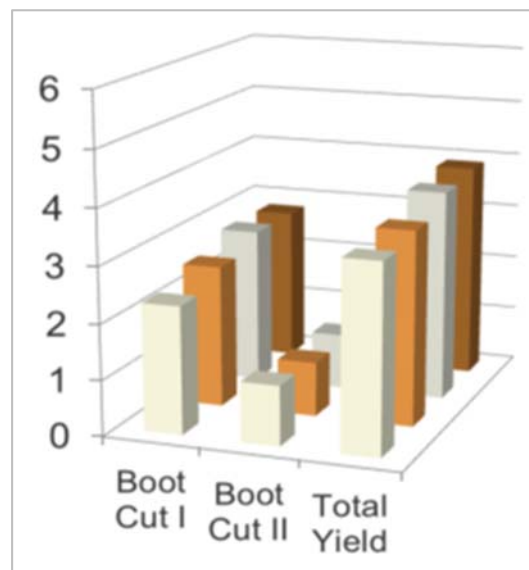
YERINGTON, NEVADA, 2010



KAYSVILLE, UTAH, 2010



YERINGTON, NEVADA, 2010



KAYSVILLE, UTAH, 2010

Graph 16. Yerington, NV and Kaysville, UT. Growth Comparison

In 2011, Nevada produced approximately 700,000 lbs. of teff @ \$0.40/lb. to farmers, \$0.65/lb. cleaned to wholesalers, and \$0.92/lb. as flour and the 2012 teff demand is calculated at 2,000,000 lbs., more than double last year's production, representing a growth opportunity.

Teff is increasing in demand and has been tested and charted as a good product for Nevada, but the downside (and the economic development opportunity) is, there are not any teff processors in the state. All teff seed is sent out-of-state for processing. This discussion is covered thoroughly in the “Nevada Agriculture Gaps” portion of Section 6.

Expansion Opportunities

For the purpose of this study “Expansion Opportunities” means taking what we already do well and expanding processes, methods, and practical farming parameters. Expanding what is grown and how it is grown can increase sustainability and improve the livelihood of the farmers and local communities. Keeping within the guidelines of practical parameters, not only means utilizing farms that have additional acreage that can be farmed or incorporating hoop house technology throughout the state in order to lengthen growing seasons, but it also means creating alternative ways of growing and alternative farming products.

The expansion areas discussed are:

- **Vertical Farming**
- **Wine Grapes and Vineyards**
- **Potatoes, Onions and Alfalfa**

Vertical Farming and Hydroponics

Mr. Hienz Gisel, founder of Vitality Concepts and his associate Mike Dial are experts on sustainable vertical farming and organic, soilless hydroponic growing methods. Mike Dial is an international authority in sustainable vertical farming and has built more than 800 organic farms around the world. Together they are currently tackling food security for Tohoku (Japan) and decontaminating radioactive and tsunami devastated soil. In addition, their research farm and school in the Philippines is making a major impact on the growing process and health of consumers within the region.

EXPANSION	PROS	CONS
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OPPORTUNITY		
VERTICAL FARMING	Sustainability and Dependable food source; Food Security	High cost if large scale. \$1.5 to 2 million per acre
	Produces Large yields in Controlled environment	Lack of knowledge and awareness
	Soiless cultivation, eliminating pest, toxins, and soil diseases; healthier foods; increase in nutritional value	Lack of volunteers to help run small community gardens; lack of community support
	Excellent growing method for herbs, strawberries, tomatoes, and small vine crops	Lack of funding from county and/or state (needs micro funding)

Vertical farming and/or hydroponics growing produces about 10 times the amount of produce per acre, per year, than a traditional soil farmer. This type of growing uses 70 to 90 percent less water than a field farmer, as the water is recirculated and goes straight to the plant, resulting in minimal evaporation. Since most pests and diseases are soil-born and hydroponics is soiless, there are fewer pest and disease problems. This type of growing allows crops that would traditionally be a mono crop to have multiple yields.

Wine Grapes/Vineyards

Wine grapes have low-water requirements, and vineyards offer tourism opportunities such as tours and wine tastings; however, wine grape growing success in Nevada can be hampered by spring frosts and the dearth of varieties that succeed in local growing conditions.

EXPANSION OPPORTUNITY	PROS	CONS
WINE GRAPES	Low water use crop	Red grapes struggle in climate
	Potential for higher return than forages or grain crops	Potential to have high winter die rates
	Currently high demand for Nevada wine	Slow vine maturity
	Provides diversity in a cropping system	

Three wineries in the state have expanded operations in recent years and have vineyards that grow their own grapes in addition to importing grapes from California.

- **Churchill Vineyard**
- **Tahoe Ridge Winery**
- **Pahrump Winery**

Churchill Vineyards, Tahoe Ridge Winery, and Pahrump Winery have each expanded wine-grape production in recent years, and each winery offers Nevada grown wines, tourist attractions, and special events.

Churchill Vineyard

Also known as Frey Vineyards, Churchill planted 13 varieties in 2001 and in 2005 bottled their first wine and with the following results:

- | | |
|-----------------------------|-------------|
| • White Riesling | 680 bottles |
| • Sémillon | 435 bottles |
| • Gewurztraminer | 215 bottles |
| • Chardonnay | 140 bottles |
| • White Riesling / Sémillon | 125 bottles |
| • Merlot | 80 bottles |

Totaling 1,680 Bottles/140 Cases

After more than a decade of growing grapes, Churchill Vineyard has narrowed their varietal menu and only grows four varieties of White grapes and four varieties of Red grapes. The Vineyard has many success mile markers, making them a model subject for this crop opportunity.

- All wine is produced and sold locally; it is reported that the vineyard cannot keep up with total demand.
- Expanded winery in 2006.
- Started statewide distribution in 2008.
- Received 1st Nevada Commercial Distillery permit in 2010, after 5 year experimental license. Also produces vodka, brandy, grappa, and single malt whiskey (Churchill Vineyard, 2012).

Tahoe Ridge Winery

Tahoe Ridge Winery began operations in 1990 with a three-acre research vineyard and completed three more research vineyards in 1994, adding one more research vineyard under the University of Nevada, Reno, Cooperative Extension in 1995. Today the company grows 60 varieties in 17 Nevada locations from Pahrump to the Carson Valley, making them a model subject for this crop opportunity. The operation includes a marketplace and bistro in Minden, where special events and wine tastings are offered.

Pahrump Valley Winery

The Pahrump Valley Winery is the oldest winery in the state and is currently growing Zinfandel and Petite Syrah varieties in the Pahrump area. The winery currently imports 60 percent of their grapes from California due to local microclimate conditions. The winery recently completed a 1,000 case order to Shanghai, China and they are looking to purchase additional acreage in the Pahrump area to grow more grapes locally. The vineyard also offers wine tastings and a “grape stomp,” a competition that sells out each year (Pahrump Winery, 2012).

Potatoes and Onions

The United State Department of Agriculture of Nevada reported potatoes and onions as two of the top five commodities in Nevada for 2010. The cash receipts for potatoes and onions totaled over 81.6 million. The climate, environment, and soil allow these two commodities to grow well and make expansion of these products an opportunity for Nevada.

Alfalfa

Alfalfa hay is grown more than any other hay in Nevada. The United States Department of Agriculture of Nevada reported 280,000 acres of hay were harvested in 2010, up 15,000 acres from 2008. The cash receipts totaled over 143.2 million, an increase of approximately 2.5 million from 2009. The demand for hay is continuing to drive up the price for the commodity. Alfalfa and other hays are the number three commodity in the state and the expansion of this product is an opportunity for Nevada.



**“Localized food is the strongest trend in agriculture
and has been for a number of years.”**

Agriculture Gaps



5. AGRICULTURE GAPS

This study has not only identified what Nevada presently has in terms of producers, processors, and other agriculture related businesses, it has also identified what Nevada is lacking. Nevada agriculture performs well in many areas, but economic gaps are occurring that result in a large in-state revenue loss. In addition to the major gap of animal processing within the state as described in the Economic Analysis Section, there are six additional gaps identified for improvement to avoid out of state economic leakage.

1. **Teff Processing**
2. **Localized Agriculture**
3. **Dairy Processing**
4. **Meat Production and USDA Meat Processing/Slaughterhouses**
5. **Agriculture Equipment Manufacturing**
6. **Agriculture Marketing Program**
7. **Understanding and Access to Federal Loans, Grants, and Incentives**

To complete the analysis, 341 phone calls were made to current agriculture-related businesses, including food and dairy processors and companies that sell to processors outside of the state to evaluate impact. Evaluation questions included:

1. Is your business dependent on being in Nevada?
2. Do you process your product in Nevada or send it out of state?
3. If there was a processor in-state for that type of product, would you use them?
4. What do you purchase outside of the state because Nevada does not provide that product or service?
If there was an in-state business providing that product or service, would you use them?
5. What is the freight impact?
6. What is the revenue impact?

The agriculture gaps identified are categorized in two areas:

- What we have and can build on
- What we need

What we have and can build on identifies what Nevada already has and does well on the front end, but the back end is lacking, causing in-state revenue losses.

What we need identifies the gaps that are causing large revenue losses because the products and services are not in-state.

GAP 1: Seed Processing

Teff Processing

As teff gains popularity and more acres are being produced, a need for an in-state processor also increases. The company used as an example is Desert Oasis Teff Company (DOTC), with future plans to expand and possibly double teff production. DOTC owns one teff farm and contracts three other farms to grow. Together they produce approximately one million pounds and are the only teff seed cleaning company in the state. DOTC sends all teff outside of the state to be processed into gluten-free flour, due to the lack of an in-state processor. The company ships its product to Bob's Red Mill in Redding, California and Moore's Mill in Portland, Oregon. It is reported that freight is their largest expense, and are now contracting with larger companies to pick up the seed, resulting in less expensive freight fees. DOTC reported they would use an in-state teff processor, resulting in higher profits for their business.



The economic cost to Desert Oasis for out-of-state processing is primarily the shipping, which amounts to approximately \$90,000 annually. Desert Oasis spends another \$70,000 to have it processed in California and Oregon. Due to the increased demand for teff, DOTC is going to expand, contracting more farms to grow double what is currently being grown, which will double the freight expense as well as double the processing expense. Although this may be one small example, it shows the economic disconnect of this emerging alternative crop with the revenue losses that will continue to be incurred. Alpine Farms of Gardnerville is another Nevada business incurring freight and out of state processing charges to ship their teff to California.

Other Seed Processing

Another gap in seed processing is alfalfa seed. Brinkerhoff Ranches in Lovelock sends all of its seed to Idaho to be processed. Val Brinkerhoff stated Nevada used to have several alfalfa seed processors in the state, but it became more economical to be in other states where the demand was greater, leaving Nevada without a seed processor. Additional research will need to be conducted to determine leakage and processing viability.

GAP 2: Localized Agriculture Development

Vegetables, potatoes, and other crops made up 21.1 percent of the Total Cash Receipts, by Commodity, in Nevada 2010 (Nevada Agriculture Statistics, 2011) or in terms of economic contribution, \$10,587,500; however, the state imports \$93.8 million of vegetables and melons and \$195 million of fruits every year (Harris). This is an economic disconnect. Nevada is importing approximately nine times current in-state production, in commodities already successfully grown in Nevada.

A strategy to increase statewide agriculture revenues throughout the state is the development of “*localized agriculture*” or the creation of distribution channels that will connect local producers to restaurants, grocers, and the communities.

The newer strategies are defined as *food hubs*. The goal of this hub is to create “a system of mutual support that increases sustainability and profitability (Compendium of Food Clusters, 2009, [Appendix D](#)).

Advantages of localized agriculture:

- Creates healthy sustainable community
- Increases in-state economic contributions
- Introduces farmers to local markets, commercial and residential
- Supports efforts to increase sustainability by growing and meeting demands for fresh produce
- Reduces transportation costs
- Initializes food hubs
- Produces fresher, more nutritious products
- Provides positive impact to health

Industry Trends and Fit

Localized food is the strongest trend in agriculture and has been for a number of years. There is concern that local food costs more to produce, especially in the desert. Some research shows that people from all incomes are willing to spend more on good quality food. The sale of food locally is shown to create a 1.45 to 1.58 multiplier effect on both income and the number of jobs (USDA, 2010).

In rural Nevada there is great need for jobs and business development and the response to locally grown food has been favorable. This is a segment that can grow with support from local communities. Business professionals in Lincoln County have commented that this is one of the first business development concepts that appears feasible for the rural frontier and has real potential to a create positive, long-term impact.

Filling the Gap in Business Demand

There is a series of gaps in Nevada to develop local food systems. One gap is consumer awareness. The goal is getting the consumers to understand that high quality food is available and produced in Nevada. There are several successful programs to be used as a model that can be duplicated in filling this gap.

- **NevadaGrown** - The oldest statewide localized agriculture program in Nevada. Nevada Grown works with Whole Foods and US Foods, grows produce for other retailers and restaurants, provides marketing materials, holds monthly agriculture workshops and keeps the most extensive website listing for the availability of all locally grown foods including farmers’ markets, CSAs (Community

Supporting Agriculture), and restaurants in the state. NevadaGrown has been funded from grants by the Nevada Department of Agriculture for the past 10 years.

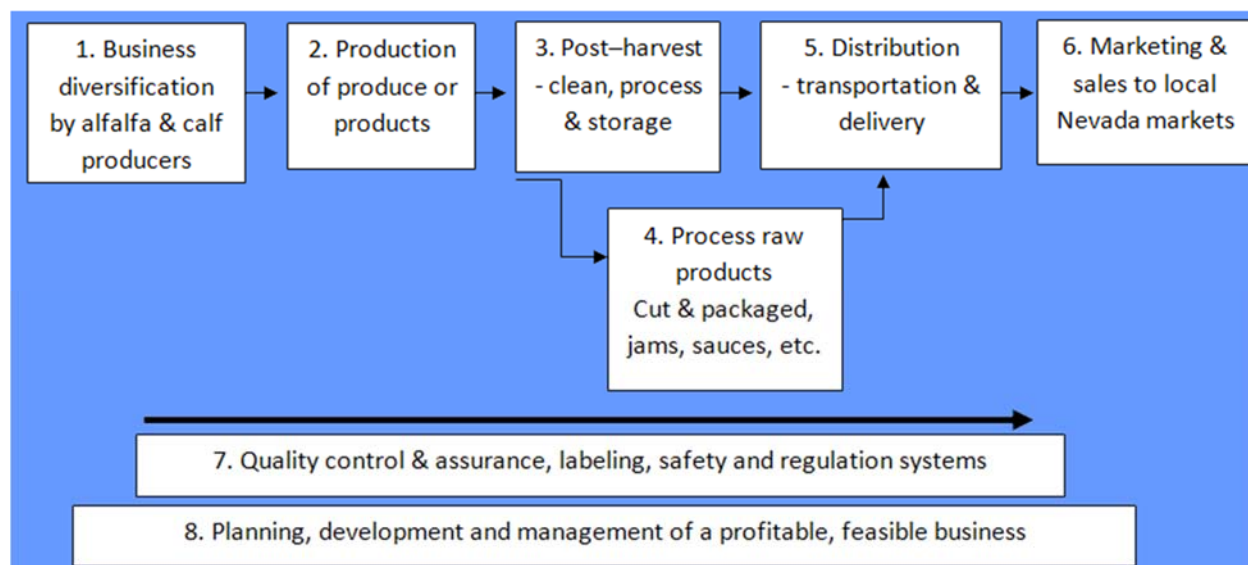
- **Producer to Chef Program** - University of Nevada Cooperative Extension educates Nevada restaurants and consumers that quality food can be grown in Nevada. This program takes chefs to farmers' fields and has locally grown food evaluated by chefs. The program has also started local farmers' markets, runs local food events, and educates farmers on producing high quality food for local sales. Because of the program, there has been an increase in requests for local produce from high end chefs, farmers' markets, Community Supported Agriculture (CSA) businesses, and specialty grocery stores (Whole Foods and US Foods).
- **Bet on the Farm** - Doug Taylor, Executive Chef for B & B restaurants, works with Mario Batali and Joe Bastianich, and helped opened Bet on the Farm in 2009. More than 100 chefs have been introduced to local farmers; approximately 40 chefs are now supporting local farming on a weekly basis. More work is needed to educate the consumers on the local food availability in Nevada.
- **Sierra Bounty** – Using a collective CSA (Community Supporting Agriculture) model, several farms are growing vegetables, herbs, flowers, fruit, hops, corn, and wheat. Two farms raise chickens, turkeys, and deer, and sell the eggs produced by the chickens and turkeys. Sierra Bounty makes local products available by coordinating pre-ordered sales and deliveries between growers, members, restaurants, and grocers.
- **Greenhouses and community gardens** - Winnemucca community gardens, Carson City Greenhouse Project, Lyon County Hoop houses, Bellagio Hotel and Resort Rooftop Herb Gardens are examples of local gardens.
- **Fallon Farmers Collaborative** - Comprised of Winnemucca, Fallon, Lovelock, and Reno, the small farm coalition received a Specialty Block Grant in 2011 to help farmers market their goods to local area farmers' markets. The Coalition received a Specialty Block Grant in 2012 to help form a business entity.
- **Solano and Yolo Counties** – This industry model is described in “The Food Chain Cluster, Integrating the Food Chain in Solano and Yolo Counties to Create Economic Opportunity and Jobs” by Collaborative Economics (Appendix E). The approach focused on the interrelationships in the agriculture industry cluster, including emphasis on the definition of the diversity of industries, the potential markets, and the connection to the other industry clusters in the area. While the size of the direct agriculture industry in Solana and Yolo counties is similar to Nevada, it has achieved a better integration into other local industries and has been practicing innovation for a number of years.

There is a series of gaps that needs to be addressed to develop a supply of locally grown products in Nevada. These gaps appear in production, postharvest handling, marketing, sales and delivery of quality products. Local food production is a different business for Nevada farmers because it is more intense

(greater labor and production in a smaller area) and more complex (the farmer must market, distribute and sell their products directly to the consumers themselves).

The chart below shows development steps required for establishing a supply system. The chart aids in the many phases that must be taken to ensure products get to markets, grocers, and communities. According to the size of the business or the intended or expected growth, employees can be added at any phase (Holly Gatzke, University of Nevada, Reno, Cooperative Extension).

Farm to Market Establishment



Additional Food Cluster Opportunity

Localized Agriculture is the key component to managing a significant threat to the State of Nevada known as Food Security. An excessive reliance on imported foods threatens Nevada economically and diminishes its ability to properly meet a major disaster that would cut off food supply to the state. Fortunately the state has an initiative underway that should be recognized and supported. The Lead Nevada steering committee is establishing an initiative that requires support of every agency in the state. Lead Nevada is organized in three areas, each having a working committee: Grow Nevada, Reach Nevada, and Feed Nevada. The initiative is currently undergoing its assessment of its critical issues to result in a strategic plan.

GAP 3: Dairy Processing

Nevada has approximately 28,000 milk cows and has the potential to be a very strong industry, but Nevada needs to double or triple that number in order to attract more companies requiring milk production (e.g. yogurt producer).

The present day example is the powdered milk plant being built in Fallon, Nevada, that will require an additional 13,000 milk cows to reach full capacity processing 2 million lbs. of milk per day. The DFA (Dairy Farmers of America, developer of the plant) is trying to recruit dairies to Nevada, but the relocation or expansion cost for these companies can be cost prohibitive.

Increasing dairy cows is vital to the dairy industry in Nevada. A typical dairy cow generates more than \$30,000 in economic activity and a herd of 100 cows creates 20 jobs for Nevada residents each year. The increase of 13,000 milk cows for the dry milk plant will generate more than \$390,000,000 each year and will create 2,600 jobs.

Since 2001, the number of milk cows in Nevada has increased by 3,000 head and cash receipts from marketing have increased from \$62,270,000 to \$103,766,000 (Nevada Agriculture Statistics, 2011). Although an increase in milk cows has occurred, it is not enough to meet demand both current and expected. This creates another economic development opportunity when compared to the value of Agriculture Cluster Imports in Nevada.

According to an analysis of the top ten Nevada imports, Fluid Milk and Butter Manufacturing is number six. It also shows the top imported commodities for this category.

- #1 Imported commodity - Dairy Cattle and Milk Products \$60,202,852
- #2 Imported commodity - Fluid Milk and Butter \$8,783,254

Nevada imports \$68,986,106 in the Fluid Milk and Butter Manufacturing category, providing a growth potential in two areas (a) Milk (Dairy) Cows and (b) Milk product processors and/or manufacturers.

GAP 4: Meat Production and USDA Meat Processors/Slaughter Houses

Approximately \$780 million of Processed Animal (except poultry) Meat and Rendered Byproducts goods and services were imported into Nevada in 2010 (Ekay Consulting, 2012). Local Nevada industries produced only \$58.6 million worth of this commodity, indicating underproduction of this commodity locally, which makes Nevada an attractive market for a company supplying this commodity.

Of the more than \$45.4 million worth of the goods and services produced by this industry, 79 percent of total production is exported outside of Nevada. This is a significant disconnect, with over \$780 million of this industry's product being imported from outside the state and the majority of the industry's local production exported outside the state.

Research could be conducted to understand the reason for this disconnect. There may be regulatory limitations and constraints keeping companies in this industry from locating and operating in Nevada. One study found that a mobile slaughter operation was feasible and potentially profitable, but it has not yet been pursued (Cowee & Harris, 2011). If these constraints can be overcome, the impact could be significant for the state.

For example, if 25% of the \$780 million that is currently produced outside of Nevada and imported into the state can be produced locally, a direct increase on Nevada's output is \$195 million. Applying indirect and induced multipliers for this industry to total impact of a 25 percent increase in this industry can have a statewide effect of \$360 million. Using existing employee productivity for the animal processing industry, an increase in sales of \$195 million will generate approximately 430 employees. This is a basic example of the potential for growth that can be found in import substitution.



Not only is this an import disconnect, but what is produced in state primarily goes out of state to be processed due to an absence of a USDA meat processor. One example of large amounts of money leaving the state is through the USDA, Food Commodities Program and the Child Nutrition Program. According to Jim Barbee, State Director for Department of Agriculture, approximately \$115 million is part of the processing gap in Nevada. Purchases and processes occur outside of the state and incur hundreds of thousands of dollars in freight charges. Once everything is processed it is trucked back into the state and distributed.

Another real life example is First Quality Sausage, with an annual income of \$7,980,000, buys 100% of their raw materials, chicken, turkey, and beef from Arizona, South Dakota, and Ohio, due to an absence of a USDA approved slaughterhouse in Nevada. It should be noted that 100 percent of the First Quality Sausage's products are sold in the state primarily to hotels and casinos in Las Vegas, NV.

GAP 5: Agriculture Equipment Manufacturing Companies

Nevada is highly concentrated with agriculture businesses and is surrounded by states that are also highly agriculturally concentrated: California, Utah, and Idaho. Farm Equipment Manufacturing companies are ideal for Nevada given the corporate tax structures, state incentives and the availability of land and buildings. The companies listed below are the manufacturing companies currently in Nevada, totaling \$27.7 million annually:

- Cummins-Allison Corporation

- High Desert Barns
- High Desert Livestock Supply
- Rain Aid Inc.
- Windspur Discount Pipe and Irrigation
- Winnemucca New Holland
- Wyatt Gate and Corrals

The Northern Nevada Development Authority Agriculture Committee, chaired by Lynn Hettrick, determined additional equipment manufacturers that would be most beneficial to Nevada’s landscape. These include:

- Tractors suppliers
- Seed mill equipment suppliers
- Equestrian-related businesses
- Dairy equipment suppliers and manufacturers
- Irrigation and field equipment suppliers and manufacturers

The business development specialist within the economic development agencies could explore potential opportunities in these categories for possible relocations or expansions into Nevada, such as from California.

GAP 6: Agriculture Marketing Program

An Agriculture Marketing Program is needed to support the acceleration of growth within the sector by creating a statewide outreach strategy for Nevada agriculture. This study has identified numerous individuals and organizations striving to accomplish this, but they are operating in silos, increasing overlap of efforts and reducing overall effectiveness. The state would benefit from a higher level of coordination and development of marketing programs.

A Statewide Agricultural Marketing (SAM) program would analyze the supply and demand of agricultural products and services, and would create an organized effort to increase the sector’s ability to better meet the demands of the buyers and support higher profits for the suppliers. This program would include the support of marketing the key growth products and commodities, conduct market research, develop and deliver industry promotions, develop and communicate state branding, support transportation improvement, create agriculture map, outlining all crops grown in each location, define and determine other agriculture related business opportunities to form food clusters, support and actively work with Food Security Programs and provide constant vigilance on industry retarding policies and regulations within all levels of government.

GAP 7: Understanding and Accessing Federal Loans, Grants and Incentives

Nevada growers, producers and distributors have many loans, grants, and incentives available to support their operations, expansions and eventual bottom line success. However, many of these programs are minimally utilized. Through conversations within the agriculture community, it is clear that businesses would use these programs if they were aware of them and if they knew how to access them. This lack of understanding and process capabilities represents an economic gap. It is believed that if filled, the expansion of the sector would be accelerated. The programs provide assistance to organizations connected to the Agriculture industry to support:

- Research
- Access to capital
- Community development
- Marketing
- Conservation practices
- Operating funds
- Export assistance
- Renewable energy implementation
- Organic certification
- Youth programs

Available grants, loans, and incentive programs are summarized below and listed by master agency.

USDA

- **Agriculture and Food and Research Initiative (AFRI)**

Agricultural Economics and Rural Communities - Supports research, education, and/or extension projects that address the long-term viability of small and medium-sized farms as well as entrepreneurship and small business development, markets and trade, and rural communities.

Improved Sustainable Food Systems – Conducts research, education, and extension on local and regional food systems, from field to fork, that will increase sustainable food security in U.S. communities and expand viability within local economies.

- **Beginning Farmers and Ranchers Loan** - Makes and guarantees loans to beginning farmers who are unable to obtain financing from commercial lenders.
- **Business & Industry Guaranteed Loans** - Supports hydroponic and aquaculture food production.

- **Business and Industry Guaranteed Loan Program (B&I)** - Helps new and existing businesses based in rural areas gain access to affordable capital, providing guarantees on loans made by private lenders. USDA essentially co-signs the loan with the loan recipient, lowering the lender's risk and allowing for more favorable interest rates and terms.
- **Community Development Block Grant Program** – Designed to address the critical issues involving community development such as, infrastructure development and improvement, education and workforce development, job creation through entrepreneurship, business development etc., marketing the community, and development of tourism and other natural resources.
- **Community Facilities (CF)** – Supports rural communities by providing loans and grants for the construction, acquisition, or renovation of community facilities or for the purchase of equipment for community facilities.
- **Community Food Projects (CFP)** – Designed to assess strengths, establish linkages, and create systems in the whole food system that improve the self-reliance of community members to increase food security.
- **Conservation Loan Program (CL)** – Farm Service Agency makes and guarantees conservation loans to promote conservation on farms and ranches to conserve our natural resources and can be used to implement conservation practices approved by the Natural Resources and Conservation Services.
- **Cooperative Development Assistance** – Assist in forming business entities that allow producers to cooperate on one or more aspects of the production and marketing cycle, sharing the costs, the risks, and the profits associated.
- **Efficiency Improvement Guaranteed Loan and Grant Program** - Provides financial assistance to agricultural producers and rural small businesses in rural America to purchase, install, and construct renewable energy systems; make energy efficiency improvements to non-residential buildings and facilities; use renewable technologies that reduce energy consumption; and participate in energy audits, renewable energy development assistance, and feasibility studies.
- **Environmental Quality Incentives Program (EQIP)** - Assists farmers and ranchers in planning and implementing conservation practices that improve the natural resources (e.g. soil, water, wildlife) on their agricultural land and forestland.

- **Environmental Quality Incentives Program (EQIP)** - Offers financial and technical help to assist eligible farmers and ranchers to install or implement structural and management practices on eligible agricultural land.
- **Farm and Ranch Lands Protection Program (FRPP)** - Purpose is to keep agricultural lands in production by assisting with the purchase of conservation easements from volunteer landowners to ensure that the land will never be developed out of agricultural uses and provide income for landowners.
- **Farm Operating Loans** – FSA loan used to purchase livestock, feed, farm equipment, fuel, farm chemicals, insurance and other operating costs, including family living expenses, minor improvements or repairs to buildings, and refinance certain farm-related debts, excluding real estate.
- **Farm Ownership Loans** - FSA loan providing farmers and ranchers opportunity to purchase farmland, construct and repair buildings, and make farm improvements.
- **Farm Storage Facility Loans (FSFL)** - Finances the purchase, construction, or refurbishment of farm storage facilities. This program finances new cold storage buildings, which can be particularly important to those growing fruits and vegetables for the fresh market.
- **Farmers Market Promotion Program (FMPP)** - Helps communities support local food systems through direct marketing of farmers markets, roadside stands, community-supported agriculture, agri-tourism and other direct producer-to-consumer marketing opportunities. Project awards increase access to local foods by low-income consumers, expand opportunities for farmers and growers to market their products directly to the consumer, and raise customer awareness of local farm products through promotion and outreach.
- **Federal-State Marketing Improvement Program (FSMIP)** - Funds are used to explore barriers, challenges, and opportunities in marketing, transporting, and distributing food and forest products.
- **Minority and Women Farmers and Ranchers**, also known as Socially Disadvantaged Applicants (SDAs) - Targets a portion of its loan funds to minorities and women farmers and ranchers.
- **Organic Cost Share Program** - Reimburses eligible producers and handlers for a portion of the costs of organic certification.
- **Rural Business Enterprise Grant (RBEG)** – Funds projects that facilitate the development of small and emerging rural businesses, distance learning networks, and employment-related adult education programs.

- **Rural Cooperative Development Grants (RCDG)** - Supports rural economic development through the creation or improvement of cooperative development centers that provide assistance for starting up, improving, or expanding rural businesses, especially cooperatives.
- **Rural Energy for America Program (REAP)** - Provides financial assistance to agricultural producers and rural small businesses in rural America to purchase, install, and construct renewable energy systems; make energy efficiency improvements to non-residential buildings and facilities; use renewable technologies that reduce energy consumption; and participate in energy audits, renewable energy development assistance, and feasibility studies.
- **Rural Micro-Entrepreneur Assistance Program (RMAP)** - Provides direct loans, technical assistance grants, and technical assistance-only grants to Microenterprise Development Organizations (MDOs) to support the development and ongoing success of rural micro-entrepreneurs and micro-enterprises.
- **Rural Youth Loans** – Designed to establish and operate income-producing projects of modest size in connection with their participation in 4-H clubs, FFA and similar organizations, providing practical business and educational experience and produces sufficient income to repay the loan.
- **Specialty Crop Block Grant Program (SCBGP)** - Enhances the competitiveness of specialty crops (fruits, vegetables, tree nuts, dried fruits, horticulture, nursery crops, floriculture), including locally grown and consumed specialty crops, e.g. school or community gardens.
- **Value-Added Producer Grants** - Supports business planning activities and helps farmers and ranchers receive a higher portion of the retail dollar, e.g. helps a farmer develop a business plan to turn berries into jam or basil into pesto.
- **Western Sustainable Agriculture Research and Education Competitive Grants Program (SARE)** Provides assistance for a producer, working with a technical advisor that develops a proposal to conduct research and education on a sustainable agricultural topic and incorporates such items as: on-farm/ranch demonstrations; farmer-to-farmer educational outreach and other items to assist in producer adoption in an area of sustainable agriculture. The information must help improve income, the environment, communities and quality of life for all citizens.
- **Western United States Agriculture Trade Association (WUSATA)** – Provides assistance to small food and agricultural companies in marketing their products overseas.

Small Business Administration

- **Small Business Innovation Research (SBIR)** - Helps small businesses conduct high quality research related to important scientific problems and opportunities in agriculture. Research is

intended to increase the commercialization of innovations and foster participation by women-owned and socially and economically disadvantaged small businesses in technological innovation.

- **State Trade and Export Promotion Grant Program (STEP)** - Designed for businesses that desire financial support to build brand-name recognition of U.S. made products in foreign markets and increase product exports.
- **Nevada Investment and Trade Revenue Opportunities (Nitro)** – Encompasses (4) key programs and events all designed to help small businesses market products overseas and increase exports from Nevada.

Industry Constraints

The primary research determined two areas of constraint that producers and processors report as consistent issues and problems.

Regulations

In the primary research survey, there was an opportunity for respondents to give general comments as well as comments specifically about food safety and other regulations. Recurring themes were focused on relationships with Federal agencies, such as the BLM, and perceived misplaced antagonism from environmental organizations. Another common comment was the constraints of the lengthy and difficult permitting process.

Regarding Federal agencies, the primary challenges for Nevada Agricultural companies are reported as excessive fees, burdensome permits, adjudication and process time and the lack of empathy in dealing with real world issues.

With environmentalists, complaints are delays related to issues such as sage grouse protection and an antagonistic relationship with the advocacy groups.

There were widespread complaints with respect to the inconsistency of regulations across the state. The regulations, both county and state based, were mentioned numerous times expressing how different the process is for some of these regulations from the northern part of the state vs. the southern part of the state.

Taxes

Payroll and property taxes dominated the survey as creating the biggest burden on businesses. To a lesser extent, federal income taxes and annual business taxes also scored high in the survey. In the general

political climate in the state and across the nation, these results were not surprising. Only about 6 percent of the surveys did not list any taxes as creating a burden.



**“Expand focus and investment on agricultural sciences
in the state’s higher education system.”**

Recommendations



6. RECOMMENDATIONS

This study has identified the gaps and opportunities associated with Nevada agriculture. It is clear there is no one single solution to solve the issues associated with such a diverse industry across the broad geography of the state. However, a number of recommendations can be suggested. The recommendations are presented in order, as each topic area was discussed in the report. Additional recommendations are made that coincide with the larger challenges that face the state's agriculture industry, such as reliable funding for the state's agriculture programs in the Nevada System of Higher Education, as well as improving regulations impact the agriculture industry.

Hoop House

Continue to hold workshops for hoop house growing through the community colleges, university and community horticulture programs, and by community gardening organizations to support best practices and adoption of new applications of hoop houses.

Wine Grapes and Vineyards

Target programs to support expansion of wine grape production in the state to reduce the importing of grapes from California.

Saffron

Expand the research and testing of growing saffron in Nevada by experimenting with different organic soils and varieties to determine the best-case growing procedures for maximum yield. Also, focus on saffron as an export crop.

Hops

Establish a "farmer-to-brewer" initiative to in-state brewers to promote the crop as a niche-market reality. Expand export programs.

Canola

Continue the growth of canola as an edible food oil and biofuel, working with in-state processors for out-of-state exporting opportunities.

Perennial Grass as a Biomass Crop

Due to an inability to economically produce these crops, it is recommended that additional effort be placed on research and development that would improve economic viability before committing resources in the field.

Teff

Expand production of teff due to low input cost, its high potential returns and lower water demand. Promote the use of teff as a forage and support the attraction and development of in-state processing of gluten-free flour for in-state distribution and export.

Vertical Farming and Hydroponics

Expand local based agriculture through vertical farming and hydroponic growing operations. Focus efforts on expanding technology adoption within the state and the promotion and education of businesses to establish and succeed. Seek out empty buildings within communities and support their transition to growing centers.

Aquaculture

Target aquaculture companies and solicit them to expand operations to Nevada. Develop an “add on” program targeting current farmers and animal producers to consider adding aquaculture in an integrated system.

Teff

Target a teff seed processor for relocation to Nevada or support the expansion of an existing company to reduce economic leakage.

Alfalfa Seed

Quantify the feasibility of this type processor in Nevada to support active solicitation of a relocation or expansion to Nevada.

Local Agriculture Development

Develop a state wide program to support the development and success of local growing hubs through the following activities:

- Connect local growers to local markets
- Create distribution centers
- Create statewide cooperatives, working together
- Create an agriculture marketing program in the state or in the northern and southern regions that connects, markets, and increases the crop agriculture production with a main goal of import substitution, thereby increasing the economic contribution of this industry cluster.

Dairy

Provide state incentives to support the expansion of Nevada's dairy herd. Target dairy processors for liquid milk, powdered milk and yogurt as recruitment and expansion opportunities.

Exports

Organize the information and processes of existing programs of the state and the U.S. Department of Commerce and create an aggressive communications program targeting producers with the goal to expand exports.

Federal Loans, Grants, and Incentives

Create a single source on-line data web site organizing all available loans and programs and provide user friendly access. Aggressively promote use of site and therefore programs.

Meat Production and USDA Meat Processors/Slaughter Houses

Bring every support mechanism possible to ensure the successful establishment of the Walker River Beef project in Wabuska in recognition of its aggressive scale and its ability to fill the gap within the state.

Agriculture Marketing Program

The forming of an agriculture marketing program is recommended at the state level through the Department of Agriculture, to develop, initiate and sustain agricultural food systems.

Agriculture Equipment Manufacturers

Develop a state supported marketing and sales program to attract key expansions and relocations within this sector.

Research, Education, and Outreach

Expand focus and investment on agricultural sciences in the state's higher education system. The University of Nevada Agricultural Experiment Station provides the research backbone for Nevada's many agricultural industries. Recent cutbacks to the university system have impacted the Experiment Station's programs. This is in spite of previous recommendations to increase the state's research investment, particularly to address the Great Basin's natural resource challenges (Great Basin Wildfire Forum, 2008). A research foundation is frequently required for new industries to develop, as evidenced by the wine grape enterprises that developed after research conducted at the University of Nevada, Reno.

The University of Nevada Cooperative Extension has been the state's agriculture outreach resource. It also conducts research and offers numerous community education opportunities. At the time of this writing, budget cut recommendations approved by the system of higher education's Board of Regents are threatening to further impact UNCE's operations. Though UNCE has a statewide mission, its personnel have been reduced in recent years as the higher education system suffered budget cuts. Work by UNCE personnel has been invaluable for the state's agriculture industry, and it is anticipated that further reducing this resource will negatively impact the state's producers.

Other higher educational institutions have also contributed to local agriculture needs. The Specialty Crop Institute at Western Nevada College (<http://www.wnc.edu/ce/sci/>) is a program that provides training for new farming methods for the high-desert climate. Similar programs in the state can benefit producers directly, and with a regional focus, can aid producers with needs specific to their locations. The Ornamental Horticulture program at the College of Southern Nevada is an example of a program geared toward regional horticultural requirements. Great Basin College's (GBC) Associate of Science in Agriculture offers animal science, a natural resources emphasis, and rangeland livestock production. GBC partnered with UNR and offers a 2+2 degree option, where students can receive a bachelor's degree after two years of study at GBC and two additional years at UNR.

Reductions to the state's higher education system can negatively impact growth potential in Nevada's agriculture industry. It is recommended that funding become stable for the state's agriculture-related research, education, and outreach programs. These programs can continue partnering with local efforts where appropriate as well as finding alternate sources of funding where available.

Regulations and Taxes

Producers consistently expressed concern over regulations and taxes that negatively impact agricultural operations. Streamlining or improving regulations may allow producers to expand and improve their businesses. Similarly, there remains contention expressed toward the federal government and how it impacts agriculture producers. More than 60 percent of producers surveyed indicated that the federal government costs them the most time and money. Easing these burdens could potentially help agriculture producers expand and become more profitable.

**“If we knew what it was we were doing,
it would not be called research, would it?”**

Albert Einstein

Research



7. Research

Primary and Secondary Research of the Agriculture Cluster Study

The primary research methods for this report were designed to gather information addressing agriculture gaps, challenges, and obstacles pertaining to employment, regulations, government, taxes, and successes that can be expanded or duplicated. Two surveys were administered: one to county officials, and the other to include processors, producers, retailers, manufacturers, and service providers. The primary research included 312 calls to producers and processors gathering information about imports, exports, and future growth. During this phase, phone and face-to-face interviews were conducted throughout the state with agriculture experts to better understand the agriculture industry and the economic impact of various agriculture factors. Additional interviews were conducted with Tom Harris of the University of Nevada, Reno's University Center for Economic Development. John McLain of Resource Concepts, Inc. was also invaluable in providing information about pinyon-juniper as having biomass potential.

The secondary research involved in-depth research from sources, including detailed economic impact analysis by Ekay Economic Consultants. Research focused on the impact of the agriculture cluster by comparing the cluster's performance to other economic sectors in the state and agriculture industries nationally, providing information relevant to future economic development strategies regarding the cluster, and estimating the economic and employment impact of the cluster's operations on Nevada and state regions (Ekay Consultants, 2012). Additional secondary research included a review of economic reports from the University Center for Economic Development and reports and factsheets produced by University of Nevada Cooperative Extension.

Major sources of data used in the secondary research included:

- Nevada Agricultural Statistics 2011; Nevada Department of Agriculture, October 2011
- 2007 Census of Agriculture-State Data; USDA National Agriculture Statistics Service
- Impact Analysis for Planning (IMPLAN) model
- Nevada Governor's Office of Economic Development (GOED). July 2012
- University of Nevada, Cooperative Extension

**“Agriculture not only gives riches to a nation,
but the only riches she can call her own.”**

Samuel Johnson

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Appendices



Appendices – Available upon request from the Northern Nevada Development Authority

APPENDIX A –

- University of Nevada, Reno, Cost and Return
- Cost Summary
- Monthly Cash flow Report

APPENDIX B –

- Michigan State University Business Plan Model

APPENDIX C –

- Berry and Tomato Cost and Return
- Low Cost Construction

APPENDIX D –

- Compendium of Food Clusters, 2009

APPENDIX E –

- The Food Chain Cluster, Integrating the Food Chain in solano and Yolo Counties to Create Economic Opportunity and Jobs