



Chemehuevi Agricultural Strategic Plan



What is the purpose of this plan?

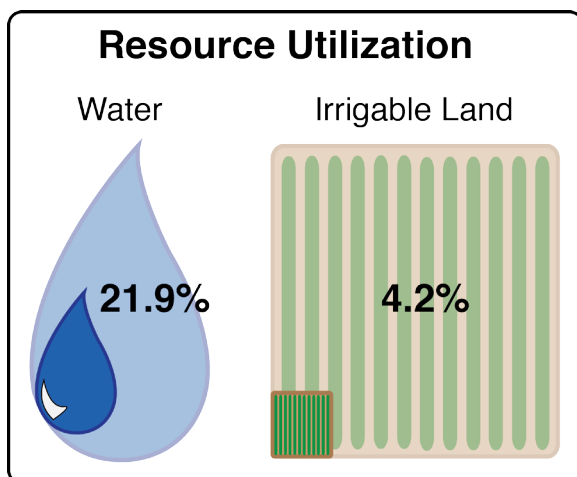
The Chemehuevi Tribe, in partnership with the University of Southern California (USC) Center for Economic Development (CED), is developing a plan to examine the reservation's potential for agriculture as a means for sustainable economic development. This plan identifies strategies to develop an agricultural operation on Chemehuevi land, and offers recommendations to successfully bring the Tribe's products to market. The overall goal of this project is to chart a course for Chemehuevi agriculture that:

- Creates employment opportunities
- Raises tribal revenues
- Diversifies the tribal economy
- Enhances environmental stewardship
- Improves quality of life for all Nuwu

Why agriculture?

The Chemehuevi Reservation encompasses 1,900 acres of practicable irrigable land—land that is suitable for agriculture. Also, the Tribe has 11,400 acre-feet of water rights to the Colorado River and people that are ready and willing to work. Currently, only 80 acres are being farmed and only 2,500 acre-feet of water are being utilized. Additionally, tribal unemployment remains very high.

Agriculture would put the Tribe's valuable (yet significantly underutilized) land, water, and labor resources to more productive use. Farming would create jobs and raise incomes, while providing a source of nutritious, locally-grown food to the Chemehuevi. It would also complement ongoing economic development efforts and expand the Tribe's economic base. More importantly, agriculture would restore Nuwu ties to their land.



How is the plan being developed?

Stage One: Background research on local socioeconomic indicators, market conditions, and agricultural best practices.

Stage Two: Focus group meetings to obtain local knowledge and expertise. Participants included:

- Chemehuevi Tribal Council, and Departments of Agriculture and Environment
- USDA Natural Resources Conservation Service
- University of Arizona Cooperative Extension
- Havasu Landing Resort & Casino and General Store

Stage Three: Identify key findings and offer recommendations for next steps.

The **success of Chemehuevi agriculture** depends on strong tribal support and a willingness to invest in the future. While up-front investments would tax tribal resources, the long-term financial, environmental, and cultural benefits would likely outweigh the short-term costs. Agriculture presents a unique economic development opportunity. By taking **ownership and pride in agriculture** as an enterprise, the Chemehuevi Tribe can make agriculture succeed.

What will this cost?

Cost estimates vary by crop and the size of the operation. To maximize production on the existing 80-acre plot and provide flexibility to scale up operations to 1,500 acres, the up-front cost would be approximately \$3.1 million (includes infrastructure, equipment, and engineering). Additionally, annual operating costs would total \$285,000.

It should be noted these costs would be amortized over the long-term. Government programs and low-interest loans can substantially reduce the Tribe's commitment. Additionally, up-front costs can be significantly reduced by entering into contracts and leasing equipment.

What can be grown?

Anything and year-round. The region's population fluctuates by season, with demand for vegetables in winter and fruits in summer such as watermelon. Alfalfa commands a high price locally due to high demand for cattle feed. There is local demand for everyday staples (lettuce, tomatoes), national demand for "cold crops" (broccoli, cauliflower, dates, nuts), and global demand for seed.

Chemehuevi Agricultural Strategic Plan

What are the plan's key findings?

The USC CED research team has identified eight key findings to guide agricultural development on the Chemehuevi Reservation:

Start Small, Think Big

Demonstrate agriculture's potential and build tribal know-how by fully developing the Tribe's existing 80-acre agricultural plot. The food produced could serve local markets, provide nutrition, and complement the Chemehuevi's health and wellness programs. A successful small operation will help make the case for further investment from the Tribe, government agencies, and private contractors and wholesalers. This plan recommends championing a successful demonstration project through firm financial and political support, including investments in adequate irrigation infrastructure.

Dedicate Portion of Production to Serve Local Markets

Lake Havasu City is the largest regional market and is growing rapidly. Also, the Havasu Landing Resort & Casino, General Store, planned hotel development, and local residents offer a stable source of untapped demand with limited competition. This plan recommends committing 5-10 percent of the Tribe's built-out agricultural land to meet local needs, and establishing relationships with local vendors. It also suggests partnering with the Dreamcatcher Ferry service to more efficiently transport products to Lake Havasu City.

Partner with Wholesalers to Stabilize Production and Revenue

Local growers earn most of their revenue by selling their products to wholesalers. This allows them to focus on what they do best and makes their cash flows more predictable. This plan recommends committing 90-95 percent of the Tribe's built-out agricultural land to wholesale production. The Chemehuevi should limit production to one or two major crops to minimize up-front costs, and establish relationships with wholesalers to begin structuring its long-term agricultural investments.

Consider Contracting and Leasing Arrangements

While the Chemehuevi have the physical resources needed for agriculture, the Tribe will also need to build tribal capacity to be successful. To put its resources to immediate use, the Tribe might consider entering into contracting or leasing agreements. Such an

arrangement would permit a tenant to use tribal land for farming in exchange for lease payments. The tenant would also be responsible for most up-front infrastructure, equipment, and operational costs, reducing the Tribe's financial risk. The Tribe could include a tribal hiring preference in the contract to create jobs and build capacity for the future.

Explore Seed Growing to Capitalize on Geographic Isolation

The Chemehuevi Reservation is geographically isolated, posing challenges for logistics and market access. However, this creates an opportunity for the Tribe to grow seed, which requires isolation to avoid cross-pollination from other farms. The reservation's location and topography give the Chemehuevi a unique competitive advantage in the lucrative, regional and global seed market. This plan recommends establishing relationships with seed contractors to take advantage of this niche.

Integrate Agricultural Plan into an Overall Economic Development Strategy

For agriculture to succeed, it must be championed politically and fully integrated into the Chemehuevi's economic development strategy. The Tribe should set clear agricultural investment commitments and attainable objectives. This plan recommends partnering with other economic development efforts on the reservation to encourage collaborative development and reduce overall costs. Also, it suggests complementing agriculture with other innovative, revenue-producing projects such as biofuel production and aquaculture.

Establish Clear Agricultural Land Use Boundaries

To plan for the future, the Tribe's land use plan should reflect the vision for its built-out agricultural operation. This means agricultural land boundaries should be clearly established and adhered to. Also, this land should be reserved for full-scale, commercial ag-production, and restrict other encroachments.

Consider Leasing Water Rights

Water is gold in the Western U.S. The Tribe's water rights are a valuable resource; however, these rights provide no value if left unused. This plan recommends the Chemehuevi generate revenue from these water rights in the interim by leasing them to other local farmers or municipalities. The Tribe should work with the Bureau of Indian Affairs to ensure leasing agreements provide fair compensation and protect future tribal use.

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Chemehuevi Agricultural Strategic Plan

Final Report

Submitted to

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EXECUTIVE SUMMARY

PROJECT PURPOSE

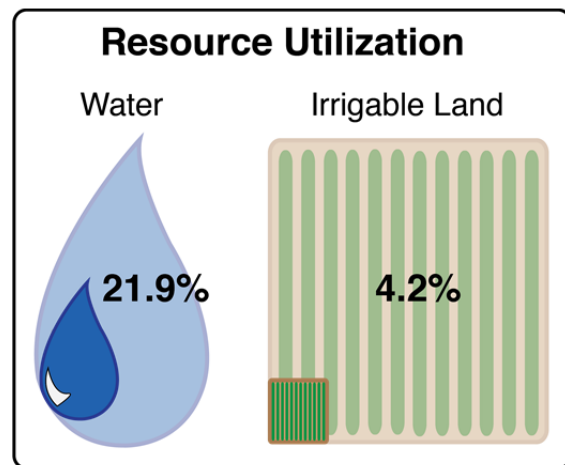
This report examines the potential for agriculture to provide sustained economic development for the Chemehuevi Indian Tribe. Developed in partnership with the University of Southern California (USC) Center for Economic Development (CED), this plan identifies strategies to develop a full-scale agricultural operation on Chemehuevi land and offers recommendations to successfully bring the Tribe's products to market. The overall goal of this report is to chart a course for Chemehuevi agriculture that:

- Creates employment opportunities
- Raises tribal revenues
- Diversifies the tribal economy
- Enhances environmental stewardship
- Improves quality of life for all Nuwu

AGRICULTURE-BASED ECONOMIC DEVELOPMENT

The Chemehuevi Reservation encompasses 1,900 acres of practicable irrigable land—land that is suitable for agriculture. Also, the Tribe has 11,400 acre-feet of water rights to the Colorado River and people that are ready and willing to work. Currently, only 80 acres are being farmed and only 2,500 acre-feet of water are being utilized. Additionally, tribal unemployment remains very high at 38 percent.

Agriculture would put the Tribe's valuable (yet significantly underutilized) land, water, and labor resources to more productive use. Farming would create jobs and raise incomes, while providing a source of nutritious, locally-grown food to the Chemehuevi. It would also complement ongoing economic development efforts and expand the Tribe's economic base. More importantly, agriculture would restore Nuwu ties to their land.



METHODOLOGY

This report was developed in three stages. During stage one, researchers at CED conducted background research on local socioeconomic indicators, market conditions, and agricultural best practices. Through this initial investigation, researchers developed socioeconomic, consumer, industrial, and agricultural sector profiles to better assess the opportunities and challenges for Chemehuevi agriculture.

During stage two, Chemehuevi leadership and the CED research team held focus groups with tribal members, government agricultural support agencies, and local buyers. The intent of these meetings was to obtain local knowledge and expertise to more effectively develop agricultural strategies that reflect local market dynamics. Lastly, stage three involved follow-up research and analysis of information gathered during stages one and two. During this stage, CED researchers coordinated with Chemehuevi leadership to identify key findings and offer recommendations for next steps.

KEY FINDINGS

Working in tandem with Chemehuevi leadership, the CED research team identified nine key findings to guide the agricultural development on the reservation:

1. Start small, think big

Demonstrate agriculture's potential and build tribal know-how by fully developing the Tribe's existing 80-acre agricultural plot. The food produced could serve local markets, provide nutrition, and complement the Chemehuevi's health and wellness programs. A successful small operation will help make the case for further investment from the Tribe, government agencies, and private contractors and wholesalers. This plan recommends championing a successful demonstration project through firm financial and political support, including investments in adequate irrigation infrastructure.

2. Dedicate portion of production to serve local markets

Lake Havasu City is the largest regional market and is growing rapidly. Also, the Havasu Landing Resort & Casino, General Store, planned hotel development, and local residents offer a stable source of untapped demand with limited competition. This plan recommends committing 10-20 percent of the Tribe's built-out agricultural land to meet local needs, and establishing relationships with local vendors. It also suggests partnering with the Dreamcatcher Ferry service to more efficiently transport products to Lake Havasu City.

3. Partner with wholesalers to stabilize production and revenue

Local growers earn most of their revenue by selling their products to wholesalers. This allows them to focus on what they do best and makes their cash flows more predictable. This plan recommends committing 80-90 percent of the Tribe's built-out agricultural land to wholesale production. The Chemehuevi should limit production to one or two major crops to minimize up-front costs, and establish relationships with wholesalers to begin structuring its long-term agricultural investments.

4. Consider contracting and leasing arrangements

While the Chemehuevi have the physical resources needed for agriculture, the Tribe will also need to build tribal capacity to be successful. To put its resources to immediate use, the Tribe might consider entering into contracting or leasing agreements. Such an arrangement would permit a tenant to use tribal land for farming in exchange for lease payments. The tenant would also be responsible for most up-front infrastructure, equipment, and operational costs, reducing the Tribe's financial risk. The Tribe could include a tribal hiring preference in the contract to create jobs and build capacity for the future.

5. Explore seed growing to capitalize on geographic isolation

The Chemehuevi Reservation is geographically isolated, posing challenges for logistics and market access. However, this creates an opportunity for the Tribe to grow seed, which requires isolation to avoid cross-pollination from other farms. The reservation's location and topography give the Chemehuevi a unique competitive advantage in the lucrative, regional and global seed market. This plan recommends establishing relationships with seed contractors to take advantage of this niche.

6. Integrate agricultural plan into an overall economic development strategy

For agriculture to succeed, it must be championed politically and fully integrated into the Chemehuevi's economic development strategy. The Tribe should set clear agricultural investment commitments and attainable objectives. This plan recommends partnering with other economic development efforts on the reservation to encourage collaborative development and reduce overall costs. Also, it suggests complementing agriculture with other innovative, revenue-producing projects such as biofuel production and aquaculture.

7. *Establish clear agricultural land use boundaries*

To plan for the future, the Tribe's land use plan should reflect the vision for its built-out agricultural operation. This means agricultural land boundaries should be clearly established and adhered to. Also, this land should be reserved for full-scale, commercial ag-production, and restrict other encroachments.

8. *Consider leasing water rights*

The Tribe's water rights are a valuable resource; however, these rights provide no value if left unused. This plan recommends the Chemehuevi generate revenue from these water rights in the interim by leasing them to other local farmers or municipalities. The Tribe should work with the Bureau of Indian Affairs to ensure leasing agreements provide fair compensation and protect future tribal use.

9. *Brand "Chemehuevi"*

As part of a larger marketing strategy, it is important to develop brand equity for the "Chemehuevi" by showcasing and selling agricultural products regionally and nationally. Success stories of Indian tribes nationwide can serve as a roadmap and be emulated. A strategy of developing brand equity—"the Chemehuevi"—creates positive spillovers by strengthening existing business on the reservation, brings tourist dollars, and opens new opportunities for investments and partnerships.

COST

Cost estimates vary by crop and the size of the operation. To maximize production on the existing 80-acre plot and provide flexibility to scale up operations to 1,500 acres, the up-front cost would be approximately \$3.1 million (includes infrastructure, equipment, and engineering). Additionally, annual operating costs would total \$287,000.

It should be noted these costs would be amortized over the long-term. Government programs and low-interest loans can substantially reduce the Tribe's commitment. Additionally, entering into contracts and leasing equipment can significantly reduce up-front costs.

CONCLUSION

Agriculture offers a unique and valuable economic development opportunity to the Chemehuevi by more effectively utilizing the Tribe's land, water, and labor resources, generating a sustainable source of revenue, diversifying its economic base, and restoring cultural ties to tribal lands. Additionally, agriculture would enhance the sustainability of the reservation's ecosystem and contribute to the health and wellbeing of the Tribe's members.

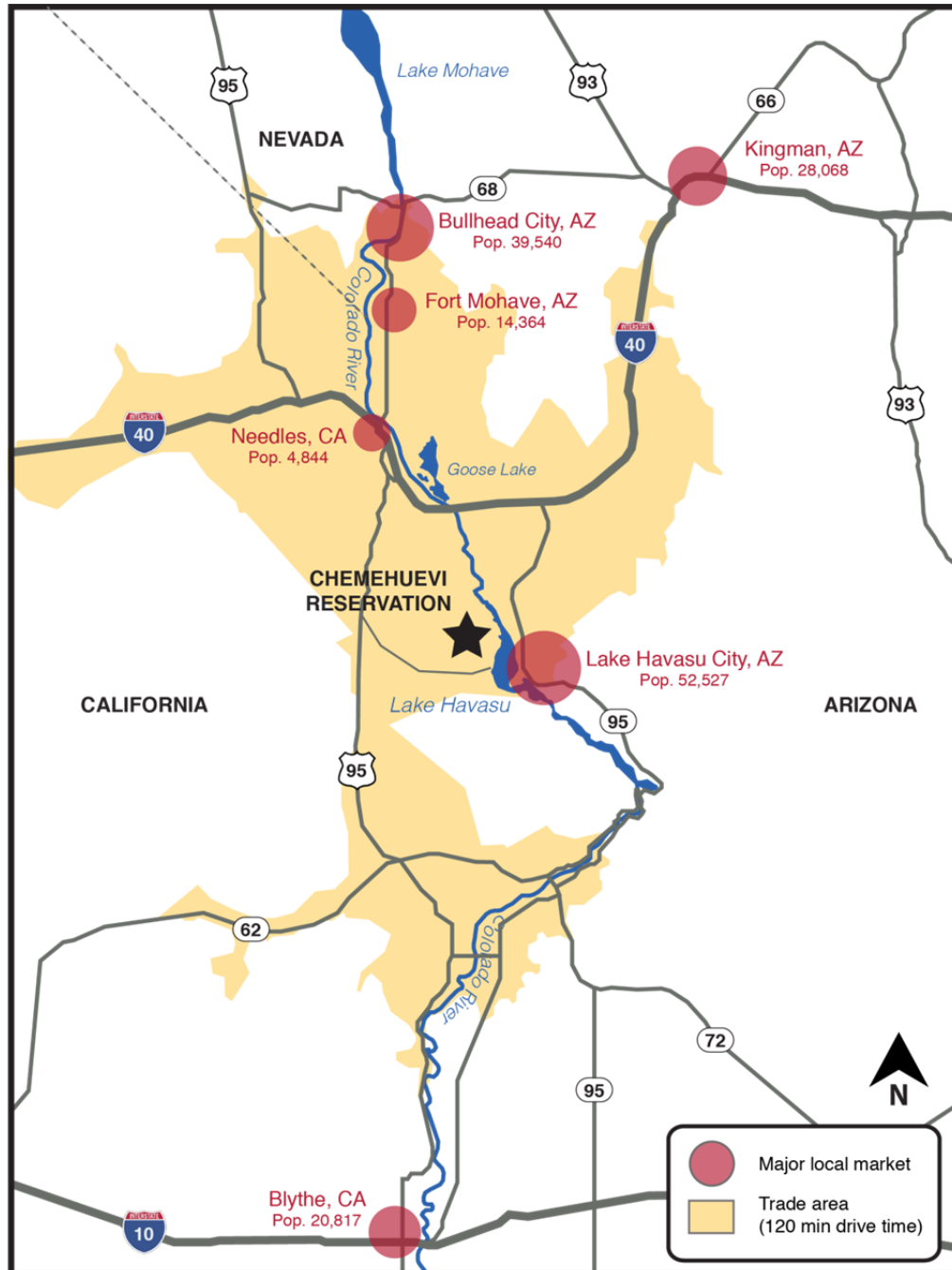
The success of Chemehuevi agriculture depends on strong tribal support and a willingness to invest in the future. While up-front investments would tax tribal resources, the long-term financial, environmental, and cultural benefits would likely outweigh the short-term costs. By taking ownership and pride in agriculture as an enterprise, the Chemehuevi Indian Tribe can make agriculture succeed and improve the quality of life for all Nuwu.

PART ONE: TRADE AREA ASSESSMENT

TRADE AREA

The trade area encompasses all land within a typical two-hour (120-minute) commute from the intersection of Havasu Lake Road and Mills Drive on the Chemehuevi Indian Reservation (149401 Havasu Lake Road, Needles, CA 92363). Located at the tri-state intersection of California, Arizona, and Nevada, the trade area covers portions of five counties: San Bernardino and Riverside Counties in California, Mojave and La Paz Counties in Arizona, and Clark County in Nevada.

Figure 1.1: Trade Area Map with Major Local Markets



The trade area’s ecology is predominantly arid desert with agricultural opportunities concentrated along the Colorado River. Major bodies of water include Lake Havasu and Goose Lake, and the Colorado River runs north-south shaping the California-Arizona border. Mountains flank the trade area and topography varies considerably throughout the region. The Mohave and Chemehuevi Mountains are located adjacent to Lake Havasu City and the Chemehuevi Reservation, respectively. Additionally, the trade area encompasses the Havasu National Wildlife Refuge and the southeastern portion of the Mojave National Preserve, as well as several state parks and nature preserves.

Climate

The Chemehuevi Reservation is located in a climate zone that is amenable to growing many different types of crops throughout the year. These crops include both cool crops and warm crops, with ideal average temperatures of 55-75F and 65-95F, respectively (California Garden Web, 2013). Table 1.1 below shows the average monthly temperatures of the Lake Havasu City area (Western Regional Climate Center, 2013):

Table 1.1: Average Monthly Temperatures – Lake Havasu City

Temp (F)	Period of Record	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
LAKE HAVASU	1967-1991	52.9	58	64.9	73.2	81.8	91.6	96.6	94.8	87.8	76	62.4	53.7	74.5
LAKE HAVASU CITY	1991-2010	55.5	59.3	65.8	73.2	83.2	91.7	98.3	97.2	90.2	76.6	63.5	54	75.7

The University of California’s California Garden Web (2013) lists numerous crops that could be grown in this largely frost-free environment. They include:

- *Cold crops:* root crops such as beets, carrots, parsnip, radish and turnips; stems such as asparagus and white potato; leafy crops such as cabbage, celery, lettuce, onion, and spinach and plants with immature flower parts such as broccoli, cauliflower, and globe artichokes
- *Warm crops:* tomatoes, cantaloupe, winter squash, watermelon, corn, squash, and snap beans

For additional information on potential vegetable crops that could grow in the trade area, along with recommended planting dates, planting requirements, and storage conditions, please consult *Appendix C: California Master Gardener Handbook – Vegetable Gardening at a Glance* (2013).

Major Markets

Within the trade area’s two-hour driving radius, there are five markets with populations greater than 10,000 people: Lake Havasu City (52,527), Bullhead City (39,540), Kingman (28,068), Blythe (20,817), and Fort Mohave (14,364) (U.S. Census Bureau, Interactive Population Map, 2010) (Google Maps, 2012).

Table 1.2: Major Trade Area Markets (more than 10,000 people)

Place	2010 Population	Drive Time from Reservation
Lake Havasu City, AZ	52,527	1:32
Bullhead City, AZ	39,540	1:32
Kingman, AZ	28,068	1:43
Blythe, CA	20,817	1:57
Fort Mohave, AZ	14,364	1:18

Transportation

The Chemehuevi Indian Reservation is situated between two east-west interstate highways: I-40 to the north and I-10 to the south. These interstates provide access to regional and national markets. U.S. Highway 95 lies east of the reservation and runs north-south connecting I-40 and I-10. U.S. 95 is a major connector for goods being shipped overland to and from the reservation, providing access to the five major trade area markets. Average annual daily traffic (AADT) counts on U.S. 95 are higher in the north part of the trade area than in the south, ranging from 4,150 daily automobiles at U.S. 95/Route 62 to 10,800 daily automobiles at U.S. 95/I-40. These are not considered high-traffic volumes (i.e., greater than 50,000 AADT) (Federal Highway Administration, 2012), and recent trends have shown very modest increases in traffic on these routes (Chemehuevi, 2012).

Havasus Lake Road is the main local route from the reservation to U.S. 95. It connects the Havasu Landing Resort and Casino, the Chemehuevi Valley Airport, and the Tribe's Dreamcatcher ferry service to Lake Havasu City.

Two main state routes serve the trade area: California Route 62 and Arizona Route 95. California 62 runs east-west to the south of the reservation, crossing the Colorado River near Parker to connect with Arizona 95. Arizona 95 runs north-south connecting Bullhead City, Fort Mohave, Lake Havasu City, Parker and Quartzite. It crosses I-40, I-10 and California 62, providing linkages to U.S. 95 and the Chemehuevi Indian Reservation. Arizona 95 also intersects the Dreamcatcher's berth in Lake Havasu City, providing a multi-modal connection (Google Maps, 2012). Traffic counts on Arizona 95 reach 26,000 AADT within Lake Havasu City (Chemehuevi, 2012)—around half the volume considered "high-traffic."

Seven bridges cross the Colorado River in the trade area: California 163 (Laughlin Highway) in Laughlin, Aztec Road in Fort Mohave, Harbor Avenue between Needles and Fort Mohave, I-40 south of Needles, Arizona 95 in Parker, Agnes Wilson Road south of Parker, and I-10 near Blythe (Google Maps, 2012).

Although the reservation is connected to major trade area markets by well-maintained, low-volume state and federal routes, it is relatively isolated geographically. By automobile, the nearest major market—Fort Mohave—is 50 miles away and takes nearly 80 minutes of drive time. Lake Havasu City, despite being a 12-minute ferry ride from the reservation, requires 90 minutes of drive time (Google Maps, 2012).

There are several airports in the trade area, including Chemehuevi Valley Airport on the reservation, Lake Havasu City Airport, Eagle Airpark north of Needles, Avi Suquilla Airport in Parker, Kingman Airport and Laughlin-Bullhead International Airports. These airports are modest, one-runway operations. The two nearest airports—Chemehuevi Valley and Lake Havasu City—see between 6,000 to 8,000 operations each year. Much of the traffic comes from people traveling in private aircraft to and from their nearby vacation homes. Laughlin-Bullhead International estimates annual operations of 5,200 in 2012, corresponding to slightly more than 131,100 passenger enplanements (Laughlin-Bullhead International Airport, 2008). To accommodate projected increases in population and demand for passenger air service, Laughlin-Bullhead International is renovating and expanding its facilities (Kanable, 2012).

The Chemehuevi Tribe owns and operates the Dreamcatcher ferry service, which runs 17 daily roundtrip operations (19 on the weekends) from Havasu Landing on the reservation to London Bridge in Lake Havasu City. It costs \$2.00 for a round-trip ticket, has a capacity of 150 people, and takes 12 minutes to cross the lake (Havasus Landing, 2013).

SOCIOECONOMIC PROFILE

A Note on the Data

Unless otherwise noted, the data in this report refer to the two-hour drive time trade area. In some cases, this report expands the trade area to include Census-designated places whose borders expand outside the two-hour trade area. For example, some parts of Kingman City are located within the two-hour trade area, while other parts are not. For certain analyses, this report includes entire Census-designated places rather than just a fraction of them. In these instances, the text indicates the data's geographical range.

This strategic plan uses aggregate data from the five counties (referred to as "five-county region"), as well as national data, as baselines for comparison.

Population

There have been considerable increases in regional population during the past decade, and this growth is expected to continue in the trade area during the next five years. Generally speaking, continued population growth will help sustain and augment regional demand for agricultural products.

Between 2000 and 2010, the total trade area population increased 25.5 percent from 103,903 to 130,362. This compares to a five-county regional growth rate of 33.1 percent and national growth rate of 9.7 percent during the same period (U.S. Census Bureau, DP-1, 2000 and 2010). Projections indicate that trade area population will continue to grow at an annual rate of 0.88 percent through 2015, reaching a total of 136,169 people (Esri, Market Profile, 2012).

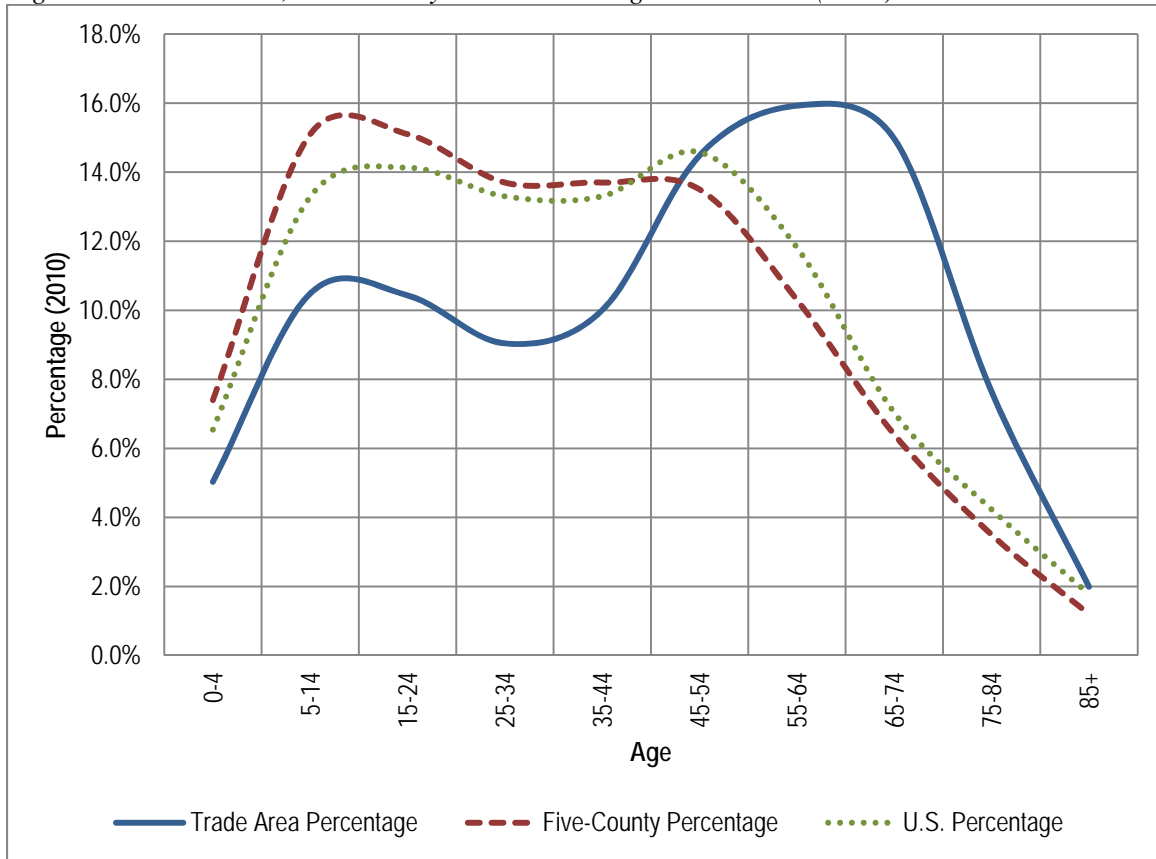
Age

The trade area's age profile skews older than the five-county region and the nation. In the trade area, the percentage of individuals 55 and older is 19.1 percent higher than the five-county region and 15.6 percent higher than the U.S. (U.S. Census Bureau, DP-1, 2010). Projections indicate that the proportion of individuals 55 and older in the trade area will grow relative to its total population, increasing from 40.5 percent in 2010 to 44.5 percent in 2016 (Esri, Demographic and Income Profile, 2012).

Table 1.3: Trade Area, Five-County and National Median Age (2010)

2010	Median Age	Percent 55 and Older
Trade Area	48.7	40.5%
Five-County Region	40.5	21.4%
United States	37.2	24.9%

Figure 1.2: Trade Area, Five-County and National Age Distribution (2010)



Race and Ethnicity

Generally speaking, the trade area is whiter, more Native American, less Black, and less Asian than the nation and the five-county region. Indexed to the U.S. and five-county percentages, the differentials in the trade area are striking (U.S. Census Bureau, Overview of Race and Hispanic Origin, 2010):

- Black's account for a 1.1 percent share of the trade area population, significantly below the five-county share of 8.3 percent and national share of 12.6 percent.
- The share of American Indian's in the trade area is more than four times the national and 3.5 times the five-county share.
- Asian's account for a 1.1 percent share of the trade area population, significantly below the five-county share of 6.7 percent and national share of 4.8 percent.
- The share of Hispanic's in the trade area is 66 percent higher than the national share, but well below the five-county share.

Table 1.4: Trade Area, Five-County and National Race and Ethnicity Composition (2010)

Race / Hispanic Ethnicity (2010)	Trade Area	Five-County Region	Index (Five-County = 1.00)	United States	Index (U.S. = 1.00)
White (alone)	82.4%	60.4%	1.36	72.4%	1.14
Black (alone)	1.1%	8.3%	0.14	12.6%	0.09
American Indian (alone)	3.8%	1.1%	3.46	0.9%	4.00
Asian (alone)	1.1%	6.7%	0.16	4.8%	0.22
Pacific Islander (alone)	0.1%	0.4%	0.36	0.2%	0.82
Other race (alone)	8.2%	18.2%	0.45	6.2%	1.32
Two or more races	3.3%	4.9%	0.67	2.9%	1.13
TOTAL	100.0%	100.0%	1.00	100.0%	1.00
Hispanic Origin (any race)	19.0%	40.6%	0.47	11.4%	1.66

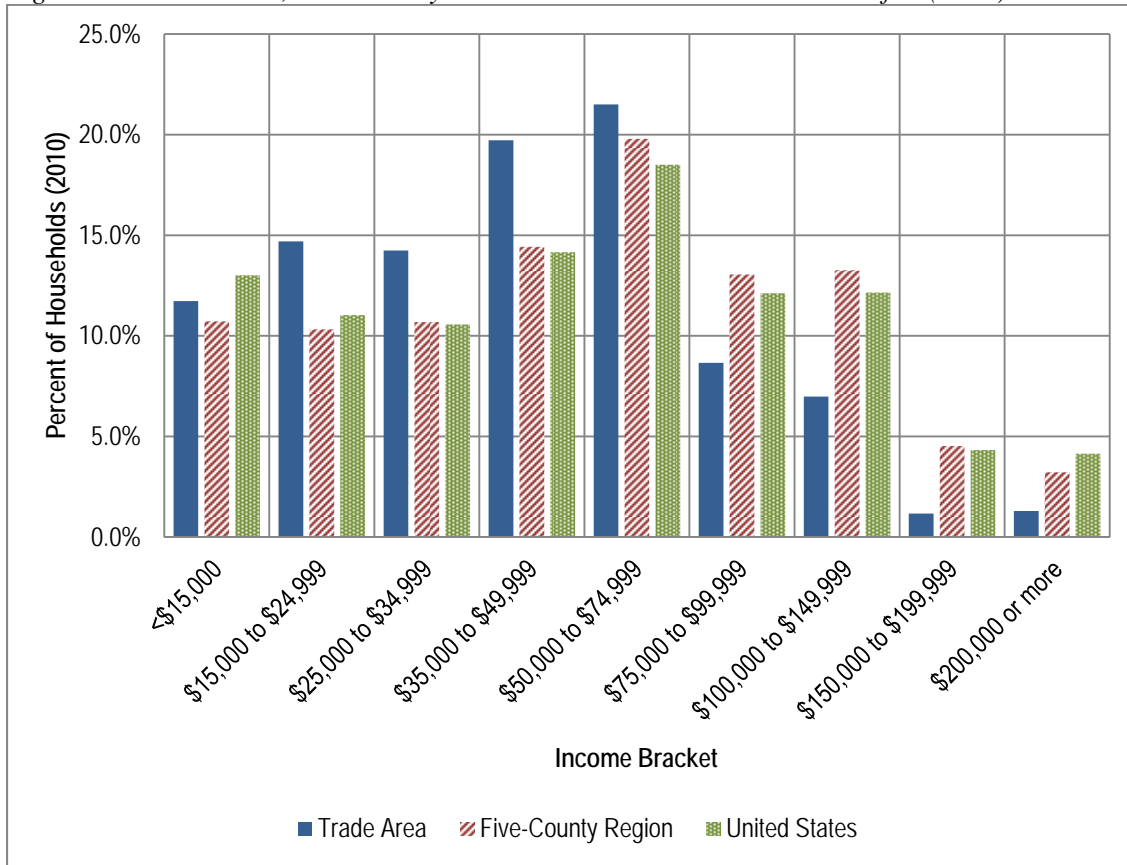
Projections indicate that race and ethnic composition in the trade area will remain fairly stable through 2016. The largest projected changes will be a 1.8 percent decrease in the proportion of Whites and a 2.4 percent increase in the proportion of Hispanics. It should be noted that this does not represent a decrease in the amount of Whites in the trade area; populations of all races will increase in number through 2016 (Esri, Demographic and Income Profile, 2012).

Income and Poverty

Between 2000 and 2010, household income rose substantially in the trade area, and this trend is expected to continue through 2015. The amount of households in the bottom income brackets is decreasing, while the amount of households in the upper income brackets is increasing rapidly. As people have moved to the trade area in increasing numbers, the amount of households and the average household income have increased (Esri, Detailed Income Profile, 2012).

Despite increasing household incomes, households in the trade area earn less income relative to the five-county region and the United States as a whole. *Figure 1.3* illustrates that in 2010, trade area households clustered in the bottom income brackets in higher proportions than five-county regional and national households. Nearly 82 percent of trade area households earned less than \$75,000 per year in 2010, compared to 66 percent regionally and 67 percent nationally (U.S. Census Bureau, DP-3, 2010). If household incomes continue to rise as they have in recent years, the income gap between trade area households and regional and national households will gradually diminish.

Figure 1.3: Trade Area, Five-County and National Household Income Profile (2010)



Interestingly, the percentage of people living below the poverty line is lower in the trade area than it is regionally and nationally. In 2010, the trade area poverty rate was 13.5 percent, while the five-county regional and U.S. poverty rates were 14.7 percent and 14.4 percent, respectively (U.S. Census Bureau, DP-3, 2010). This can be partially attributed to lower overall costs of living, which the U.S. Census Bureau accounts for when determining local poverty levels. In other words, since the trade area has a lower cost of living relative to the five-county region and the nation, trade area incomes—despite being lower—have more purchasing power and fewer households falling below the poverty line.

Table 1.5: Trade Area, Five-County and National Poverty Rates (2010)

Trade Area	Five-County Weighted Average	United States
13.5%	14.7%	14.4%

Unemployment

In 2010, the trade area’s unemployment rate was 11.3 percent, compared to 12.9 percent in the five-county region and 8.9 percent nationally (U.S. Census Bureau, DP-3, 2010). Unemployment rates will likely fall—albeit gradually—as the United States recovers from the post-2007 recession. By 2015, the trade area’s unemployment rate is expected to drop to 9.2 percent (Esri, Market Profile, 2012). Despite an improving economy, the Chemehuevi Reservation exhibits an unemployment rate of 38 percent, more than four times higher than the national unemployment rate (Chemehuevi, 2013).

Table 1.6: Trade Area, Five-County and National Unemployment Rates (2010)

Trade Area	Five-County Weighted Average	United States
11.3%	12.7%	8.9%

Housing

Compared to the five-county region and the nation, the trade area has highly seasonal variations in housing occupancy. In 2010, the trade area had a 21.6 percent vacancy rate for “seasonal, recreational, or occasional use” housing units, while the five-county region and nation showed 5.2 percent and 3.5 percent rates, respectively (U.S. Census Bureau, DP-1, 2010). This reflects the seasonality of the area, which attracts “Snowbirds” during winter months and college students during Spring Break. Visitors and tourists flock to the trade area to enjoy the region’s pleasant winter weather and natural amenities like Lake Havasu. Opportunities for outdoor recreation and the area’s unique geography also attract many visitors year-round (Chemehuevi, 2012).

Table 1.7: Trade Area, Five-County and National “Seasonal, Recreational or Occasional Use” Vacancy Rates (2010)

Trade Area	Five-County Weighted Average	United States
21.6%	5.2%	3.5%

Trade area households tend to be smaller than regional and national households, reflecting the area’s high concentration of older individuals whose children no longer live with them. The average family size in the trade area is 2.8, while the five-county region and United States have averages of 3.14 and 3.48, respectively. Similarly, households in the trade area average 2.3 people, while the region averages 3.0 people and the nation averages 2.6 people (U.S. Census Bureau, DP-1, 2010).

CONSUMER PROFILE

Households in the trade area spend the majority of their money on housing, transportation and food, accounting for 65.9 percent of total expenditures. The percentage of income households allocate to housing and transportation is slightly higher than the national average, while food expenditures are one percentage point lower (Bureau of Labor Statistics, 2011).

Table 1.8: Top Three Trade Area Household Spending Categories (2010)

Item	Trade Area	United States
Housing	35.5%	34.4%
Transportation	18.7%	16.0%
Food	11.7%	12.7%

Trade area households spend 11.7 percent of their income on food—7.0 percent on food at home and 4.7 percent on food away from home (Esri, Household Budget Expenditures, 2012). Additionally, 87.5 percent of adults (88,105 individuals) purchase fresh fruit or vegetables and 52.4 percent (52,808 individuals) purchase fish or seafood during any given six-month period. These percentages are consistent with national purchasing patterns (Esri, Retail Market Potential, 2012). In 2010, each trade area household spent an average of \$3,445 on food at home and \$2,353 on food away from home (Esri, Market

Profile, 2012). These values are below national averages, although this difference can likely be attributed to lower food prices in the trade area.

Based on Esri’s Tapestry Segmentation system, nearly 80 percent of the trade area’s population falls within five segments: Senior Sun Seekers (37.8), Rural Resort Dwellers (18.2), Midlife Junction (9.4), Crossroads (6.9) and Midland Crowd (5.1). These percentages are all above the U.S. average, with the proportion of Senior Sun Seekers and Rural Resort Dwellers substantially higher in the trade area than nationally (Esri, Tapestry Segmentation Area Profile, 2012).

Table 1.9: Top Five Trade Area Tapestry Segments

Tapestry Segment	Trade Area (%)	United States (%)	Index (U.S. = 1.00)	Characteristics
Senior Sun Seekers	37.8%	1.1%	34.4	<ul style="list-style-type: none"> • Median age is 53.6 years; many are retired • Relocated to warmer areas or are “snowbirds” • High proportion of seasonal housing
Rural Resort Dwellers	18.2%	1.7%	10.7	<ul style="list-style-type: none"> • Median age is 47.6 years; more than half are aged 55 and older • Live modestly and have simple tastes • High percentage of seasonal housing; 16 times the U.S. average
Midlife Junction	9.4%	2.6%	3.6	<ul style="list-style-type: none"> • Median age is 41.8 years; most are still working • Live quiet, settled lives as they move away from child-rearing into retirement; careful spenders
Crossroads	6.9%	1.4%	4.9	<ul style="list-style-type: none"> • Median age is 32.2 years; nearly half are younger than 45 • Priorities are their families and their cars • Home ownership is 73 percent; more than half live in mobile homes
Midland Crowd	5.1%	3.2%	1.6	<ul style="list-style-type: none"> • Median age is 37.2 (consistent with the U.S. average) • Rural location and traditional lifestyle • Home ownership is 81 percent; two-thirds is single-family housing

Generally speaking, individuals in the trade area’s top five tapestry segments live simple, traditional lifestyles, and are modest with their expenses. Their incomes tend to be below the national average, they are predominantly white, and they live mostly in single-family homes. The top three segments, making up more than 65 percent of the trade area population, skew older and are nearing retirement age. Among the top two segments—which represent 54 percent of the population—there is a high percentage of seasonal housing indicating high variability in seasonal occupancy rates (Esri, Tapestry Segmentation Reference Guide, 2012).

BUSINESS AND INDUSTRY PROFILE

Compared to five-county and national averages, the trade area is characterized by robust “arts, entertainment and recreation,” “educational services,” “utilities,” “real estate, rental and leasing,” and “construction” industries (U.S. Census Bureau, Nation/County Business Patterns, 2010) (Esri, Business Summary, 2012). Its strength in arts, entertainment and recreation is attributable to a strong service economy that supports seasonal tourist influx. Strong construction and real estate industries are indicative of the area’s recent growth, as well as rental turnover from tourist seasons.

Conversely, the trade area is comparably weak in the “professional, scientific and technical services,” “management of companies and enterprises,” “manufacturing,” “wholesale trade,” and “finance and insurance” sectors. This reflects the trade area’s orientation toward a seasonal, service-based economy. In addition, educational attainment in the trade area is lower than national levels (U.S. Census Bureau, S1501, 2010) (Esri, Population Summary, 2012), suggesting a smaller workforce available to perform technical and management services.

The trade area is relatively consistent with regional and national averages for the “agriculture, forestry, fishing and hunting” sector, making up 0.4 percent of local industry (U.S. Census Bureau, Nation/County Business Patterns, 2010) (Esri, Business Summary, 2012). In 2010, there were 24 businesses operating in this sector, employing 146 individuals.

ANALYSIS: SOCIOECONOMIC, CONSUMER, AND BUSINESS PROFILES

The trade area’s socioeconomic and industrial trends provide support for an agriculture-based economic development initiative on the Chemehuevi Reservation. The strongest demographic indicators are the area’s rapid population growth and business expansion. Continued population influx in Lake Havasu City, coupled with limited competition for local agricultural producers, gives the Tribe an opportunity to take advantage of burgeoning demand for food products.

Area residents’ relatively low incomes and modest spending habits further support the presence of a local producer that is capable of supplying agricultural products at reasonable prices. The reservation’s proximity to Lake Havasu City and on-reservation buyers gives the Chemehuevi a distinct logistical advantage over its competition by requiring lower transportation, time, and storage costs.

Furthermore, seasonal demographic variations offer an opportunity for the Tribe’s agricultural operation to serve increased consumer demand during the winter and spring months. As a local producer, the Chemehuevi can quickly adapt to local, seasonal demand and capitalize on the influx of “Snowbirds” and Spring Breakers. The trade area’s climate is amenable to nearly all types of crops, providing the Chemehuevi the capability and flexibility to grow products with the best return and highest demand.

Lastly, with high unemployment rates on the reservation, agriculture affords an opportunity to put people to work while contributing to the tribal economy.

AGRICULTURAL SNAPSHOT OF THE FIVE-COUNTY REGION

This section provides a brief snapshot of agricultural operations in the five-county region drawing on data from the U.S. Department of Agriculture’s 2002 and 2007 Census of Agriculture (most recent data). Sales and expenditure projections for the Chemehuevi’s agricultural operation may vary from these figures due to the reservation’s relative isolation and the Tribe’s choice of crops and production methods. However, these figures do offer an overview of the agricultural trends affecting the region and direction to guide the development of the Tribe’s agricultural strategy.

Agricultural Operations

- Between 2002 and 2007, the number of *farm operations* increased 6.4 percent from 5,164 to 5,494 operations.
 - All counties experienced growth during this period except for Clark County, NV.
 - Mohave County, AZ grew the most in percentage terms, increasing 39.7 percent from 239 to 334 operations.
 - In 2007, Riverside County, CA had the greatest amount of farm operations with 3,463 operations. San Bernardino County, CA and Mohave County, AZ had 1,405 and 334 operations, respectively.
- Between 2002 and 2007, the number of *acres operated* decreased 6.8 percent from 1,947,595 to 1,815,760 acres.
 - *Median farm size* (weighted) decreased from 12 acres per operation to nine between 2002 and 2007.
 - *Mean farm size* (weighted) declined from 420 acres per operation to 330.
 - In 2007, Mohave County, AZ had the greatest amount of *acres operated* at 859,392 acres. San Bernardino County, CA and Riverside County, CA had 514,234 and 354,753 acres, respectively.
- The growth in farm operations between 2002 and 2007 centered on the addition of small operators.
- In 2007, there were 210 *organic farm operations* occupying 5,268 acres. Riverside County, CA had the most with 166 operations (3,272 acres), followed by San Bernardino County, CA with 34 operations (553 acres).
 - La Paz County, AZ's six organic farm operations comprise 1,435 acres.
 - In 2007, the region had \$22,725,000 in organic commodity sales.
- Between 2002 and 2007, *commodity sales per operation* (weighted) increased 3.4 percent from \$338,060 to \$349,685.
 - In 2007, La Paz County, AZ experienced the greatest commodity sales per operation in the five-county region at \$1,379,731. Clark County, NV had the lowest at \$53,060, followed closely by Mohave County, AZ at \$55,783.
 - In 2007, total commodity sales in the five-county region were \$1.9 billion.
- Between 2002 and 2007, *net income per operation* (weighted) increased 23.7 percent from \$68,460 to \$84,658.
 - In 2007, La Paz County, AZ experienced the greatest net income per operation in the five-county region at \$308,532. Mohave County, AZ had the lowest at \$3,148.
 - In 2007, total net income in the five-county region was \$465.1 million.
- Between 2002 and 2007, *contract labor expenses* incurred increased 31.1 percent from \$78.6 million to \$103.1 million.
 - During the same period, *hired labor expenses* incurred decreased 4.8 percent from \$265.2 million to \$252.4 million.
 - All counties experienced decreases in the amount of operations with contract labor expenses.
 - San Bernardino County, CA, Mohave County, AZ, and Clark County, AZ experienced decreases in the amount of operations with hired labor expenses, while Riverside County, CA and La Paz County, CA experienced an increase.

Land Use for Top Local Crops

- 1) Forage (land used for all hay and haylage, grass silage, and greenchop) – 149,740 acres
- 2) Vegetables harvested for sale – 40,972 acres
- 3) Cotton, all – 26,755 acres
- 4) Grapes – 13,664 acres

- 5) Avocados – 9,338 acres
- 6) Wheat for grain, all – 6,363 acres
- 7) Corn for silage – 2,705 acres
- 8) Oranges, all – 2,429 acres
- 9) Cabbage, Chinese – 1,410 acres
- 10) Pecans, all – 37 acres

Agricultural Workforce

- Farm labor contractors (FLCs) hire most farm workers, meaning most seasonal and temporary farm workers in California are not employed directly by farm operations, but instead by contractors who operate agricultural service firms (State of California, 2008).
 - Typically, the contractors are directly liable for complying with labor regulations.
- More than half (52.1 percent) of California’s agricultural workforce is classified as “foreign-born, not a U.S. citizen,” compared to less than one-fifth the non-agricultural workforce (State of California, 2008).
 - Agricultural sector depends on low-wage, immigrant labor.
 - Agricultural sector was hit hardest by increased border enforcement, immigration controls, and minimum wage hikes.
- In 2008, 61.8 percent of California’s agricultural workers earned \$10 per hour or less (State of California, 2008).
 - 31.6 percent earned the minimum wage of \$8 per hour or less
 - 23.8 percent earned between \$10.01 and \$15 per hour; 14.4 percent earned more than \$15 per hour

San Bernardino County 2012 Crop Report

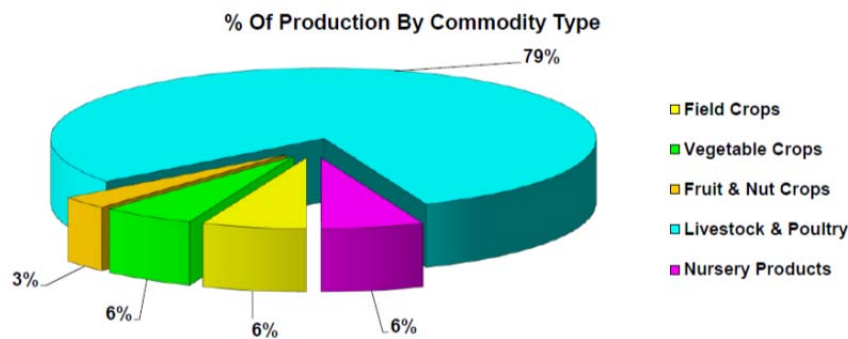
The County of San Bernardino’s 2012 Crop Report corroborates the findings listed above from the US Agricultural Census. In particular, it notes that alfalfa is the crop with the greatest amount of planted acreage. In the North Desert Region of the County (where the Chemehuevi Reservation is located), field crops accounted for nearly one million acres and \$16 million in 2012. This amounted to 77 percent of the County’s total planted acreage for field crops; however, it accounted for 55 percent of the total production value for field crops (County of San Bernardino, 2012). This suggests that field crop growers in the North Desert region command lower prices for their products than do their counterparts elsewhere in the County.

Even more striking, the North Desert’s planted acreage comprised 77 percent of the County’s total planted acreage, but only accounted for 12 percent of the County’s total production value. This may imply that there is an untapped market for higher value and/or value-added crops in the North Desert Region, including vegetable, fruit, and nut crops. In the North Desert, fruits and nuts brought in \$1.1 million on 900 acres and vegetables provided \$600 thousand on 58 acres in 2012 (County of San Bernardino, 2012). Vegetable crops were the only North Desert crops that exhibited higher values than their planted acreage (2 percent of total County value on 1 percent of total County planted acreage), suggesting that vegetable crops may offer a more lucrative option to North Desert farmers than field crops.

Table 1.10: San Bernardino 2012 Crop Report – County and North Desert Commodities

Commodity Group	San Bernardino County		North Desert		North Desert (% Share)	
	2012 Acreage	2012 \$ Value	2012 Acreage	2012 \$ Value	2012 Acreage	2012 \$ Value
Field Crops	1,396,912	28,825,100	1,080,269	15,911,700	77%	55%
Vegetable Crops	5,111	25,721,100	58	594,100	1%	2%
Fruit and Nut Crops	4,443	13,590,600	900	1,122,100	20%	8%
Livestock and Poultry		370,029,900		38,285,300		10%
Nursery Products	1,147	28,335,800	200	1,300,000	17%	5%
Total	1,407,613	466,502,500	1,081,427	57,213,200	77%	12%

The Crop Report’s Top Ten Products by production value also corroborate the Census of Agriculture’s top local crops by land use. While animal products make up the County’s top three products in terms of sales, alfalfa had the fourth highest production value, Bok Choi (Chinese cabbage) the fifth, and oranges the ninth (County of San Bernardino, 2012).



Top Ten Products					
2012 Rank	Product	Value	% of Total	2011 Rank	
1	Milk	\$ 264,611,600	56.7%	1	
2	Eggs	\$ 42,972,500	9.2%	2	
3	Cattle & Calves (Meat)	\$ 39,761,800	8.5%	3	
4	Alfalfa, All	\$ 20,795,400	4.5%	4	
5	Bok Choi	\$ 11,866,100	2.5%	7	
6	Replacement Heifers	\$ 10,277,100	2.2%	6	
7	Trees and Shrubs	\$ 8,734,800	1.9%	5	
8	Indoor Decoratives	\$ 7,027,800	1.5%	9	
9	Oranges	\$ 6,210,100	1.3%	8	
10	Turf	\$ 5,394,000	1.2%	10	
	Total Top Ten	\$ 417,651,200	89.5%		

Oranges includes both navel and valencia oranges.

Source: County of San Bernardino Department of Agriculture/Weights and Measures

For more information on the 2012 Crop Report, please see *Appendix D: County of San Bernardino 2012 Crop Report*.

ANALYSIS: AGRICULTURAL SNAPSHOT

Interestingly, while the amount of regional operators increased during this period, the number of acres harvested decreased. This implies the addition of smaller producers, while larger operators either reduced the size of their operations or stopped operating entirely. Additionally, regional producers overall experienced increases in sales and income. These increases likely reflect the increase in local population, as more operators have stepped in to satisfy enhanced local demand and revenues have subsequently increased. These trends bode well for the Chemehuevi’s agricultural operation, which is ideally situated to take advantage of population inflows in and around Lake Havasu City.

The majority of the region’s agricultural land use is reserved for growing forage crops, particularly alfalfa. This provides support for the Tribe’s initial efforts to harvest alfalfa, although it also may imply

an opportunity for the Tribe to differentiate its crop mix from other local producers and carve out its own niche market. This could include focusing on serving local populations on the reservation and in Lake Havasu City, as well as growing seed (both are discussed below in *Part Three: Key Findings and Next Steps*).

Lastly, while farm labor costs increased during this period, wages remain relatively low. Agriculture provides the Chemehuevi an opportunity to put its members to work and address its high unemployment rate. While these individuals would be working for a relatively modest wage, they would be contributing to the tribal economy and earning money that could be reinvested locally.

PART TWO: FOCUS GROUP FINDINGS

This section details findings from focus groups convened on March 13 and 14, 2013. The purpose of these meetings was to solicit local knowledge and expertise to help the research team tailor recommendations to the context of the Chemehuevi Reservation's environment. USC CED held face-to-face meetings with three disparate constituent groups:

- Meeting One (March 13): Government Agencies and Agricultural Support Services
- Meeting Two (March 14): Chemehuevi Agricultural and Environmental Leadership
- Meeting Three (March 14): Local Purchasers

Please see *Appendix B* for a detailed log of focus group discussion.

COMPETITIVE ADVANTAGES

The Chemehuevi Reservation's geographic and climatic conditions offer the Tribe advantages over agricultural competitors elsewhere regionally and nationally. These advantages are outlined below:

- Climate facilitates year-round cultivation and production
- Limited local competition and captive markets provide sustained and growing demand
- Proximity to major transportation corridors provides regional, national, and international linkages
- Geographic isolation supports seed production and reduces risk of cross-pollination
- Environment supports most crop varieties
- Abundance of land (1,900 practicable irrigable acres)
- Access to Colorado River water rights (11,400 acre-feet)
- Labor availability

OPPORTUNITIES FOR LOCAL AGRICULTURE

Focus groups viewed agriculture as highly advantageous for the Chemehuevi Tribe. These opportunities are highlighted below:

- Secures Tribe's water rights
- Develops sustainable source of revenue
- Diversifies Tribe's economic base
- Creates local jobs
- Improves tribal health and wellbeing
- Provides source of sustenance
- Reclaims desert for productive use
- Synergizes with Tribe's economic, environmental, and social initiatives

CHALLENGES FOR LOCAL AGRICULTURE

Participants mostly noted challenges experienced by agricultural operators generally, including climate and market risks. Participants also identified workforce availability and motivation as a potential concern. Securing adequate funding from the Tribe, government support services, and third parties remains the greatest obstacle to scaling up the Chemehuevi Reservation's agricultural operations.

Some participants expressed concern about entrenched competition and saturated agricultural markets near the I-10 and I-40 corridors. Lastly, the Chemehuevi Realty and Planning Department representative cited a USDA soil analysis indicating the Tribe's agriculturally-zoned land was categorized as Class III soil. According to the USDA Natural Resources Conservation Service (NRCS), Class III soils "have severe limitations that reduce the choice of plants or require special conservation practices, or both" (NRCS, 2013).

MAJOR MARKETS

Focus groups corroborated the major markets identified in the Trade Area Assessment (i.e., Lake Havasu City, Bullhead City, Kingman, Blythe, Fort Mohave, and Needles). They noted robust local demand from the Havasu Landing Resort & Casino, Sail Inn Restaurant & Bar, and the reservation's general store, as well as Lake Havasu City's burgeoning population and seasonal visitors.

Beyond the trade area, major markets include Laughlin, Las Vegas, San Bernardino, Los Angeles, and San Diego. In particular, participants viewed Las Vegas casinos as major purchasers. Additionally, they identified national and international markets as both attainable and lucrative outlets for Chemehuevi agricultural products. During the winter, the tri-state region (Arizona, California, and Nevada) produces the majority of vegetables in the U.S., attesting to the national reach of local producers.

SALES CHANNELS

The region is characterized predominantly by high-acreage farmers who sell their products wholesale. Participants discussed direct-to-consumer sales options including the organic farmers market in Lake Havasu City and roadside stands. Additionally, they noted opportunities to sell directly to restaurants and casinos, particularly large casinos in Las Vegas and local outlets in Havasu Landing and Lake Havasu City.

Focus groups emphasized that producers have been most successful selling to wholesalers. Advantages to contracting with wholesalers include higher volume sales, lower transaction costs, and more revenue predictability and stability.

COMPETITION

Participants noted a lack of local competition due to the reservation's isolation. Local markets receive agricultural products from wholesalers, who in turn source from farms near Parker, Yuma, Phoenix, Mexicali Valley, and throughout the U.S. In particular, Sail Inn Restaurant & Bar receives produce from US Foods and the Chemehuevi general store sources from Associated Grocers.

Agricultural production is concentrated along the I-40 and I-10 corridors in the Mohave Valley and Parker, respectively. Major markets near these corridors (e.g., Fort Mohave, Needles, Bullhead City, Kingman, Parker, and Blythe) are likely well-served by these agricultural operators. As a result, local and niche markets may offer the best outlets for locally-grown products.

AGRICULTURAL DEMAND

Participants indicated nearly all crop varieties could be grown on Chemehuevi land given proper soil amendments and irrigation. Generally, there is high demand for vegetables in the winter and fruit in the summer due to climatic conditions and seasonal demographic fluctuations. The Local Purchasers Focus

Group expressed a need for everyday staples, specifying lettuce as a particularly valued commodity. Additionally, they noted watermelon is in extremely high demand during the summer.

Alfalfa offers a potentially lucrative market given high concentrations of cattle in the region, the ability to cultivate the crop year-round, and relatively high price points locally. Focus groups also identified seed as a possible high-demand, niche market for the Chemehuevi. The reservation's isolation provides the Tribe a competitive advantage over regional agricultural clusters, since seed producers must minimize the risk of cross-pollination.

For a comprehensive list of agricultural products mentioned during focus group interview, please consult *Appendix B: March 2013 Focus Group Notes*.

ORGANIC CERTIFICATION

Focus groups contended the organic certification process was too burdensome and costly to provide added value to the Chemehuevi Tribe. The USDA's Organic Certification Program oversees the federal certification process, while the California Department of Food and Agriculture implements the law statewide. Fees depend on the amount of organic gross sales, with the average California State Organic Program registrant paying \$318.79 in 2010 (California Department of Food and Agriculture, 2013). This excludes compliance costs and costs associated with organic growth and production.

While some customers may prefer organic products, the price premium would drive down local demand due to high consumer price sensitivity. If the Tribe were to earn less than \$5,000 in gross sales from organic products, it would be considered an "exempt producer" and would not be required to obtain organic certification (California Food and Agricultural Code, 2003). However, a large-scale agricultural operation will certainly surpass this limit.

Additionally, participants noted the need to occasionally treat crops with fertilizer and pesticides to thrive in the local environment. They indicated the most effective way to achieve organic certification would be to grow agricultural products indoors.

OTHER LABELING OPTIONS

Focus groups noted two additional labeling options the Tribe could pursue:

1. Locally-grown
2. Native American agriculture label

"Local" and "Native American" labels do not require formal certification. Participants viewed these labels as effective marketing strategies that capitalize on consumer preferences for locally-grown foods. These labels may command a marginal price premium; however, the Tribe should remain sensitive to high price elasticity.

CONTRACTING AND LEASING

Participants recommended contracting and leasing as effective methods to implement large-scale agricultural operations on the reservation. In contract farming, the Chemehuevi Tribe would enter into an agreement with a purchaser (e.g., wholesaler) who would commit to purchasing a certain amount of product at a certain price. In turn, the purchaser would have some control over inputs and farming methods.

Leasing would enable a farm contractor to use Chemehuevi land to cultivate and produce agricultural goods. The contractor would have complete control of the land within the context of the contract. This arrangement could be executed as a simple land lease or include provisions so the Tribe could accrue partial earnings from crop sales. The contractor would supply the necessary equipment and potentially the

infrastructure; however, land values would be significantly diminished were infrastructure not provided by the Tribe. Additionally, the agreement could specify a tribal hiring preference to bolster Chemehuevi employment.

Advantages of these contractual arrangements include reduced investment risk, enhanced access to markets, predictable and stable cash flows, and capacity building opportunities. These advantages come at the expense of reduced control of the land.

WATER RIGHTS

A major advantage to agriculture is its ability to maximize the Tribe's utilization of its water rights. According to one estimate, the Tribe currently uses 2,500 acre-feet of water, while its total allocation is 11,400 acre-feet. The focus groups discussed the possibility that the Tribe could be stripped of its underutilized water rights, citing the Fort Mohave Tribe as a precedent (see *Arizona v. California*, 1963).

The Chemehuevi also have the option of leasing water rights to one or more local purchasers. Participants noted the Tribe is prohibited from selling the rights outright, but could entertain lease arrangements. These actions would need to be coordinated with the Bureau of Indian Affairs.

SEED PRODUCTION

Participants recommended taking advantage of the Chemehuevi reservation's land by growing native seeds. Cross-pollination is the greatest concern among seed growers, and the reservation's relatively isolated location effectively minimizes this risk. Potential seed crops include broccoli, cauliflower, and onions, among many others. Growing seed might provide sales opportunities in the national and international markets.

Focus groups noted several private seed contractors that may be willing to enter into an agreement with the Tribe. They also expressed the possibility of contracting with the Bureau of Land Management in Nevada to supply seed for the Bureau's reforestation efforts.

PARTNERSHIPS AND SYNERGIES

The Chemehuevi Tribe's agricultural efforts could potentially complement other ongoing and/or future economic development efforts on tribal land. Participants noted a variety of different programs that could synergize with agriculture, listed below:

- Produce cottonwood, mesquite, and willow cultivation to support Chemehuevi Environmental Department's partnership with U.S. Fish and Wildlife to eradicate salt cedar (tamarisk) along the shoreline. Trees could also serve as a windbreaker to protect crops and prevent soil erosion.
- Configure agricultural land uses to complement Bureau of Reclamation and Corps of Engineers efforts to channelize water runoff from the mountains and stabilize the Colorado River. These efforts will help control erosion, stabilize the riverbank, and reduce sedimentation.
- Grow seed for the Bureau of Land Management's reforestation program
- Integrate agriculture into the Tribe's comprehensive economic development plan. EDA has indicated willingness to fund programs that produce 100-plus new jobs.
- Partner with local purchasers (e.g., casino, general store, and Sail Inn Restaurant & Bar) to adapt crop varieties and production schedules to customer demand.
- Transport agriculture products to Lake Havasu City using Dreamcatcher Ferry Service to reduce transit time.
- Collaborate with Chemehuevi health and wellness programs (e.g., diabetes program) to promote healthy eating.
- Involve local children and adolescents in food production through 4H and other tribal programs
- Leverage Chemehuevi Environmental Department's expertise and equipment

- Coordinate efforts with NEDCO’s economic development initiatives (e.g. hotel, solar energy)
- Purchase or lease land in Lake Havasu City to stage a farmers market
- Develop aquaponic, hydroponic, and/or aquaculture systems
- Cultivate algae for biofuel
- Compost organic byproducts

FUNDING

Focus groups identified a range of potential funding sources, including loans and/or grants from the USDA Farm Service Agency (FSA), Farmers Home Administration (USDA Rural Development), USDA NRCS, Bureau of Indian Affairs, Economic Development Administration, and Western Sustainable Agriculture and Education. Appendix A provides a detailed list of agriculture-related funds. All funding sources require resource commitments from the recipient.

INVESTMENT PRIORITIES

The primary investment priority is securing funding for another water pump to develop system redundancy. The Tribe currently operates one diesel pump, which poses a critical risk to existing crops should the pump fail. Rain for Rent developed an irrigation plan for the Tribe that calls for investments in a new pumping system and retention pond.

PART THREE: KEY FINDINGS AND NEXT STEPS

Agriculture offers a unique and valuable economic development opportunity to the Chemehuevi by more effectively utilizing the Tribe’s land, water, and labor resources, generating a sustainable source of revenue, diversifying its economic base, and restoring cultural ties to tribal lands. Additionally, agriculture would enhance the sustainability of the reservation’s ecosystem and contribute to the health and wellbeing of the Tribe’s members. As with all economic development initiatives, agricultural production will demand resources, necessitate financial and opportunity costs, and entail risk. Tribal leadership must fully commit to supporting—both financially and politically—agriculture for this initiative to succeed.

This section spotlights important findings and strategies that should shape the development of a detailed agricultural business plan. It concludes with recommendations for next steps and vital considerations the Tribe should make prior to expanding its agricultural operations.

START SMALL, THINK BIG

Before investing in a full-scale agricultural operation, the Chemehuevi should first commit to testing crops and building capacity on its existing 80-acre agricultural plot. Demonstrating whether agricultural production is reasonable, feasible, and efficient on the existing plot will help make the case for further investment from both the Tribe and potential contractors and wholesalers. Tribal decision-makers can use the results of this demonstration project to better assess the benefits and costs of scaling up. Additionally, products from this test plot could serve local markets, provide sustenance, and complement the Tribe’s health and wellness programs.

To make this initial project a reality, the Chemehuevi should consider several initial, priority investments. Of primary importance is procuring a second irrigation pump to provide system redundancy and reduce the risk of crop failure. Also, the Tribe will need to procure equipment for cultivation and production, which varies by crop variety and the size of the operation. To maximize production on the existing 80-acre plot and provide flexibility to scale up operations to 1,500 acres, the up-front cost would be

approximately \$3.1 million. This includes all infrastructure, equipment, and engineering. Annual operating expenditures are estimated at \$287,000 (see *Appendix E*).

Government assistance and low-interest loans are available to offset these costs (see *Appendix A*). Additionally, up-front costs can be significantly reduced by entering into contracts and leasing equipment. When considering these initial investments, decision-makers should also bear in mind their shared vision for agriculture on the reservation. Decisions now regarding infrastructure, equipment, and land use will affect the Tribe's ability to scale up production later.

DEDICATE PORTION OF AGRICULTURAL YIELD TO SERVE LOCAL NEEDS

Lake Havasu City, the largest market in the trade area (and growing rapidly), lies 12 minutes by ferry from the Chemehuevi Reservation. On the reservation, residents and commercial outlets like the Havasu Landing Resort & Casino, the general store, and planned hotel development offer a predictable source of demand with limited competition.

In contrast, markets along the I-10 corridor (Blythe and Parker) and I-40 corridor (Bullhead City, Kingman, Fort Mohave and Needles) are near high concentrations of agricultural operators. Competition from these producers coupled with limited transportation to and from the Chemehuevi Reservation puts the Tribe at a competitive disadvantage in these markets. Additionally, overreliance on direct sales—particularly to geographically-scattered markets—poses considerable logistical challenges and may increase financial risk.

To take advantage of local markets, the Chemehuevi should establish a direct sales network with local grocers, restaurants, and other potential customers. The Tribe should consider dedicating the existing 80-acre test plot to meeting these customers' needs. Crop varieties and production schedules should be tailored to meet seasonal demographic variations and demand. To more effectively market its products locally, the Chemehuevi could use the “locally-grown” and/or “Native American agriculture” labels.

The Chemehuevi Agriculture Department could also collaborate with tribal health and wellness programs to supply nutritious food and offer educational opportunities. In addition, it could partner with the Dreamcatcher ferry service to more efficiently transport products to Lake Havasu City.

PARTNER WITH WHOLESALERS TO STABILIZE PRODUCTION AND REVENUE

There is a robust national demand for agricultural products from the southern Colorado River region. The region's ability to support agriculture year-round—particularly “cold crops”—provides local farmers a distinct competitive advantage over other U.S. producers.

Local producers earn the majority of their revenues by selling to wholesalers, who in turn distribute to extensive national and international networks of grocers, processors, and other buyers. This eliminates the need for producers to maintain sales relationships with numerous, disparate buyers, which reduces logistical challenges, minimizes financial and production risks, and allows the producer to focus on its core competencies—i.e., producing agricultural goods. Wholesalers and producers typically enter into a contractual agreement specifying the terms of delivery, including quantity and price. This enables both parties to more effectively predict cash flows and more efficiently allocate resources.

The Tribe's long-term agricultural plan should dedicate the majority of its acreage (80-90 percent) to producing row crops for wholesale. It should identify one or two primary crops for wholesale purposes to establish economies of scale and minimize infrastructure, equipment, and land preparation costs. While the Tribe proves the viability of agriculture on its 80-acre test plot, it should begin establishing relationships with potential wholesalers. These companies can help the Chemehuevi identify high-demand crops, which will enable the Tribe to tailor its long-term agricultural investments accordingly.

CONSIDER CONTRACTING AND LEASING ARRANGEMENTS TO BUILD CAPACITY, ENHANCE RESOURCE UTILIZATION, AND REDUCE FINANCIAL EXPOSURE

While the reservation has labor, land, and water to sustain agricultural production, the Tribe will also need to build knowledge, skills, and abilities internally. To expedite operations and put its resources to immediate use, the Chemehuevi should consider entering into contracting or leasing agreements. A contracting arrangement would enable the Tribe to maintain control over the land, while the contractor would specify inputs, methods, and other factors affecting production.

A leasing arrangement would require the Chemehuevi to cede more control by effectively leasing tribal land to a farm operator tenant. This could take two general forms (Kunkel, P., Peterson, J. & Mitchell, J., 2009):

1. Cash lease: Tribe would receive a set amount of land rent regardless of yield. The farm operator tenant would maintain full control over production decisions.
2. Crop-share lease: Tribe maintains some control over management and investment of farm. The farm operator tenant and the Tribe would split profits based on their respective production contributions.

While the farm operator tenant has control over crop management, he does not need to leave the land in the same condition. However, he may not allow the Tribe's land to be permanently or substantially damaged—i.e., “commit waste” (Kunkel, P., Peterson, J. & Mitchell, J., 2009).

Irrigated land in Arizona and California achieves significantly higher land rents than non-irrigated land. In 2012, irrigated land in California was valued at more than three times non-irrigated land (U.S. Department of Agriculture, 2012). As a result, the Tribe should perform a cost-benefit analysis for land irrigation before leasing, comparing expected lease revenues against initial capital investments and operational costs.

Contracting and leasing agreements would require the Chemehuevi to relinquish a degree control over land management. In turn, financial risk would be transferred to the contractor or farm operator tenant, while the Tribe earns a predictable revenue stream that can be reinvested into the reservation. Additionally, the Tribe could include a local hiring preference in these agreements to encourage employment of tribal members. This would build capacity within the Tribe, providing Chemehuevi the knowledge, skills, and abilities to effectively manage an agricultural operation internally.

The Chemehuevi should also take into account cultural considerations when evaluating these arrangements. To succeed, tangible financial and capacity building benefits must outweigh the intangible benefits of maintaining outright control of the land.

EXPLORE SEED GROWING TO CAPITALIZE ON GEOGRAPHIC ISOLATION

The Chemehuevi Reservation is geographically isolated from major transportation corridors, markets, and other farm operations. While this poses critical challenges for logistics and market access, it also creates an opportunity for the Tribe to grow seed. Seed growers require isolation to avoid cross-pollination from other nearby farms. The reservation's location and topography substantially mitigate this risk, giving the Tribe a unique competitive advantage in this niche market.

Seed companies sell their products globally, opening up national and international markets to Chemehuevi agriculture. To accomplish this, the Tribe would contract with a seed company that would cultivate and distribute the product. The agreement would take the form of either a contracting arrangement or lease, and the seed company would exercise some control over land management.

The Chemehuevi should consider establishing relationships with seed companies to assess the potential benefits and costs of growing seed. Additionally, the Tribe should explore partnering with the Bureau of Land Management to produce seeds for the Bureau's reforestation efforts.

INTEGRATE AGRICULTURAL PLAN INTO BROADER ECONOMIC DEVELOPMENT FRAMEWORK

For agriculture to succeed on the reservation, it must be championed politically and fully integrated into the Tribe's economic development strategy. Tribal leadership should set clear agricultural investment priorities and commitments, and attainable financial, production, and employment objectives. Most importantly, the Chemehuevi must take ownership and pride in agriculture as an enterprise.

To enhance economic development potential, maximize efficiencies, and reduce overall costs, the Tribe should take advantage of synergies with its existing initiatives and tailor new programs to complement agriculture. Several potential partnerships are highlighted in *Part 2: Partnerships and Synergies*.

ESTABLISH CLEAR AGRICULTURAL LAND USE BOUNDARIES

The Tribe's land use plan should reflect the long-term vision for agriculture on the reservation. This means agricultural land boundaries should be clearly established and adhered to. Also, this land should be reserved for full-scale, commercial agriculture production, and the Tribe should restrict encroachments from other development efforts.

CONSIDER LEASING TRIBAL WATER RIGHTS TO ENHANCE RESOURCE UTILIZATION

Water is an extremely valuable resource in the Western U.S. Currently, the Chemehuevi use 21.9 percent of their 11,400 acre-feet of water rights. This presents an immediate opportunity to put the Tribe's unused water rights to productive use through leasing arrangements. These rights could be leased to other local farmers and/or municipalities to generate a steady revenue stream.

According to a study published in *Water Resources Research*, the median price for leasing water rights in California between 1990 and 2003 was \$55 per mega-liter (Brown, 2006). Assuming the Tribe leased its currently underutilized water rights (8,900 acre-feet) at this rate, it could bring in an estimated \$600,000 per year.

If the Chemehuevi wish to explore leasing their water rights, they should work with the Bureau of Indian Affairs to ensure that all leasing agreements provide fair compensation and protect the Tribe's rights to future use of the resource.

BRAND "CHEMEHUEVI"

As a branding strategy, the Tribe should consider leveraging the "Chemehuevi" name to market its agricultural products. By developing and fostering brand equity, the Tribe can better differentiate and showcase its products. It can also emulate successful branding efforts from Indian tribes nationwide to develop best practices for promoting the Chemehuevi brand. This strategy would create positive spillover effects by strengthening existing business initiatives, bringing in additional tourist dollars, and opening new investment opportunities.

APPENDIX A: AGRICULTURE-RELATED GOVERNMENT ASSISTANCE

Provider	Services and Loan Programs	Contact Information
California Department of Food and Agriculture (CDFA)	<ul style="list-style-type: none"> • Protect and promote agriculture in the State of California • Oversees county Agricultural Commissioner’s Offices. Responsibilities include environmental protection, pest management, consumer protection, and weights and measures. • Administers the Specialty Crop Block Grant Program (SCBGP), which funds for projects that enhance the competitiveness of California specialty crops including fruits, vegetables, tree nuts, dried fruits, horticulture, and nursery crops. Grants related to research, marketing, and nutrition (http://cdfa.ca.gov/Specialty_Crop_Competitiveness_Grants/) 	Website: http://cdfa.ca.gov/
Catalog of Federal Domestic Assistance	<ul style="list-style-type: none"> • Internet database containing information about all federal domestic programs including federal grants, loans, insurance, and training programs; information is available on eligibility, application procedures, selection criteria, and deadlines 	Website: https://www.cfda.gov/
Cooperative Extension, Colorado River Indian Tribes	<ul style="list-style-type: none"> • Affiliated with University of Arizona Cooperative Extension (La Paz County) and funded through the USDA Federally Recognized Tribes Extension Program (FRTEP) (see below) • Provides extension programming to previously underserved communities by designing programs that are culturally sensitive and respectful of tribal sovereignty 	Website: http://www.indiancountryextension.org/extension/office/colorado-river-indian-tribes-extension Colorado River Indian Tribes Extension – Parker Masters, Linda Extension Agent P: (928) 669-9843 E: lmasters@ag.arizona.edu

<p>Cooperative Extension, University of Arizona (Mohave and La Paz Counties, AZ)</p>	<ul style="list-style-type: none"> • Provides technical assistance and educational programs for agriculture, natural resources, rural development, entomology, and water quality and conservation 	<p>Website: http://extension.arizona.edu/mohave</p> <p>La Paz County – Parker, AZ Browning, Lyle Senior Instructional Specialist P: (928) 669-9843 x213 E: lyleb@cals.arizona.edu</p> <p>Mohave County – Kingman, AZ P: (928) 753-3788 E: mohavece@cals.arizona.edu</p>
<p>Cooperative Extension, University of California (San Bernardino and Riverside Counties, CA)</p>	<ul style="list-style-type: none"> • Provides technical assistance and educational programs • Agricultural Issues Center provides collection of publications and research (http://aic.ucdavis.edu/) 	<p>Website: http://ucanr.edu/</p> <p>San Bernardino County – San Bernardino, CA Peterson, Nyles Director P: (909) 387-2171 E: cesanbernardino@ucanr.edu</p> <p>Riverside County – Moreno Valley, CA Takele, Eta Area Farm Management Economics Advisor P: (951) 683-6491 x221 E: ceriverside@ucdavis.edu</p>
<p>Farm Bureau, Arizona</p>	<ul style="list-style-type: none"> • Largest farm and ranch membership organization in Arizona representing production agriculture • Programs support youth agriculture and women’s leadership, sponsor the Fence Line speakers’ series, and provide workplace safety information 	<p>Website: http://www.azfb.org/</p> <p>Mohave and La Paz Counties, AZ Davis, Christy P: (480) 635-3611 E: christydavis@azfb.org</p>

Farm Bureau, California	<ul style="list-style-type: none"> • Largest farm membership organization in California protecting and promoting agricultural interests throughout the state • Members receive discounts on various farm-related products and services • Offer publications on agricultural issues and regulations (http://www.cfbf.com/issues/index.cfm) 	Website: http://www.cfbf.com/index.cfm San Bernardino County, CA Farm Bureau Rietkerk, Kathye Managing Director P: (909) 875-5645 E: sbfarmbureau@msn.com
Federal Funding Sources for Rural Areas Database	<ul style="list-style-type: none"> • Internet database contains information about rural federal domestic programs including federal grants, loans, insurance, and training programs; information is available on eligibility, application procedures, selection criteria, and deadlines. 	Website: http://ric.nal.usda.gov/nal_web/ric/ffd.php
Grants.gov	<ul style="list-style-type: none"> • Online database for federal grant programs 	Website: www.grants.gov
Intertribal Agriculture Council Technical Assistance Program	<ul style="list-style-type: none"> • Provides technical assistance and educational programs • Partnership with USDA Office of Tribal Relations to increase access and use of USDA programs and services by Indian producers and Tribes 	Website: http://www.iactechhelp.com/ Western Tribes Bond, Steven Technical Assistance Specialist P: (928) 699-6774
Start2Farm.gov	<ul style="list-style-type: none"> • USDA National Agricultural Library-sponsored project in partnership with the American Farm Bureau Federation • Resource for new farmers or those who have less than 10 years of experience. Includes guidelines and publications for new farmers and links to federal financial assistance. 	Website: http://www.start2farm.gov/

<p>U.S. Department of the Interior, Bureau of Indian Affairs (BIA)</p>	<ul style="list-style-type: none"> • Provides support for tribal agricultural programs under tribal contracts and direct implementation • Bureau staff provide oversight and technical assistance to tribal programs at the agency level involving Indian farmers and ranchers in eight major activities: <ul style="list-style-type: none"> ○ Inventory ○ Farm and range planning ○ Rangeland improvements ○ Rangeland protection ○ Leasing and permitting services ○ Contract monitoring ○ Agriculture extension ○ Noxious weed eradication 	<p>Website: www.bia.gov</p> <p>BIA Western Region Bowker, Bryan Regional Director P: (602) 379-6600</p>
<p>USDA Farm Service Agency (FSA)</p>	<ul style="list-style-type: none"> • Provides farm loan programs to establish, improve, expand, transition, and strengthen agricultural operations • Types of loan assistance <ul style="list-style-type: none"> ○ Direct farm ownership (purchase farmland, construct and repair buildings, make farm improvements) ○ Direct down payment ○ Direct operating (purchase of livestock and feed; farm equipment; fuel, farm chemicals, and insurance; minor improvements or building repairs; debt refinancing) ○ Direct emergency ○ Guaranteed farm ownership ○ Guaranteed operating ○ Guaranteed conservation ○ Land contract guarantee • Targeted funds for beginning and socially disadvantaged farmers. American Indian Tribes are considered “socially disadvantaged.” Available for guaranteed loans, direct operating loans, and direct farm ownership loans. • Additional funds available for marketing assistance and farm storage facilities 	<p>Website: http://www.fsa.usda.gov/</p> <p>FSA Riverside County, CA Service Center Roberts, Tom Farm Loan Manager P: (559) 734-8732 E: tom.roberts@ca.usda.gov</p> <p>FSA La Paz County, AZ Program Delivery Point Stevenson, Shawneen Farm Loan Manager P: (623) 535-5055 x117 E: shawneen.stevenson@az.usda.gov</p>

USDA Federally Recognized Tribes Extension Program (FRTEP)	<ul style="list-style-type: none"> • Supports Extension Agents who establish Extension education programs on the Indian Reservations and Tribal jurisdictions of Federally-Recognized Tribes • Estimated total program funding (FY2012): \$2.8 million 	Website: http://www.csrees.usda.gov/fo/federallyrecognizedtribesextensionprogram.cfm
USDA National Institute for Food and Agriculture	<ul style="list-style-type: none"> • Administers the Beginning Farmer and Rancher Development Program (BFRDP). Offers education, training, outreach, and mentoring programs to enhance the sustainability of the next generation of farmers. • Estimated total program funding (FY2012): \$19 million 	Website: http://www.csrees.usda.gov/fo/beginningfarmersandranchers.cfm USDA NIFA Sureshwaran, Siva National Program Leader, Small Business Innovation Research Grants P: (202) 720-7536 E: ssureshwaran@nifa.usda.gov
USDA Natural Resources Conservation Services	<ul style="list-style-type: none"> • Provides financial and technical assistance to help landowners and producers manage natural resources in a sustainable manner • Financial assistance (http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/) <ul style="list-style-type: none"> ○ Agricultural management assistance ○ Agricultural water enhancement program ○ Air quality initiative ○ Cooperative conservation partnership initiative ○ Conservation innovation grants ○ Conservation stewardship program ○ Environmental quality incentives program ○ Emergency watershed protection program ○ Wildlife habitat incentive program • Environmental quality incentives program (EQIP) shares land development, infrastructure, and equipment costs with producers (between 75-90 percent cost share per unit). Land must be irrigated during two of the past five years. 	Website: http://www.nrcs.usda.gov/ USDA NRCS – Parker Service Center Ward, Shelly District Conservationist P: (928) 669-9826 E: shelly.ward@az.usda.gov USDA NRCS – Blythe Service Center Cobb, Sam District Conservationist P: (760) 922-3446 E: sam.cobb@ca.usda.gov

<p>USDA Rural Development Program</p>	<ul style="list-style-type: none"> • Provide direct and guaranteed loans, grants, technical assistance, research, and educational materials • Types of loan and grant assistance <ul style="list-style-type: none"> ○ Business and cooperative ○ Housing and community facilities ○ Utilities • Set-asides for Federally-Recognized Tribes • American Indian & Alaska Native (AI/AN) programs (http://www.rurdev.usda.gov/AI_ANHome.html) • Rural Energy for America Program – provides loan guarantees and grants to make energy efficiency improvements. Includes irrigation pump installation. 	<p>Website: http://www.rurdev.usda.gov/Home.html</p> <p>USDA RD California – Davis Wadell, Janice AI/AN Coordinator P: (530) 792-5810 E: Janice.waddell@ca.usda.gov</p> <p>USDA RD Arizona – Phoenix Trachtenberg, Joel AI/AN Coordinator P: (602) 280-8762 E: Joel.trachtenberg@az.usda.gov</p>
<p>U.S. Environmental Protection Agency National Agriculture Center (Ag Center)</p>	<ul style="list-style-type: none"> • Provides information on compliance with environmental regulations for people in the agricultural community 	<p>Website: www.epa.gov/agriculture/agctr.html</p>
<p>Western Sustainable Agriculture and Education (SARE)</p>	<ul style="list-style-type: none"> • Provides grants to advance innovations in American agriculture that improve profitability, stewardship, and quality of life • Types of grants <ul style="list-style-type: none"> ○ Research & education ○ Professional development ○ Farmer/rancher ○ Profession + producer ○ Graduate student in sustainable agriculture • Farmer/rancher grants are one- to three-year grants conducted by agricultural producers with support from a technical advisor. Individual farmers may apply for up to \$15,000. 	<p>Website: http://www.westernsare.org/</p> <p>Rasmussen, Philip Western SARE Coordinator (435) 797-3394 Philip.rasmussen@usu.edu</p>

APPENDIX B: MARCH 2013 FOCUS GROUP NOTES

Chemehuevi Agricultural Strategic Plan

Site Visit Notes – March 13-14, 2013

Participants:

Meeting One – Government Agencies and Agricultural Support Services

- Matt Leivas – Director, Chemehuevi Agricultural Department
- Lyle Browning – Senior Instructional Specialist, University of Arizona Cooperative Extension, La Paz County
- Shelly Ward – District Conservationist, USDA Natural Resources Conservation Service (NRCS), Parker
- Jim Krahenbuhl – District Conservationist, USDA NRCS

Meeting Two – Chemehuevi Tribe

- Matt Leivas – Director, Chemehuevi Agricultural Department
- Tom Pradetto – Director, Chemehuevi Environmental Department
- Delvin Williams – Assistant Director, Chemehuevi Environmental Department

Meeting Three – Local Purchasers

- Matt Leivas – Director, Chemehuevi Agricultural Department
- Shirley Smith – Council Vice Chairman, Chemehuevi Tribal Council
- Brenda – Manager, Chemehuevi General Store
- Debbie Casanova – Food and Beverage Manager, Chemehuevi Casino

Question / Response / Responder	
<i>Please identify the major advantages of operating a farm in this region</i>	
360 growing days per year	LB
Grow cold crops all winter long (even through one of the coldest winters)	LB
Proximity to I-40 and major transportation corridors; Las Vegas, Phoenix, and Los Angeles markets; border; Pacific Coast; this area is a hub	JK
Tribal council support for agriculture	SW
Grow food for self-sustainment	TP
Would be using more of the tribe's allocated water; water is like gold	TP
Plenty of land	DW
Year-round growing season	DW
Readily available supply	BX
Low transportation costs	BX
Good climate	DC
Restaurant would be interested in purchasing; hotel would be potential buyer	DC
Captive market	DC
<i>Please identify the major disadvantages of operating a farm in this region</i>	
Cold crops are labor intensive	JK
Availability of workforce (size, motivation)	JK
Don't see a disadvantage	TP
General agriculture risks, mother nature	BX
<i>Which crops grow best locally?</i>	
All of them; doesn't make a difference	LB
Heat-tolerant crops	LB
Cucurbits (cucumbers, squash, watermelon, cantaloupe); all heat-tolerant	LB
Ready-to-grow crops for profitability	LB

Have water, land, climate; can set up irrigation system; can do whatever you please	JK
Have labor	
Need to find a source of capital	JK
At least 180,000 people in Mohave County; everything has that much shelf life; domestic market is large enough	LB
Need to refrigerate along the line; coolers are simple	JK
Can't do it with alfalfa; have to go to row crops (including vegetables)	LB
Citrus, date palms	BX
<i>Please identify the major local markets for agricultural products</i>	
Lake Havasu, Needles, Kingman, Bullhead City	ML
Laughlin and Las Vegas	JK
Casinos	LB
San Bernardino, LA, San Diego, Las Vegas, endless really	TP
Export	ML
Lake Havasu (especially during winter); tri-state area; Needles, Fort Mohave, Kingman	BX
<i>Which agricultural products sell best in local markets?</i>	
Vegetables (in general); hungry population in the winter	LB
Sweet corn (good warm weather crop)	SW
Fruits, vegetables, nuts, anything that is consumable would be sellable	TP
Alfalfa, can't go wrong; lots of cattle in region; \$13 per bale; high demand in Needles, Blythe, Phoenix; can grow year-round; nine cuttings per year (three to four elsewhere)	DW
Many of the alfalfa companies enter into contractual agreements with wholesalers	ML
Alfalfa is water intensive; pretty straightforward	DW
Watermelons	
Cauliflower, broccoli in winter	DW
Alfalfa uses about six acre-feet of water per acre	ML
Up-front costs have prohibited implementation of alfalfa production	ML
Day and night operation to bale hay; need dedicated workforce	ML
Bananas are hardest to keep; local is good	BX
Oranges, avocados, onions, potatoes, normal everyday cooking staples, definitely lettuce	BX
More of the fresh fruit during the summer; vegetables during the winter at the market	DC
Good squash that's not really expensive	DC
Weather around the world affects ability to get quality produce at a reasonable price	DC
Getting current product from Associated Grocers (Utah); source from all over US; don't work with many local growers	DC
Price and quality will drive demand at the market, restaurant, casino	BX
Locally-grown and Indian agriculture labels would likely enhance demand, enable price premium	BX
Busiest months at market are summer months; customers from Southern California	DC
Go through a lot of lettuce at the store	DC
Chili peppers, tomatoes, bananas; ground crops, potatoes, squash, green onions	BX
Watermelons in summer, only thing bought by palette at market	DC
<i>Through what channels have local farmers been most successful selling their products?</i>	
High-acreage farmers (few truck farmers)	LB
Victor's in Fort Mohave sells sweet corn; ships most of it, though	SW
Wholesale	LB
Not much that resembles substantial farmers market	LB
Direct to restaurant, casinos	LB
Indian agriculture label	SW

Need to develop Chemehuevi stamp	ML
Selling to retail is difficult and there isn't a lot of money; should have put it on a truck and sold it wholesale	LB
Small farmers on 95 en route to Las Vegas selling on roadside	TP
Organic farmers market in Lake Havasu	TP
Mostly wholesale operations	TP
<i>Have local farmers been successful selling their products outside the region?</i>	
Yuma, Parker – produce 90 percent of vegetables in US during winter	JK
Don't have enough acreage here	LB
Nobody in this area; produce trucks come in for swap meet in Parker, Havasu	SW
Most come out of Mexicali Valley; not producing them here	LB
Go with one or two products; don't spread too thin; won't be able to fulfill orders	SW
Works better for equipment	JK
Don't have local farmers	SS
<i>Is there robust local demand for organic products?</i>	
Not in my world; too many problems	LB
Too many hoops to jump through for certification	LB
Sometimes you have to nuke them	LB
Indian agriculture label is stronger than organic	LB
Can label organic as long as you sell less than \$5000	SW
Local market not too amenable; Phoenix and Las Vegas maybe	SW
Need to water and fertilize to get citrus to produce	SW
Probably potential, but may not be feasible economically	TP
Can't imagine organic being produced unless it's produced inside	TP
Everybody is health-conscious these days; but expensive in the market; strong demand for locally-grown	BX
Some customers would love to have organic; issue is pricing, especially for locals	DC
Anybody would love anything that's locally grown; Indian agricultural label	DC
<i>Please describe the local competitive environment</i>	
Nothing here but Chemehuevi	SW
Only game in town	LB
Lake Havasu City is bringing in product from Phoenix, Mexicali Valley, Yuma, Arizona, distributors	LB
<i>What niches would the Tribe be able to meet in the near future?</i>	
Could get into produce game pretty easily	JK
Don't need to talk about niche markets; the market is there	JK
Winter snowbirds; vegetables; nothing better to do	LB
Winter population is probably three to four times higher	LB
Average age in summer is 25; in winter it's 75	JK
Equipment is limited for specialty markets; need to make do with what tribe has	ML
Seed growers in Parker Valley and Yuma area; broccoli and cauliflower; ship all over the world	LB
Isolated enough area to grow seed; avoid cross-pollination; certified seed	JK
Cross-pollination is elephant in the room	LB
Don't have isolation in Yuma, Parker, Fort Mohave; only one operator here	JK
Not limited to one crop; only one variety of each crop	LB
Two or three companies on Colorado River that market on all continents	LB
Would probably front capital; contracted in; sold before it's put in the ground; some hoops to jump through	LB
Contracting may be answer to stabilize cash flow	LB

Contracting tradeoffs; you're going to grow it the way they want to grow it; will have field reps there with you	JK
Contracting may help build capacity; can always terminate down the line	LB
Tribe would need to make investment; easier to finance with guaranteed contract	LB
Not necessarily taking a discount on product; probably getting a premium	LB
People crawling all over each other in Parker for land	SW
Tribe would entertain this	ML
Potential seed crops: anything, onions, broccoli, cauliflower	JK
ACTION ITEM: Lyle to contact seed growers	LB
Dates would probably be a niche; doesn't require much water	TP
Everyday staples	BX
<i>Please identify major barriers to new entrants</i>	
<i>Please identify other markets and/or synergies that could complement farming</i>	
Aquaponics	SW
Raising fish in Phoenix area	LB
Another tribe (not named) is contracting out a fish farm operation	LB
Shrimp down in Yuma; one in Buckeye; otherwise not much locally	SW
Unsure of demand; nothing like saltwater	LB
Growing algae for biofuels; former chairman was big supporter; University of Arizona process; was willing to work with Chemehuevi	ML
Recycling project; environmental department buying wood chipper; for reservation use	TP
Cottonwood, mesquite, and willow cuttings; growing them to plant in Clear Bay; replacing salt cedar (tamarisk); could sell while they're in nursery; some will be used for a windbreaker	TP
Partnership with US Fish and Wildlife service to eradicate salt cedar in the reservation and refuge (section of shoreline managed by USFW)	TP
Bureau of Reclamation (Yuma) programs to channelize water runoff from mountains, protect bays; could partner with them to open channels from bays; erosion control; sedimentation of lake poses risk to ecosystem and navigability; water diversions around agriculture	ML
Need to look at agriculture as part of a comprehensive plan; 100 jobs to meet EDA requirements	ML
NEDCO is exploring solar energy	ML
NEDCO is proceeding with hotel construction; 100 rooms	ML
Ferry could be used to transport agricultural products; unsure on cost; managed by transportation authority; ten minutes to cross; already facing navigability problems, automobile ferry is probably not feasible	ML
BIA 638 grants, USDA, NRCS program, FSA, Western SARE (assistance available to everybody)	ML
Bureau of Reclamation, Army Corps of Engineers; bank stabilization, dredging, erosion control	ML
Bureau of Land Management in Nevada want seeds for reforestation	ML
Solar has problems tapping into transmission lines	SS
Hydroponics, fish farming is something tribe would like to look into	SS
Diabetes program; funding for healthy eating; nutritional cooking; going out into agriculture field; picking food, cooking food, sharing menu with family	SS
4H program in La Paz county; getting kids here involved	DC
Purchase land in Lake Havasu, open farmers market	SS
<i>What infrastructure is needed to support operations?</i>	
Irrigation	ML
All of the above (see list)	SW
Need to determine type of delivery system	JK

ACTION ITEM: Shelly to provide numbers (per acre cost matrix)	SW
Dome houses; USDA NRCS Victorville; need crops on the ground now to qualify for assistance; 20-ft by 100-ft; concrete footings; current crops would qualify; application process; needs to be in tribe's conservation plan	ML
<i>What equipment is needed to support operations?</i>	
Depends on what you want to raise	LB
Slope may take drip out of equation	LB
Matt may not want to do drip; has converted to flood	SW
Suspended solids in water; Catfish Bay; need floating platform; keep filter on system; or extend pumping station further out	SW
Surface irrigation	JK
Center pivots	SW
Rain for Rent irrigation system; have dollar amount (\$1 million); 760 acres; four pumps: two at catfish bay, one to reservoir, one from reservoir to sprinklers; seven different sprinkler systems; \$1 million to develop land; \$2 million off the top; energy costs add \$3000-\$4000 per month	ML
Vegetable crops don't care for sprinklers; salty water	SW
<i>What land preparation activities must be undertaken prior to operations?</i>	
Agricultural statistics book; lays out costs, yields	JK
Capital costs will be the elephant in the room	LB
ACTION ITEM: Shelly to send link to agricultural statistics book	SW
<i>Please identify local lenders that specialize in lending to farming operations</i>	
<i>Please identify government programs that help finance capital investments</i>	
Farm Service Agency rural development loans; just year-by-year crops; don't cover capital costs	SW
Tribe has access to excess government property; free; may not be what you want	SW
Equipment may be in disrepair	ML
Farmers Home Administration	LB
Intertribal financing	ML
California NRCS could pick up 70 percent of costs; Arizona 90 percent; up to 30 percent up-front money	ML
Depending on project, opportunity to get BIA low-interest loans	SS
Less of an opportunity for intertribal lending	SS
EDA will put up money if tribe can create 100 jobs	ML
<i>Please identify the major cost drivers during operations</i>	
<i>Through what channels do local operators solicit labor?</i>	
<i>Please identify major challenges to hiring farm labor locally</i>	
<i>What soil amendments are needed to make the land amendable to agriculture?</i>	
<i>Please identify major costs associated with bringing agricultural products to market</i>	
<i>Please identify government programs that help finance operations</i>	
<i>Please identify major risks of operating a farm in this region</i>	
All of the above (see list)	LB
Risks are no different here than elsewhere	LB
Go through FSA for crop insurance	SW
<i>How do local growers mitigate the threat of natural disaster and inclement weather?</i>	
<i>How will potential changes to agricultural legislation affect local operators?</i>	
<i>Do local farmers typically invest in crop insurance?</i>	
<i>Do local farmers typically use spot exchanges or enter into formal contractual agreements?</i>	
Play it 50-50; lock in a certain price with future markets; take a gamble on other half	JK
More experienced farmers would gamble more	JK

<i>Which regulations have proven most burdensome for local operators?</i>	
Organic certification	SW
Inspections by Indian Health Services (at tribe's discretion)	SS
Exporting off reservation; inspections by San Bernardino	ML
Transportation across state lines may pose barriers; would need to work with Arizona	ML
<i>What bodies of law govern agricultural operations on Native American lands?</i>	
<i>Please identify agency assistance opportunities</i>	
<i>Are most local farms owner-operated or leased to third-party operators?</i>	
<i>Please identify major challenges to leasing an agricultural operation</i>	
Question of control	LB
Hybrid leasing models may invite legal issues	LB
Tribal hiring preference; common in Parker	SW
Straight cash lease	SW
Let them take care of cropping stuff, infrastructure	SW
Hasn't been discussed at a Council level (at least recently)	SS
<i>What prices and terms have local landowners been able to secure for agricultural land leases?</i>	
<i>Are there additional regulations governing the lease of Native American lands?</i>	
<i>Is it possible to transfer tribally-held water rights?</i>	
Tribe can lease but cannot sell	ML
Use it or lose it; need to lose it efficiently	SW
Southern Paiute case; lost water rights for not using them	ML
Tribe previously discussed marketing its water; pricing depended on the purveyor; ended up dumping the idea	ML
Current utilization is about 2500 acre-feet; total allocation is 11,400 acre-feet	ML
Partnership with five lower basin and five upper basin tribe (ten tribes partnership for Colorado River); wanted to be part of California Water Users Association; wouldn't allow the tribe to participate; let in the coalition	ML
<i>Please identify major challenges to transferring tribally-held water rights</i>	
<i>Is there robust local demand for water rights?</i>	
<i>What prices and terms have local holders of water rights been able to secure?</i>	
Additional notes	
Exploit the isolation; seed	LB
The less you're willing to invest, the less control you'll have	LB
Reno BLM contact; pay people to grow native seeds	ML
Workforce is available; local labor is taking advantage of opportunities at resort, casino, freelance work	ML
Unemployment rate is around 50 percent on reservation; 200 Indian, 1200 non-Indian; could employ 8-10 people year-round; typically pay \$10 per hour plus benefits	ML
ACTION ITEM: Matt to provide budget (capital, operating, investment, labor)	ML
Political resistance a matter of understanding; cultural understanding; looking at casinos as economic development model; don't know how to use the land; unwillingness to invest	ML
Competing interests: quick projects, casino, Sail Inn Restaurant and Bar, general store; per capita payments; about 80 percent of revenues go to per capita; need majority vote to reallocate	ML
Casino as a partner	ML
Closest market is in Needles 45 miles away	DC
Sail Inn purchases from US Foods (Phoenix); food service delivery company	DC
Deco Foods in Needles (wholesaler)	DC
Workforce is available; skilled and unskilled	DC
Unemployment may not be 50 percent, but it's very high	DC

Underutilization of land, labor, water	DC
Financing is a major concern	SS
Investment priority now is funding for another pump; then look at next steps; Council would be receptive to listening to anything	SS
Las Vegas \$24/bale; Hualapai \$22/bale for alfalfa; need certified tractor-trailer operation to transport	ML
Big issue is water	ML
You can get alfalfa and vegetables in Parker; great production and yield; seems infeasible to compete against Parker given isolation; seed operation may be more viable; niche production is probably a better bet; long way to I-40 and I-10, especially when you have mass agricultural production there already	SS

APPENDIX C: CALIFORNIA MASTER GARDENER HANDBOOK – VEGETABLE GARDENING

Table 14.2

VEGETABLE GARDENING AT A GLANCE: HOW TO PLANT AND STORE

Vegetable	Recommended planting dates ^a				General planting requirements				Storage conditions		
	North and North Coast	South Coast	Interior Valleys	Desert Valleys	Crop type ^b	Amount to plant (4 persons)	Distance in inches ^c between plants in rows (cm)	Distance in inches ^c between rows (no beds) (m)	Best temp °F (°C)	Time length to (weeks)	How to preserve ^d
artichoke ^e	Aug-Dec	May-Jul	Jul	Sep	C	3-4 plants	48 (122)	60 (1.5)	32 (0)	1-2	freeze whole, can, dry, or freeze hearts
asparagus ^e	Jan-Mar	Jan-Feb	Jan-Feb	Feb-Apr	C	30-40 plants	12 (31)	60 (1.5)	32 (0)	3-4	can, dry, or freeze
beans, lima ^f	May-Jun	May-Jun	May-Jun	—	W	15-25-ft row	6 (15) bush; (4.5-7.5-m row)	30 (0.8) 24 (61) pole	40 (4)	1-3	can, dry, or freeze
beans, snap ^g	Jul; May-Jun	Mar-Aug	Apr-May; Jul-Aug	Jan-Mar; Aug	W	15-25-ft row	3 (7.5) bush; (4.5-7.5-m row)	30 ^h (0.8) 24 (61) pole	45-55 (7-13)	1-2	can, dry, or freeze
beets ^g	Feb-Aug	Jan-Sep	Feb-Apr; Aug	Sep-Jan	C	10-15-ft row (3-4.5-m row)	2 (5)	18 ^h (0.5)	32 (0)	3-10	can, dry, or freeze
broccoli ^{h,i}	Feb-Apr; Aug-Sep	Jun-Jul; Jan-Feb	Dec-Feb; Jul	Sep	C	6-10-ft row (2-3-m row)	12-18 (30-45)	36 (0.9)	32 (0)	1-2	dry or freeze
brussels sprouts ^e	Feb-May	Jun-Jul	—	—	C	15-20-ft row (4.5-6-m row)	24 (61)	36 (0.9)	32 (0)	3-4	dry or freeze
cabbage ^h	Jan-Apr; Jul-Sep	Aug-Feb	Jul; Feb	Sep-Nov	C	10-15 plants	24 (61)	36 (0.9)	32 (0)	12-16	dry or freeze
cabbage, Chinese ^f	Jul-Sep	Aug-Oct	Aug	Aug-Nov	C	10-15-ft row (3-4.5-m row)	6 (15)	30 ^h (0.8)	32 (0)	2-3	dry or freeze
cantaloupes and other melons	May	Apr-May	Apr-Jun	Jan-Apr; Jul	W	5-10 hills	12 (30)	72 (1.8)	40-45 (4-7)	2-4	freeze
carrots ^g	Jan-May; Jul-Aug	Jan-Sep	Aug-Sep; Feb-Apr	Sep-Dec	C	10-25-ft row (3-7.5-m row)	2 (5)	24 ^h (0.6)	32 (0)	16-20	can, dry, or freeze
cauliflower ^e	Jun-Jul	Jul-Oct; Feb Jan-Feb	Jul-Aug	Aug-Sep	C	10-15 plants	24 (61)	36 (0.9)	32 (0)	2-3	pickle, dry, or freeze
celeriac	Mar-Jun	Mar-Aug	Jun-Aug	—	C	10-15-ft row	4 (10)	24 ^h (0.6)	32 (0)	8-16	can, dry, or freeze
celery ^h	Mar-Jun	Apr-Aug	Jun-Aug	—	C	20-30-ft row (6-9-m row)	5 (13)	24 ^h (0.6)	32 (0)	8-16	can, dry, or freeze
chard ^f	Feb-May; Aug	Feb-May	Feb; Aug	Sep-Oct	C	3-4 plants	12 (30)	30 (0.8)	32 (0)	1-2	freeze
chayote	—	Apr-May	May-Jun	—	W	1-2 plants	72 (183)	use trellis	—	—	use fresh
chives ^f	Apr	Feb-Apr	Feb-Mar	Sep-Feb	C	1 clump	—	—	—	—	use fresh
corn, sweet ^g	May-Jul	Mar-Jul	Mar-Jul; Aug	Feb-Mar	W	20-30-ft (6-9 m) In 4 rows	12 (30)	36 (0.9)	32 (0)	1/6-1	can, dry, or freeze
cucumbers	Apr-Jun	Apr-Jun	Apr-Jul	Feb-May; Aug	W	6 plants	24 (61)	48 (1.2)	45-55 (7-13)	1-2	freeze, pickle, or puree
eggplant ^h	May	Apr-May	Apr-May	Feb-Apr	W	4-6 plants	18 (46)	36 (0.9)	50-60 (10-16)	1-2	dry or freeze
endive ^f	Mar-Jul	Dec-Aug	Jan; Apr; Aug	Sep-Dec	C	10-15-ft row (3-4.5-m row)	10 (25)	24 ^h (0.6)	32 (0)	2-3	use fresh
Florence fennel	Mar-Jul	Feb-Jul	Aug	Sep-Nov	C	10-15-ft row (3-4.5-m row)	4 (10)	30 ^h (0.8)	32 (0)	2-3	can, dry, or freeze
garlic ^f	Oct-Dec	Oct-Dec	Oct-Dec	Sep-Nov	C	10-20-ft row (3-6-m row)	3 (7.5)	18 ^h (0.5)	65-70 (18-21)	24-32	use fresh
kale	Feb-April	Aug-Oct	Aug-Sept	Sept-Nov	C	10-ft row (3-m row)	18-24 (46-61)	24-30 (0.6-0.8)	32 (0)	2	use fresh
kohlrabi ^f	Jul-Aug	Jan; Aug-Sep	Aug	Oct-Nov	C	10-15-ft row (3-4.5-m row)	3 (7.5)	24 (0.6)	32 (0)	2-4	use fresh
leeks	Feb-Apr	Jan-Apr	Jan-Apr	—	C	10-ft row	2 (5)	24 (0.6)	32 (0)	4-12	use fresh
lettuce ^g	Feb-Aug	Aug-Apr	Aug; Nov-Mar	Sep-Dec	C	10-15-ft row or 5 ft (1.5m) each month	12 (30) head; (3-4.5-m row)	24 (0.6) 6 (0.15) leaf	32 (0)	2-3	use fresh

Table 14.2 cont.

Vegetable	Recommended planting dates ^a				Crop type ^b	General planting requirements			Storage conditions		
	North and North Coast	South Coast	Interior Valleys	Desert Valleys		Amount to plant (4 persons)	Distance in inches ^c between plants in rows (cm)	Distance in inches ^c between rows (no beds) (m)	Best temp °F (°C)	Time length to (weeks)	How to preserve ^d
mustard	Apr; Jul–Aug	Aug–Feb	Aug; Apr	Oct–Dec	C	10-ft row (3-m row)	8 (20)	24 ^e (0.6)	32 (0)	1–2	use fresh
okra	May	Apr–May	May	Mar	W	10–20-ft row	18 (46)	36 (0.9)	50–60 (10–16)	—	use fresh
onions, bulb ^f	Jan–Mar	Feb–Mar	Nov–Mar	Oct–Nov	C	30–40-ft row	3 (7.5) (9–12-m row)	18 ^g (0.5)	32–36	12–32 (0–2)	can, dry, or freeze
onions, green ^{h,g}	Apr–Jul	All year	Aug–Dec	Sep–Jan	C				85–90 (30–32)		use fresh
parsley ^f	Dec–May	Dec–May	Dec–May	Sep–Oct	C	1–2 plants	8 (20)	24 (0.6)	32 (0)	1–2	dry or freeze
parsnips	May–Jun	Mar–Jul	May–Jul	Sep–Oct	C	10–15-ft row (3–4.5-m row)	3 (7.5)	24 ^e (0.6)	32 (0)	8–16	freeze
peas ^g	Jan–Apr; Sep–Oct	Aug; Dec–Mar	Sep–Jan; Jan–Feb	Sep–Oct	C	30–40-ft row (9–12-m row)	2 (5)	36 (0.9) bush; 48 (1.2) vine	32 (0)	1–2	can, dry, or freeze
peppers ^h	May	Apr–May	May	Mar	W	5–10 plants	24 (61)	36 (0.9)	45–55 (7–13)	4–6	can, dry, or freeze
potatoes, sweet ^a	May	Apr–May	Apr–Jun	Feb–Jun	W	50–100-ft row (15–30-m row)	1 2 (30)	36 (0.9)	55–60 (13–16)	8–24	can, dry, or freeze
potatoes, white	Early–Feb	Feb–May	Feb–Mar; Aug	Dec–Feb	C	50–100-ft row (15–30-m row)	12 (30)	30 (0.8)	40–45 (4–7)	12–20	can, dry, or freeze
pumpkins	Late–Apr–May	Jun–Aug	Aug								
radish ^g	May	May–Jun	Apr–Jun	Mar–Jul	W	1–3 plants	48 (122)	72 (1.8)	55 (13)	8–24	can, dry, or freeze
radish ^{h,g}	All year	All year	Sep–Apr	Oct–Mar	C	4-ft row (1.2-m row)	1 (2.5)	6 ^h (0.2)	32 (0)	—	use fresh
rhubarb ^a	Dec–Mar	Dec–Jan	Dec–Feb	—	C	2–3 plants	36 (91)	48 (1.2)	32 (0)	2–3	can or freeze
rutabaga	Jul; Mar–Apr	Jul–Sep; Aug–Mar	Aug	Oct–Dec	C	10–15-ft row (3–4.5-m row)	3 (7.5)	6 ^h (0.2)	32 (0)	8–16	freeze
sprout ^f	Aug–Feb	Aug–Mar	Sep–Jan	Sep–Nov	C	10–20-ft row (3–6-m row)	3 (7.5)	18 ^g (0.5)	32 (0)	1–2	dry or freeze
squash, summer ^f	May–Jul	Apr–Jun	Apr–Jul; Aug–Sep	Feb–Mar;	W	2–4 plants	24 (61)	48 (1.2)	50–55 (10–13)	2–3	can, dry, or freeze
squash, winter ^f	May	Apr–Jun	Apr–Jun	Feb–Mar; Aug	W	2–4 plants	24–48 (61–122)	72 (1.8)	55 (13)	8–24	can, dry, or freeze
tomatoes ^h	May	Apr–Jul 15	Apr–May	Dec–Mar	W	6–10 plants	18–36 (46–91)	36–60 (0.9–1.5)	55–65 (13–18)	1–2	can, dry, or freeze
turnips ^f	Jan, Aug	Jan; Aug–Oct	Feb; Aug	Oct–Feb	C	10–15-ft row (3–4.5-m row)	2 (2.5)	18 ^g (0.5)	32 (0)	8–12	can
watermelons	May–Jun	Apr–Jun	Apr–Jun	Jan–Mar	W	6 plants	60 (152)	72 (1.8)	40 (4)	2–3	freeze

Notes:

^a North and North Coast = Monterey County north; South Coast = San Luis Obispo County south; Interior Valleys = Sacramento, San Joaquin, and similar valleys; Desert Valleys = Imperial and Coachella Valleys. Because the areas shown here are large, planting dates are only approximate, as the climate may vary even in small sections of the state. Contact experienced gardeners in your community and experiment on your own to find more precise dates.

^b C = cool season, W = warm season.

^c Planting distances listed here are standards. Many crops can be spaced more closely for intensive production.

^d Adapted from *Vegetable Gardening Illustrated* 1994.

^e Transplants, shoots, or roots are used for field planting.

^f This crop is suitable for a small garden if compact varieties are grown.

^g In a suitable climate, these crops can be planted more than once per year for a continuous harvest.

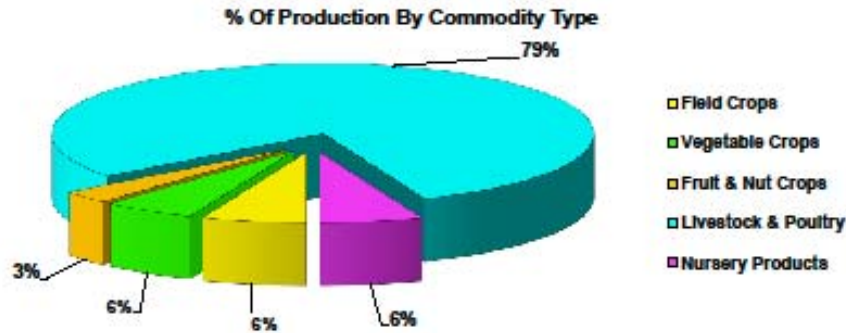
^h If grown in beds, plant two rows per bed. Space the beds about 32 to 40 inches (80 to 100 cm) apart and make the tops of the beds 18 inches (45 cm) wide.

APPENDIX D: COUNTY OF SAN BERNARDINO 2012 CROP REPORT

SUMMARY AND NOTES

Highlights

Total Value of Production	\$466,502,500
Change in Value from 2011	-\$52,914,900
Commodity with highest reported dollar value	Milk, Market 264,611,600
Highest per acre value	Indoor Decorative Plants 785,048
Lowest per acre value	Rangeland \$0.38
Commodity with the greatest % increase in reported total value from 2011 <small>Due to planted acreage increases</small>	Mixed Hay 373%
Commodity with greatest % decrease in reported total value from 2011 <small>Nearly all milk went for the fresh market</small>	Milk, Manufacturing -99.80%
Crop with the greatest amount of planted acreage	Alfalfa 8,040



Top Ten Products

2012 Rank	Product	Value	Value	% of Total	2011 Rank
1	Milk	\$	264,611,600	56.7%	1
2	Eggs	\$	42,972,500	9.2%	2
3	Cattle & Calves (Meat)	\$	39,761,800	8.5%	3
4	Alfalfa, All	\$	20,795,400	4.5%	4
5	Bok Chai	\$	11,866,100	2.5%	7
6	Replacement Heifers	\$	10,277,100	2.2%	6
7	Trees and Shrubs	\$	8,734,800	1.9%	5
8	Indoor Decoratives	\$	7,027,800	1.5%	9
9	Oranges	\$	6,210,100	1.3%	8
10	Turf	\$	5,394,000	1.2%	10
Total Top Ten		\$	417,651,200	89.5%	

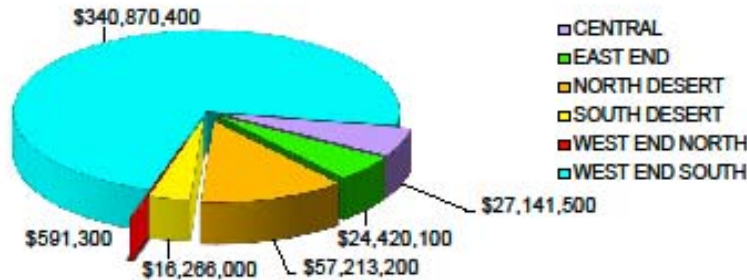
Oranges includes both navel and valencia oranges.

COUNTY REGION	FRUIT & NUTS		VEGETABLES		FIELD CROPS	
	ACRES	VALUE	ACRES	VALUE	ACRES	VALUE
CENTRAL	27	\$ 38,300				
EAST END	2,929	\$ 9,609,300	1,406	\$ 1,861,900	18	\$ 2,700
NORTH DESERT	900	\$ 1,122,100	58	\$ 594,100	1,080,269	\$ 15,911,700
SOUTH DESERT	148	\$ 249,800	44	\$ 362,000	298,940	\$ 1,758,000
WEST END NORTH	102	\$ 127,200	-	\$ -	-	\$ -
WEST END SOUTH	337	\$ 2,443,900	3,604	\$ 22,903,100	17,675	\$ 11,151,200
TOTAL	4,443	\$ 13,990,600	5,111	\$ 25,721,100	1,396,912	\$ 28,825,100

COUNTY REGION	NURSERY AND MISCELLANEOUS		LIVESTOCK AND POULTRY		TOTAL VALUE	
	ACRES	VALUE	VALUE	ACRES	VALUE	
CENTRAL	55	\$ 2,285,900	24,415,800	82	\$ 27,141,500	
EAST END	252	\$ 1,450,400	11,495,800	4,605	\$ 24,420,100	
NORTH DESERT	200	\$ 1,300,000	38,285,300	1,081,427	\$ 47,213,200	
SOUTH DESERT	18	\$ 3,431,600	10,464,600	299,150	\$ 16,266,000	
WEST END NORTH	0	\$ -	464,100	102	\$ 591,300	
WEST END SOUTH	622	\$ 19,467,900	284,904,300	22,237	\$ 340,870,400	
TOTAL	1,147	\$ 28,335,800	370,029,300	1,407,603	\$ 466,502,500	

Central = The area east of Interstate 15 to Highway 30, south of the San Bernardino Mountains.
East End = The area east of Highway 30 and including all of the San Bernardino Mountains west of Highway 62.
North Desert = The area north of Victorville including the area east along Highway 40 and National Trails Highway.
South Desert = The communities of Adelanto, Apple Valley, Victorville, Heaperia, Lucerna Valley, Yucca Valley , 29 Palms and the surrounding area.
West End North = The area north of Mission Boulevard and west of Highway 15.
West End South = The area south of Mission Boulevard including Chino Hills and parts of Chino and Ontario.

\$ Production By Area



Summary Comparison

Commodity Group	2011 Acreage	2011 \$ Value	2012 Acreage	2012 \$ Value
Field Crops	1,396,900	28,769,900	1,396,912	28,825,100
Vegetable Crops	5,254	26,171,000	5,111	25,721,100
Fruit & Nut Crops	4,448	17,000,700	4,443	13,590,600
Livestock & Poultry		412,301,500		370,029,900
Nursery Products	1,053	35,174,300	1,147	28,335,800
TOTAL	1,407,656	\$19,417,400	1,407,603	466,502,500

Definitions

cwt.: Hundredweight, 100 pounds.

Greenchop: Hay and other field crops harvested by cutting into small pieces and fed directly to animals.

Cropland forage: Fields where the crop stubble and residue is grazed on by animals, often sheep.

Silage: Greenchop placed into air-tight bags or enclosures and allowed to ferment, thus increasing the nutritional value.

Packed: Fruits and vegetables marketed as fresh and whole.

Processed: Fruit and vegetables either dried, juiced or otherwise changed from a fresh, whole item.

Market Milk: Milk sold for marketing as a fluid product generally for drinking.

Manufacturing Milk: Milk sold to make cheese, yogurt, powdered milk, etc.

Started Pullets: Young chickens produced to replace old egg-laying hens.

Spent Hens: Egg laying chickens who have reached the end of their productive careers.

Calves: Young cows between 200 to 300 pounds, sold to ranchers to "feed" up to a size suitable for slaughter.

Beef: Cattle raised for meat and by products. Most of these are young male calves.

Replacement Heifers: Young female cows destined for milk production

Field Crops

	Year	Acres Harvested	Per Acre	Total Yield	Unit	\$ Per Unit	\$ Per Acre	Total \$ Value
Greenchop, Total	2012	3,267	27	88,856	Ton	46.62	1,280	4,142,800
	2011	3,550	22	76,665	Ton	41.28	891	3,164,400
Alfalfa	2012	883	65	57,395	Ton	49.00	3,185	2,812,400
	2011	650	52	33,765	Ton	50.31	2,614	1,698,800
Barley	2012	80	15	1,200	Ton	36.00	540	43,200
	2011	180	7.5	1,350	Ton	30	225	40,500
Oats	2012	1,300	15	19,500	Ton	36.00	540	702,000
	2011	960	15	14,370	Ton	30.00	449	431,100
Sudan	2012	917	10	8,835	Ton	57.52	554	508,200
	2011	1,330	16	21,600	Ton	36.25	589	783,100
Mixed Grain	2012	107	18	1,926	Ton	39.98	720	77,000
	2011	430	13	5,580	Ton	37.80	490	210,900
Hay, Total	2012	9,492	7	64,538	Ton	258.03	1,754	16,652,600
	2011	9,330	8	75,417	Ton	262.65	2,123	19,808,200
Alfalfa	2012	7,157	8	56,842	Ton	256.89	2,039	14,590,500
	2011	7,840	9	70,227	Ton	268.19	2,402	18,834,300
Barley	2012			Nons reported				
	2011	480	4.5	2,160	Ton	180	810	388,600
Sudan	2012	90	3	250	Ton	1,800.00	5,000	450,000
	2011	480	3	1,420	Ton	171.76	508	243,900
Misc. Mixed Hay	2012	2,245	3	7,446	Ton	216.51	718	1,612,100
	2011	530	3	1,610	Ton	211.93	644	341,200
Pasture	2012	7,360			Acre	150.00		1,104,000
	2011	7,600			Acre	150.00		1,140,000
Range*	2012	1,370,318			Acre	0.38		514,200
	2011	1,370,300			Acre	0.16		217,600
Silage, Total	2012	5,095	18	93,550	Ton	67.45	1,238	6,310,100
	2011	4,170	17	69,240	Ton	56.89	945	3,938,800
Corn	2012	1,735	23	39,900	Ton	74.01	1,702	2,953,000
	2011	900	24	21,625	Ton	63.03	1,515	1,363,100
Sorghum	2012	1,625	17	27,625	Ton	65.00	1,105	1,795,600
	2011	960	14	13,635	Ton	52.37	755	724,600
Wheat	2012	1,735	15	26,025	Ton	60.00	900	1,561,500
	2011	2,310	15	33,780	Ton	54.80	801	1,851,100
Miscellaneous	2012	1,360						101,400
	2011	1,950						500,900
Total	2012	1,396,912						\$ 28,825,100
	2011	1,396,900						\$ 28,769,900

Miscellaneous 2011 and 2012: Blackeye Beans (2012); Cotton (2011); Cropland forage; and Silage, alfalfa (2011), and triticale.

*Range value in 2012 is derived from the carrying capacity and the current Animal Unit Month fee charged for federal grazing land. Prior years were based on rainfall and price of alfalfa hay.

Fruit and Nut Crops

	Year	Harvested Acreage	Per Acre	Total Yield	Unit	\$ Per Unit	\$ Per Acre	Total \$ Value
Apples, Total	2012	282	3.2	909	Ton	2,079.03	6,704	1,890,500
	2011	255	3.6	917	Ton	2,124.17	7,635	1,946,800
Packed	2012			570	Ton	2,504.03		1,428,100
	2011			584	Ton	2,560.24		1,493,900
Processed	2012			339	Ton	1,364.01		462,400
	2011			333	Ton	1,360.06		452,900
Avocados	2012	193	4.4	840	Ton	1,595.52	6,941	1,339,600
	2011	251	3.6	912	Ton	1,587.76	5,767	1,447,400
Grapes, Total	2012	477	1.8	839	Ton	885.32	1,556	742,400
	2011	477	1.7	797	Ton	473.45	791	377,500
Zinfandel	2012	150	3.2	486	Ton	647.26	2,098	314,700
	2011	150	2.5	371	Ton	487.19	1,205	180,700
Red Wine	2012	167	0.9	152	Ton	444.33	405	67,700
	2011	167	2.0	337	Ton	266.72	539	90,000
By-products	2012	160	1.3	200	Ton	1,800.00	2,250	360,000
	2011	160	0.6	89	Ton	1,200.00	668	106,800
Grapefruit, Total*	2012	327	4.7	1,531	Ton	127.24	596	194,800
	2011	350	7.3	2,570	Ton	231.52	1,700	595,000
Packed	2012			361	Ton	526.04		189,900
	2011			1,285	Ton	420.00		539,700
Processed	2012			246	Ton	19.92		4,900
	2011			1,285	Ton	43.04		55,300
Lemons, Total*	2012	261	1.0	266	Ton	157.89	161	42,000
	2011	258	3.4	881	Ton	300.00	1,024	264,300
Oranges-Navel, Total*	2012	1,240	7.2	8,982	Ton	319.83	2,315	2,670,900
	2011	1,266	14.8	18,721	Ton	336.30	4,973	6,295,900
Packed	2012			4,793	Ton	511.13		2,497,800
	2011			12,410	Ton	468.00		6,056,100
Processed	2012			4,189	Ton	89.07		373,100
	2011			6,311	Ton	38.00		239,800
Oranges-Valencia, Total*	2012	911	9.2	8,356	Ton	399.62	3,665	3,339,200
	2011	934	10.4	9,746	Ton	368.04	3,840	3,586,900
Packed	2012			4,566	Ton	613.25		2,800,100
	2011			5,341	Ton	572.57		3,058,100
Processed	2012			3,790	Ton	142.24		539,100
	2011			4,405	Ton	120.05		528,800
Pistachios	2012	460	0.3	132	Ton	4,233.78	1,213	557,600
	2011	367	0.2	68	Ton	4,217.14	1,005	369,000
Strawberries	2012	141	15.0	2,111	Ton	1,041.51	15,589	2,198,100
	2011	141	13.4	1,892	Ton	964.72	12,943	1,825,000
Miscellaneous	2012	151						415,300
	2011	140						292,900
TOTAL	2012	4,443					\$	13,590,600
	2011	4,448					\$	17,000,700

* Acreage as reported by the National Agricultural Statistics Service

Miscellaneous 2011 & 2012: Blood Oranges (2012); Cherries (2012); Jujubes; Kiwis (2011); Mexican Guavas; Mulberries (2011); Peaches; Pears; Persimmons; Grapes, White wine and Table; Pomegranates; and Raspberries (2011).

	Year	Acres Harvested	Per Acre	Total Yield	Unit	\$ Per Unit	\$ Per Acre	Total \$ Value
Suk Gat	2012	12.0	3.0	36	Ton	1,119.44	3,358	40,300
	2011	20.0	3.0	60	Ton	800.00	2,400	48,000
Miscellaneous Oriental Vegetables**	2012	158.5	3.2	508	Ton	1,168.96	3750	594,300
	2011	198.0	2.6	512	Ton	1,090.84	2823	559,000
**2011 & 2012	Bitter Lettuce (2012); Ken Yip; Korean Leeks/Onions; Korean Peppers; Minari; Red Mustard; Shungiku; Korean Squash(2012); Korean Watermelon (2012); Vietnamese Mint; Yermo, and Yu Chol .							
Pumpkins	2012	53	13.8	733.28	Ton	331.39	4,585	243,000
	2011	53.1	17.5	930.75	Ton	318.78	5,588	296,700
Squash	2012	67.2	9.0	601	Ton	1,035.66	9,269	622,900
	2011	80.0	16.8	1,341	Ton	720.00	12,071	965,700
Tomatillos	2012			See Miscellaneous				
	2011	33	5.7	189.6	Ton	1,179.85	6,738	223,700
Tomatoes	2012	13.3	10.4	139	Ton	1,038.39	10,820	143,900
	2011	12.1	10.5	127	Ton	796.85	8,364	101,200
Miscellaneous Vegetables***	2012	124						8,263,600
	2011	147						8,714,700
Total	2012	5,111						\$ 25,721,100
	2011	5,294						\$ 25,171,000
***Miscellaneous Vegetables	2012	Artichokes; Beans, black-eye, fava, and green; Broccoli; Cactus; Carrots; Cauliflower; Celery; Chard; Eggplant; Garlic; Green and Dry Onions; Kale; Kohlrabi; Leeks; Lettuce; Melons, cantaloupe, honeydew, and watermelon; Mushrooms; Peppers, bell and chili; Potatoes; Radish; Salad Mix; Shallots; Snap peas; Sprouts; Sweet Potatoes; Sunchoke; Tomatillos; Turnips; and Verdélago.						
	2011	Artichokes; Beans, black-eye, fava, and green; Broccoli; Carrots; Cauliflower; Chard; Collards; Eggplant; Garlic; Green and Dry Onions; Kohlrabi; Leeks; Lettuce; Melons, cantaloupe, honeydew, and watermelon; Mushrooms; Mustard Greens; Okra; Peppers, bell and chili; Potatoes; Radish; Rhubarb; Salad Mix; Shallots; Snap peas; Spinach; Sprouts; Sweet Potatoes; Sunchoke; Turnips; and Verdélago.						

APPENDIX E: PRELIMINARY BUDGET ESTIMATE FOR 1,500-ACRE FARM

Preliminary Budget Estimate for Farm Equipment and Operating Costs

Activity / Equipment	Unit Cost	Unit Amount	Estimate
Engineering and Design	n/a	n/a	\$ 80,000.00
(D-7) Caterpillar with front blade	\$ 500,000.00	1	\$ 500,000.00
Ripper with (3) 5-foot shanls	\$ 30,000.00	1	\$ 30,000.00
Drag scraper - heavy	\$ 25,000.00	1	\$ 35,000.00
Disk 14-foot - heavy	\$ 30,000.00	1	\$ 30,000.00
Carry-all earth movers	\$ 500,000.00	3	\$ 1,500,000.00
Laser scraper with instruments	\$ 70,000.00	1	\$ 70,000.00
Water drop tank	\$ 30,000.00	1	\$ 30,000.00
1000-gallon fuel tank	\$ 25,000.00	1	\$ 25,000.00
Backhoe with extend-a-hoe	\$ 75,000.00	1	\$ 75,000.00
Tandem disk	\$ 25,000.00	1	\$ 25,000.00
Border disk	\$ 8,000.00	1	\$ 8,000.00
Lister	\$ 25,000.00	1	\$ 25,000.00
Cultivator	\$ 25,000.00	1	\$ 25,000.00
New centrifugal water pumps with diesel motors (installed & connected to exsting 12-ince steel pipe)	\$ 45,000.00	2	\$ 90,000.00
New tractor	\$ 75,000.00	1	\$ 75,000.00
New 4x4, 3/4-ton utility truck with fuel storage tank, compressor, hoist and tool boxes	\$ 60,000.00	1	\$ 60,000.00
New 4x4 work truck	\$ 30,000.00	1	\$ 30,000.00
New ATV	\$ 5,000.00	1	\$ 5,000.00
New shop tool box (large on wheels), hand tools including heavy tools	\$ 5,000.00	1	\$ 5,000.00
New shop air compressor, including 100-foot x 3/4-inch galvanized steel pipe, rubber hoses and fittings	\$ 3,000.00	1	\$ 3,000.00
New heavy-duty cutting torch with oxygen, acetylene tanks, dolly	\$ 1,000.00	1	\$ 1,000.00
New arc welder with mast, golves, chipper hammers, and clamps	\$ 1,000.00	1	\$ 1,000.00
		Subtotal	\$ 2,728,000.00
<i>Hay Equipment</i>			
Swather	\$ 40,000.00	2	\$ 80,000.00
Baler	\$ 60,000.00	2	\$ 120,000.00
Rakes	\$ 15,000.00	2	\$ 30,000.00
Harrow bed	\$ 70,000.00	1	\$ 70,000.00
Tractor	\$ 65,000.00	1	\$ 65,000.00
Twine	\$ 6,000.00	1	\$ 6,000.00
		Subtotal	\$ 371,000.00
<i>Operating Capital</i>			
Farm manager	\$ 52,000.00	1	\$ 52,000.00
Fringe benefits (18%)	\$ 9,360.00	1	\$ 9,360.00
Ag Techs	\$ 31,200.00	3	\$ 93,600.00
Fringe benefits (18%)	\$ 5,616.00	3	\$ 16,848.00
Diesel fuel per year (gallons)	\$ 4.50	10,000	\$ 45,000.00
Gasoline (gallons)	\$ 5.00	2,000	\$ 10,000.00
Repair and maintenance	\$ 10,000.00	1	\$ 10,000.00
Contingency	\$ 50,000.00	1	\$ 50,000.00
		Subtotal	\$ 286,808.00
		GRAND TOTAL	\$ 3,385,808.00

WORKS CITED

- Brown, T. (2006). Trends in water market activity and price in the western United States. *Water Resources Research*, 42(W09402), 7. Retrieved from http://gis.fs.fed.us/rm/value/docs/trends_in_water_market_activity.pdf.
- Bureau of Labor Statistics. (2011). *Consumer expenditure survey 2006-2011 multi-year table*. Retrieved from <http://www.bls.gov/cex/#tables>.
- California Department of Food and Agriculture. (2013). *California organic program*. Retrieved from http://www.cdffa.ca.gov/is/i_&c/organic.html.
- California Food and Agricultural Code. (2003). *Section 46000-46029 California organic products act of 2003*. Retrieved from <http://www.leginfo.ca.gov/cgi-bin/displaycode?section=fac&group=45001-46000&file=46000-46029>.
- Chemehuevi Indian Tribe. (July 2012). *Comprehensive economic development strategy*.
- Chemehuevi Indian Tribe Tribal Employment Rights Office. (2013). *Unemployment study 2013*.
- County of San Bernardino Department of Agriculture, Weights, and Measures. (2012). *2012 Crop Report*. Retrieved from <http://cms.sbcounty.gov/Portals/13/CropReports/2012%20crop%20%20livestock.pdf>.
- Esri. (2012). *Tapestry segmentation reference guide: segments 49, 31, 33, 41 and 26*. Retrieved from <http://www.esri.com/library/brochures/pdfs/tapestry-segmentation.pdf>
- Esri Business Analyst. (2012). *Business summary*.
- Esri Business Analyst. (2012). *Demographic and income profile*.
- Esri Business Analyst. (2012). *Detailed income profile*.
- Esri Business Analyst. (2012). *Household budget expenditures*.
- Esri Business Analyst. (2012). *Market profile*.
- Esri Business Analyst. (2012). *Population summary*.
- Esri Business Analyst. (2012). *Retail market potential*.
- Esri Business Analyst. (2012). *Tapestry Segmentation Area Profile*.
- Federal Highway Administration Office of Highway Policy Information. (2012). *Highway performance monitoring system*. Retrieved from <http://www.fhwa.dot.gov/policyinformation/hpms/volumeroutes/ch5.cfm>.
- Google Maps. (2012). Retrieved from <https://maps.google.com/>.
- Havasulanding Resort and Casino. (2013). *Ferry schedule*. Retrieved from <http://www.havasulanding.com/ferry.html>.

Kanable, Rebecca. (March 2012). Laughlin/Bullhead Int'l hits the jackpot with terminal improvements. *Airport Improvement Magazine*. Retrieved from <http://www.airportimprovement.com/content/story.php?article=00359>.

Kunkel, P., Peterson, J. & Mitchell, J. (2009). Farm leases. *University of Minnesota Extension*. Retrieved from <http://www.extension.umn.edu/distribution/businessmanagement/df2593.html>.

Natural Resources Conservation Service. (2013). *Ecological and interpretive groups*. Retrieved from <http://soils.usda.gov/technical/handbook/contents/part622.html>.

State of California Employment Development Department. (2008). *California's agricultural employment*. Retrieved from <http://www.calmis.ca.gov/file/agric/ca-ag-profile.pdf>.

University of California Agricultural Issues Center. (2009). *AIC white papers on California agricultural issues*. Retrieved from <http://aic.ucdavis.edu/publications/whitepapers/whitepapers.pdf>.

University of California California Garden Web. (2013). *Vegetables & Sustainable*. Retrieved from <http://ucanr.org/sites/gardenweb/Vegetables/?uid=8&ds=462>

University of California California Master Gardener Handbook. (2013). *Vegetable gardening at a glance: how to plant and store*. Retrieved from <http://ucanr.org/sites/gardenweb/files/29040.pdf>

U.S. Census Bureau. (2000). *DP-1 profile of general population and housing characteristics: county and national data*. Retrieved from <http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml>.

U.S. Census Bureau. (2010). *Census brief: overview of race and Hispanic origin*. Retrieved from <http://www.census.gov/prod/cen2010/briefs/c2010br-02.pdf>.

U.S. Census Bureau. (2010). *Census interactive population search*. Retrieved from <http://2010.census.gov/2010census/popmap/>.

U.S. Census Bureau. (2010). *County business patterns: geography area series: county business patterns by employment size class*. Retrieved from <http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml>.

U.S. Census Bureau. (2010). *DP-1 profile of general population and housing characteristics: county and national data*. Retrieved from <http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml>.

U.S. Census Bureau (2010). *DP-3 selected economic statistics*. Retrieved from <http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml>.

U.S. Census Bureau. (2010). *S1501 Educational Attainment*. Retrieved from <http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml>.

U.S. Department of Agriculture National Agriculture Statistics Service. (2002). *Census of agriculture*. Retrieved from <http://www.agcensus.usda.gov/Publications/2002/index.php>

U.S. Department of Agriculture National Agriculture Statistics Service. (2007). *Census of agriculture*. Retrieved from http://www.agcensus.usda.gov/Publications/2007/Full_Report/

U.S. Department of Agriculture National Agriculture Statistics Service. (2007). *Census of agriculture county profile: Clark, NV*.

U.S. Department of Agriculture National Agriculture Statistics Service. (2007). *Census of agriculture county profile: La Paz, AZ.*

U.S. Department of Agriculture National Agriculture Statistics Service. (2007). *Census of agriculture county profile: Mohave, AZ.*

U.S. Department of Agriculture National Agriculture Statistics Service. (2007). *Census of agriculture county profile: Riverside, CA.*

U.S. Department of Agriculture National Agriculture Statistics Service. (2007). *Census of agriculture county profile: San Bernardino, CA.*

U.S. Department of Agriculture National Agriculture Statistics Service. (2012). *Land values 2012 summary.* Retrieved from http://www.nass.usda.gov/Charts_and_Maps/Land_Values_and_Cash_Rents/.

Western Regional Climate Center. (2013). *Arizona Monthly Average Temperatures.* Retrieved from <http://www.wrcc.dri.edu/htmlfiles/az/az.avg.html>