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The Next California

Phase 1: Investigating Potential in the mid-Mississippi Delta River region

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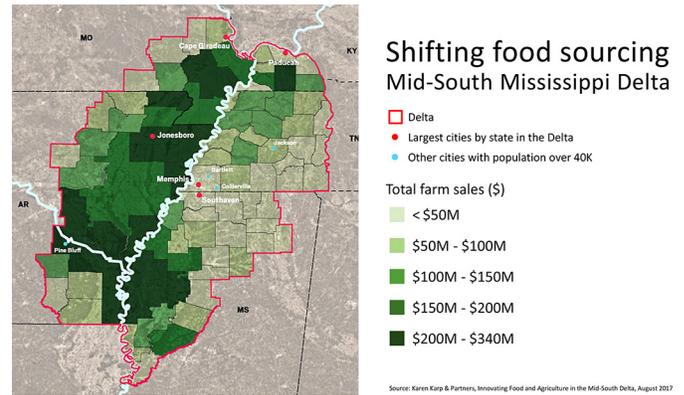
Background

California produces more than 1/3 of the vegetables and 2/3 of fruits and nuts that are grown in the United States. The state is the leading producer of dozens of produce items and the sole producer (99% or more) of almonds, dates, figs, grapes (to be made into raisins), kiwifruit, honeydew, olives, clingstone peaches, pistachios, sweet rice, ladino clover seed, and walnuts. However, California's warming climate makes farming there less certain in the future, and the state will likely suffer from more chronic weather (e.g. increased droughts) as well as severe weather (e.g. heavy rains, flooding and freezes) in the future. Fires, while not especially important for annual crops, can pose serious threats to perennials and tree crops as well as infrastructure. The Sierra Nevada mountains are getting less average snowfall and, coupled with warmer springs, this is leading to a faster melt and a lack of water by late summer for the third and fourth production cycles of many crops. This is also devastating for California's orchards since it can mean the loss of large trees due to water stress as opposed to a single planting of row crops. Over time, it is likely that farmers will have to become very efficient to maintain production and, even so, the state will need to decide which crops are going to receive the available water. Net income is likely to be the determining factor. The Markets Institute identified this growing uncertainty in domestic food production as the climate changes as an urgent challenge of our time. We are embarking on several avenues of research to identify options to build resiliency and help transition more quickly in the coming years.

WWF kicked off Phase I of this project in January 2019 with the goal of examining the potential to boost farming of specialty produce in the mid-Mississippi Delta region (eastern Arkansas, western Tennessee, southeast Missouri, and northwest Mississippi). This region has a long history of farming, but it is dominated by commodity row crops, specifically rice, soy, wheat, and corn, all largely grown for animal feed. Cotton is also a common crop.

The mid-Mississippi Delta region includes an area in cultivation that is similar in size to that of California, but 75% of it is in commodity crops and only 25% in specialty crops, just the opposite of California.

The region is also economically depressed. The mid-Mississippi Delta has a high poverty rate (19.8%) and low median income (\$45,479). Nationally, the country has a 12.3% poverty rate and a median income of \$57,652.



State	Farmland (acres)	Average Farm Size (acres)	Farms >5,000 acres	Total Market Value of Farms	Average Market Value of Farm
California	24.5M	348	923	\$45.2B	\$640K
Tennessee	10.9M	155	90	\$3.8B	\$54K
Arkansas	13.9M	326	227	\$9.7B	\$226K
Mississippi	10.4M	298	162	\$6.2B	\$177K
Missouri	27.8M	291	260	\$10.5B	\$110K

The Next California, Phase I: Our Work to Date

Before this project began, preliminary research suggested that it might make more sense to produce some food in the mid-Mississippi Delta region, in the face of climate change and shifting weather patterns, and that it could also serve as a platform for the region’s economic development. We have worked to understand the current status of the following elements and how they are likely to change in the future due to climate change, weather variability, public and private GHG emission commitments, and other economic changes: growing season, soils, land value, labor costs, water availability, infrastructure (e.g. transportation, storage, processing facilities, etc.), technical support, training, identification of likely impacts, and societal commitments around such issues as food loss and waste.

During Phase I, we had in-depth conversations with 88 people, including key academics working in relevant fields in the region, USDA officials, other government officials at federal, state, and local levels, farmers and growers, local businesses and non-profits working to promote agriculture in the region, large corporations with footprints in the region, other environmental NGOs, extension leads, community foundations and banks, and more. We have visited fifteen farms in the region, including both the mid-Mississippi Delta (Arkansas and Tennessee) and the Arkansas River Valley region (mid-Delta).

We also identified and analyzed existing data sets and holes that must be filled to fully analyze agricultural trends. This included negotiating with and receiving data from consultants who have studied this region previously, interpreting the most recent Census data, and engaging the USDA at the federal and state level. Additional data, or potential future data, has been discussed with other interested groups such as the National Association of State Departments of Agriculture (NASDA) and the Farm Journal.

Finally, three members of our research team conducted deep dives into infrastructure and investment in infrastructure, labor, and policies around labor, shipping, and dicamba in the region.

Key Learnings

While the Delta region has a long history of farming, including some specialty crops, it also has a very different climate than California’s Central Valley. Water is plentiful in the Delta and expected to remain so, but it also has a few key climate differences from California that will determine which crops can be grown at all and in a profitable manner:

- Humidity (California is very dry)
- Cold winters (there is frost in the Delta but not often in California, which has a warmer winter)
- Nighttime temperatures (California's desert gets cool at night, even in mid-summer, whereas the Delta remains hot at night in summer)

These differences bring both hurdles and opportunities, some of which are discussed in greater detail below. For example, most crops need "resting" time, but some require nightly rests, meaning cooler nights, while others are more affected seasonally, needing colder winters. If crops need time to "rest" at night in cooler temperatures, they will not grow well in the Delta region. However, for crops that need to rest over the winter, the Delta provides an opportunity. For example, as California gets warmer, it will not have cool enough temperatures in the off-season to allow peach trees enough "chilling time" to fruit properly in the summer. However, since the Delta will continue to have seasonality even in the face of climate change, it will continue to be able to offer this chilling time. Meanwhile, the humidity present in the region brings not just plentiful water, but pests. Climate change will most likely exacerbate this.

Facing a different climate, it is important to narrow focus and concentrate on specialty crops currently grown in California that can potentially grow profitably and sustainably in the Delta region. These include:

- | | | |
|------------------|----------------|--------------------|
| - Strawberries | - Peanuts | - Watermelon |
| - Blueberries | - Pecans | - Cantaloupe |
| - Blackberries | - Hazelnuts | - Muskmelon |
| - Lettuce | - Peaches | - Honeydew |
| - Collard Greens | - Tomatoes | - Sweet Potatoes |
| - Kale | - Bell Peppers | - Turnips |
| - Walnuts | - Hot Peppers | - Peas |
| - Chestnuts | - Eggplant | - Brussels Sprouts |

Some of these crops are already grown in the region, albeit on a small scale. According to the Arkansas Farm Bureau, there are an estimated 15,000 acres of vegetables. (To provide a baseline, Arkansas has about 1.3M acres of rice and 3.1M acres of soybeans.) However, most of these farms are quite small (63.7% have \$10,000 or less in sales annually) and sell to very local audiences. A full 66.7% of vegetables and 41.3% of fruits are sold at farmers' markets. Most of the rest are sold at retail markets. The large majority (72% of fruits, 69% of vegetables, and 60% of nuts) are sold in-state. New, larger markets would need to be developed to engage additional farmers or to incentivize larger farms to move into specialty crop production.



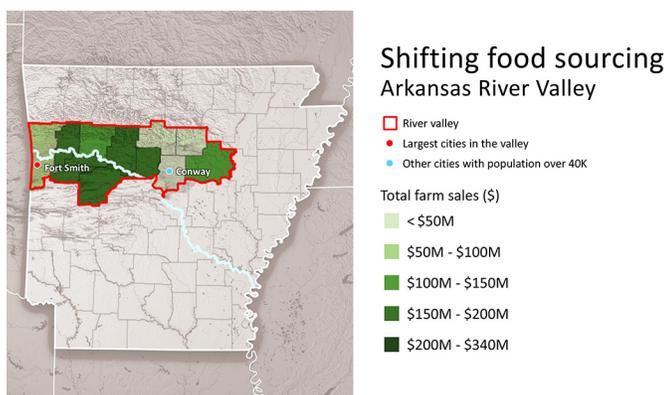
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Opportunities

With its long history of farming, strategic location, low cost land and labor, fertile soils, and abundant rain, the mid-Delta region offers many benefits that might support specialty farming on a larger scale. Specifically, some of these benefits include but are not limited to:

- Significant rainfall and two large rivers (the Mississippi and Arkansas) for irrigation
- Widespread poverty and unemployment combined with history of agricultural productivity makes the region ripe for labor intensive crops
- Climate change is already contributing to a longer growing season
- Worries over row crop prices, especially in lieu of ongoing trade concerns with China/rising tariffs, means that farmers are potentially more open to change
- There are some groups (e.g. AgLaunch, Winrock International) already working to innovate farming in the region. Both groups have networks of more innovative farmers who might be open to entering the specialty produce space.
- Strong land grant universities that are trusted and eager to work with us to boost the industry
- Diversity in climate
- Room for robust economic development and the chance to build competitive advantages

The mid-Delta region is not homogeneous. When this project began, we were concentrating on farmland along the Mississippi River. However, there is also interest in specialty produce among farmers in Arkansas' River Valley (northwest by the Ozarks). This region also has fertile areas of land with plenty of water, but it is more mountainous, with a different climate that will allow for a broader range of fruits, vegetables, and nuts to be grown. This will bring diversity to the state industry.



This geographic diversity also supports diversity in farm size. While the farms in the mid-Mississippi Delta region are quite large (often 15,000-20,000 acres), the ones in the Arkansas River Valley are smaller. Many of the farms in this region are 500-2,000 acres. While commodity crops remain popular, due to the smaller scale of the farms, some growers are already branching out. Cattle are quite common in this area and there are a handful of "pick-your-own" enterprises with fruits and vegetables. There are also several farms that are family land that has been passed down through generations, but the owners today are either not interested in farming or do not see a way to support themselves by farming full-time. Much of this land circulates in and out of

use or is currently being used to grow hay. This is a low-intensity crop, so one person can plant and harvest it with little effort in between. It brings little in value but allows the owner to avoid losing money on the taxes.

Farmers that we talked with during this phase are intrigued by the opportunity we proposed and potentially open to change. They recognize the inherent benefits specialty farming could bring. Although most are not exploring it on their own, they would be interested in entering the space if it is done in a thoughtful manner with a stepwise approach. In tours WWF took across farms in the region, growers were overwhelmingly open to the possibility of switching at least some of their land from commodity row crops to specialty crops. They recognize the chance to grow higher-value crops and the safety provided by more diversity. Many expressed concerns over low prices for commodity row crops and falling demand, especially considering ongoing trade concerns. However, they also advocated a pragmatic approach, and few were eager to be the test case.

For example, most farms suggested seed varieties would need to be tested through extension services at a land-grant university or at a research farm. They recognize the hurdles that a humid, pest-filled environment would bring to growing fruits and vegetables and want to see which varieties would grow best before they take the risk of planting their own fields. Arkansas State University, University of Arkansas, University of Tennessee, and Tennessee State University are all land grant extension schools that regularly engage in this type of work. There is also a non-profit research facility, Agricenter International, in Memphis that conducts trials. Agricenter and these universities are all seen as highly trusted, impartial entities. They are also all organizations that are interested in supporting our work and have already been quite helpful during Phase I.

Testing different varieties could also potentially lead to a competitive advantage in markets. While farmers are eager to see seeds tested for their hardiness and adaptability, testing seeds and investing in public breeding programs could also lead to heirloom and regionally specific varieties. Consumers are growing more interested in heirloom and other more unique offerings. For example, people now seek out a wide variety of apples, peaches, and squash at mainstream locations, such as grocery stores. There is an opportunity to differentiate additional types of fruits and vegetables in this way with unique taste and nutrition profiles, lending a value-add. There are already some fruits that are native to the region but little-known outside of it, such as pawpaws, persimmons, and muscadine grapes, that could provide a differentiator as consumers increasingly look for unusual offerings.



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Many of the farms in the Delta region are quite large (15,000-20,000 acres or more). Commodity row crops are grown on very large farms since they earn little per acre and scale is required for profit. This could lend itself to a stepwise approach to testing varieties. This means that farmers would not have to risk their entire crop on a new enterprise but could start with a small percent of their total land while still being significant within the specialty produce world. There were 89,200 acres of blueberries across the entire country in 2018.¹ Fruits and vegetables operate at an entirely different scale than commodity row crops. Specialty crops could also potentially be chosen strategically to provide farmers with protection from environmental risk. For example, they could potentially grow specialty produce with different environmental needs than their commodity crops, allowing for some diversification and risk “insurance” if there are unexpected weather or market changes.

Large farm size also lessens the risk of dicamba drift. This is currently a hot-button issue across the Delta and is discussed in more detail in the policy section below. Dicamba is used to control weeds in commodity row crops, but would kill vegetables, fruits, and nuts. This increases the risk for a small-scale farmer, such as current specialty farmers, but if a 20,000-acre farm decides to switch some of their land to specialty crops, they can select the acreage strategically to avoid drift from their other crops.

Finally, there is already nascent movement in the direction of specialty crops. For example, a cooperative in Arkansas was formed and received state funding to build a peanut processing facility that will open later this year. It is expected to serve as a game changer for farmers who can now grow peanuts without having to find the upfront capital to process them on their own farm. Meanwhile, Winrock International worked with the Natural Soybean and Grain Alliance to promote edamame farming in the region. The state became the first in the country to grow edamame commercially, and various groups worked to open a local processing plant, eventually leading to 12 farms growing 900 acres of the bean. Lessons can be learned from both efforts and strong economic gains could come from growing the nascent specialty produce industry. A study commissioned by Arkansas State stated that specialty crops contributed \$1.4B in total value added in 2015, including nuts, honey, turf, cut flowers, and ornamental plants.² If done at scale, the benefits could be significant.

¹Noncitrus Fruits and Nuts, NASS: June 18, 2019.

²English, Leah and Popp, Jennie. Arkansas Specialty Crop Industry, University of Arkansas: Dec 2017.

Hurdles

While there are many opportunities, there are also hurdles to shifting agricultural production in the region which need to be explored further:

- Significant farmer/grower labor education will be needed since at this time farmers in this region produce only cotton, corn, soy, wheat, and rice in significant quantities.
- Rice will be hard to supplant. It is the most popular food worldwide but also the least traded. Even if prices are low, there will likely always be a market, making it a “safe” choice.
- There is a trained labor shortage for specialty crops and very few migrant workers in the mid-Delta region. Local workers would need to be trained and/or visas granted for migrants.
- Pecans and walnuts can grow in the region, but almonds, which are nearly solely produced in California, would not grow well in the climate.
- Rainfall is plentiful but the atmosphere is far more humid than California’s Central Valley. Organic crops would be very difficult to grow since the humid air and lack of cold nights means there is a significant pest problem that is not present in the drier California region.
- Due to pests, lots of chemicals are sprayed on row crops that could carry over to vegetables and fruits located nearby. This is also true of herbicides like dicamba.
- Though Memphis has the 8th largest food processing capacity of any city in the US and FedEx is headquartered in Memphis, the infrastructure is organized mostly around the river rather than neighboring farmlands. While there is considerable capacity for food processing, there is little infrastructure for processing, packaging, and shipping specialty produce.

Many of these hurdles are explored below.

Infrastructure

While the mid-Mississippi Delta and Arkansas River Valley regions have a long history of farming and the infrastructure to support it, this infrastructure is largely geared towards commodity row crops. Some of it could be used or repurposed, but there would still need to be significant new investment in infrastructure as well. While some of this could be done at a farm level, much of it would be too expensive for an individual farmer and would need to be organized as co-ops, communities, or even regions to attract the interest and support of major corporations.

Agricultural infrastructure can be grouped in the following basic categories:

- **Input-based:** seeds, fertilizer, pesticides, farm equipment, machinery
- **Resource-based:** land, water/irrigation, power/energy
- **Physical:** roads, transport, storage, processing, preservation
- **Institutional:** agricultural research, extension and education technology, financial services

The institutional and resource-based infrastructure that already exists would largely be relevant to specialty produce as well, but additional input-based and physical infrastructure would be needed. The needs would change since specialty produce would require less harvesting equipment and more labor, along with cold storage and the ability to handle and quickly ship delicate produce.

On a farm level, this might mean a sprayer for fruits (costing up to \$100,000) and a washer. Due to the high cost, a more viable solution might be sharing some of the burden across farms or communities. In addition to sprayers or washers, a community or co-op could also invest in a larger-scale processing facility or shed. There would also need to be cold storage and the ability to get produce to market quickly. While the region currently lacks large-scale processing, some cold storage currently exists through Cloverleaf Cold Storage, which is largely located along I-40 in Arkansas. The University of Arkansas Cooperative Extension Services is also planning to build three small-scale processing kitchens and aggregation centers under the Share Grounds project, to open in 2020.

Harvesting Specialty Produce



Even with the existing roads, freight and shipping could pose an ongoing issue. Right now, time is not a problem. The commodity row crops that are grown do not spoil easily and can be stored for long periods. They are also frequently shipped via river freight, which is much cheaper than trucking. Specialty produce would need to operate on a faster schedule and in a temperature-controlled environment. Many of the farmers we visited already expressed problems with reliable truckers and a shortage of reliable labor in the industry. Some have started to vertically integrate to address this hurdle, but that remains cost-prohibitive for all but the largest farms. Transportation would need to be explored further and possibly funded in creative ways, such as through co-ops or with state support, to de-risk the switch for farmers.

While infrastructure remains a hurdle, however, outside funding is likely to be available if the commercial viability of specialty farming can be proven. Some of the needed investment could be addressed through USDA grants and bank loans if there is a demonstrated path to economic profits or even through community grants and state funds if there is workforce development in building and supporting the infrastructure. This does not remove the hurdle but makes it a surmountable one if other factors are addressed.

Labor

In discussions with farmers and analysis of next steps, labor consistently comes out as one of the top concerns. Commodity row crops can largely be produced and harvested mechanically, but most specialty crops must be harvested by hand. That means a significant investment and increase in labor, which is expensive, time-consuming, and a change in behavior. It also likely means further education about and interaction with the H-2A migrant labor program.

The H-2A visa is a non-immigrant visa extended to seasonal agricultural workers. To use the H-2A visa program, the petitioner (usually a farmer) must demonstrate that there are not enough US workers who are able, qualified, or willing to do the job. The farmer must also prove that employing H-2A workers will not have an adverse effect on the wages and working conditions of similarly employed US workers. This means that the Department of Labor sets a minimum wage (AEWR) to be paid to H-2A workers, updated annually, and that once a migrant laborer is paid this rate, all workers on the farm must receive that same minimum rate. They also need to pay for the workers to travel to the farm in the US, to provide housing, and to provide transportation to the farm, to grocery stores, and to other key locations.

H-2A Wages (per hour)		
State	AEWR	Minimum Wage
Arkansas	\$11.33	\$9.25
Mississippi	\$11.33	\$7.25
Missouri	\$13.34	\$8.6
Tennessee	\$11.63	\$7.25

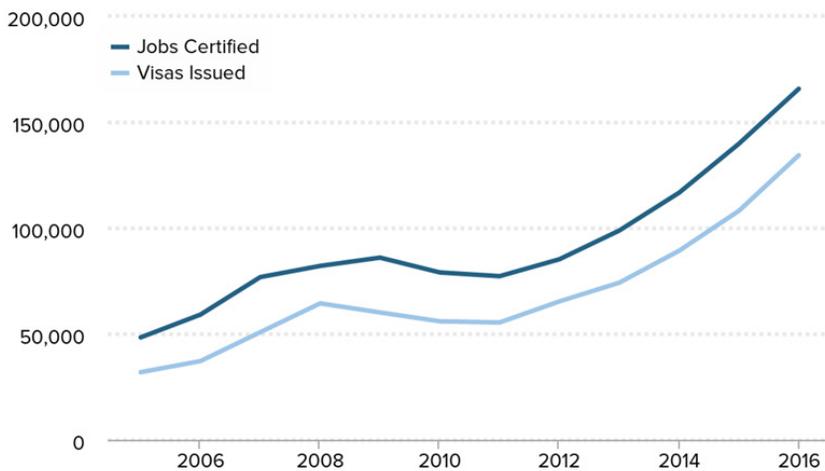
Credit: Economic Policy Institute

Cost is not the only barrier to the program. It can be time consuming, taking 75 days or more to complete the process and receive workers. There are also certain laws farmers must follow. They must guarantee workers employment hours equal to at least 75% of the workdays outlined in the employment contract. They also need to hire any qualified US worker that applies for the position during the first half of the contract period under which the H-2A workers are employed.

Despite these barriers, across the country, the program continues to grow in popularity. Approximately 200,000 H-2A visas were approved in 2018, a 21% increase from 2017, according to the US State Department. While California leads the pack in applications requested, they aren't the only state working with a significant migrant labor workforce. All the states we are examining already participate in the program, but the number of workers they request would need to rise significantly if specialty produce were boosted in the region.

Despite its success, the system is rife with abuse – often unreported. Illegal job terms are often approved in H-2A contracts. Employees routinely experience wage theft, and US workers that apply for H-2A jobs are often rejected or forced to quit. There are also plenty of abuses in the recruiting process, with guest workers often paying recruiters for jobs and then coming into the US indebted.³ There have also been reports of poor living conditions, poor working conditions, and geographic and social isolation. Many workers do not report these abuses for fear of retaliation.⁴ It leaves a lot of room to reform and consider labor questions in a potential 'Next California' scenario.

H-2A jobs certified and visas issued, 2005–2016



Notes: All references to a particular year should be understood to mean the U.S. government's fiscal year (October 1–September 30).

Source: U.S. Department of Labor, Office of Foreign Labor Certification, OFLC Performance Data, <https://www.foreignlaborcert.doleta.gov/performance/data.cfm>; U.S. Department of State, Bureau of Consular Affairs, "Nonimmigrant Visa Statistics," <https://travel.state.gov/content/visas/en/law-and-policy/statistics/non-immigrant-visas.html>.

Credit: Economic Policy Institute

In addition to simply boosting the use of specialty labor hired directly by farmers, there would be other scenarios worth exploring. First, migrant laborers could be used but aggregated to lessen the burden on any individual farm. Rather than a single farmer having to deal with a complicated bureaucratic process and build housing on their land, an aggregator could bring laborers to the region and provide central housing and transportation. Laborers could rotate from farm to farm as different crops are ready for harvest. If set up appropriately, this could also provide steadier employment for the migrant laborers. Currently, aggregators are common in California but do not really exist in the mid-Delta.

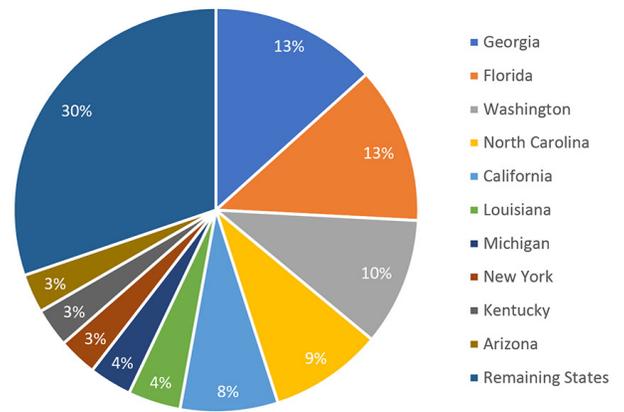
We also examined the all-in cost of migrant laborers to allow us to probe whether it would be feasible to pay local labor more to attract more workers and still save farmers money. This includes pre-employment costs, such as filing fees, advertising, surety bonds, travel, and housing, as well as the actual wage costs.

³"No way to treat a Guest, why the H-2A Agricultural Visa Program Fails U.S and Foreign Workers," Farmworker Justice | Empowering Farmworkers to Improve Their Living and Working Conditions Since 1981, accessed November 15, 2019, <https://www.farmworkerjustice.org/sites/default/files/documents/7.2.a.6%20fwj.pdf>.

⁴Ibid

For the average H-2A worker, pre-employment costs are around \$2,000 for an eight-month contract. This is in addition to the hourly rate. For example, in Arkansas, the AEWR is \$11.33 per hour. While hours worked can vary tremendously, assuming 40 hours per week for 8 months, it would come to just shy of 1,400 hours. Pre-employment costs would add \$1.43 an hour to the \$11.33 hourly wage, or \$12.76 total per hour. This compares to a minimum wage rate of \$9.25. This is on top of the time involved in the process, which is not included in the calculation. This means there is room to pay local, domestic labor more than they would currently receive, and see if that yields more interest, without adding costs to farmers who are sourcing migrant labor.

Top States for H-2A Visas



	2012-13		2013-14		% change ²
	Average (\$)	Range low-high	Average (\$)	Range low-high	
Cost per hired H-2A worker					
DOL/CIS fees ⁵	6.42	4-19	8.97	3-31	+40*
Advertising	10.76	5-50	9.64	2-78	-10
Bond	9.49	3-14	12.06	3-38	+27*
Consultant - agent filing	25.00	10-26	25.00	15-29	--
Consultant - worker recruitment	94.66	26-110	95.79	25-120	+1
Visa	190.00	flat fee	190.00	flat fee	--
Travel	407.57	186-662	463.48	273-750	+14
Subtotal (no housing)	773.90		804.94		+4
Housing	1,322.82 ³	684-1,566 ⁴	1,165.36 ³	415-1,461 ³	-12
Average (\$/H-2A)	2,066.72	1,494-2,317	1,970.30	1,371-2,355	-5

¹* Indicates a statistically significant difference (with $\alpha=0.05$) between years.
²A two-tailed two-sample *t*-test with heteroscedasticity tests for equal means between years.
³Average cost for an 8-month contract (the median reported contract length).
⁴Range includes contracts varying from 2.5 to 10 months long.
⁵DOL = U.S. Department of Labor; CIS = Department of Homeland Security's Citizenship and Immigration Services.

Policy

There are several policies that encourage commodity crops and would need to be considered as part of any future strategy. Two of the most relevant concern subsidies and Dicamba.

Currently, the US government heavily subsidizes commodity crops. The complex layering of subsidy programs began in the 1930s and has been altered regularly since then.⁵ The primary subsidy systems include marketing loans, disaster payments, and other insurance protection plans. Marketing loans offer favorable terms to farmers to realize gains through loan deficiency payments and commodity certificates. Disaster payments help farmers recoup large losses due to natural disasters and other natural phenomena. The government also subsidizes crop insurance to further insulate farmers from risk. The 2018 Farm Act increased the FY2019-2023 spending by \$1.8B and created two new crop insurance programs (supplemental coverage option and stacked income protection plan.)⁶

⁵Kimberly Amadeo, "How Farm Subsidies Affect You," The Balance, last modified January 3, 2019, <https://www.thebalance.com/farm-subsidies-4173885>.

⁶Ibid

Arkansas commodity crop farmers received about \$500M in 2017, ranking 4th in terms of subsidies in the nation. Mississippi farmers received about \$162M and Tennessee farmers received \$71M.⁷ At time of writing, there is also a \$16B subsidy package earmarked for the farmers affected by the Administration's trade war with China. Farmers will be paid between \$15 and \$150 per acre in aid under this package and payments are capped at \$500,000 per person.

There is also a subsidy program for specialty crops, but it is miniscule by comparison to the commodity crop programs. The Specialty Crop Block Grant Program & Specialty Crop multi-state program is funded by the USDA but administered by local state departments of agriculture. The 2018 Farm Bill allocated \$85M a year in perpetuity to the program and each state is allocated an amount based on a formula that considers specialty crop acreage and production value within the state.⁸ The application process varies by state and each state has its own requirements for use of the funding.

Dicamba is another hot-button issue in the Delta region and is a concern to farmers considering entering specialty produce production. Dicamba is a broad-spectrum herbicide used on a range of row crops in the region. It is usually sprayed aerially and can drift onto neighboring fields and crops – and will kill specialty produce. There are some policies around its use and liability for that use, but different states have different rules and enforcement protocols. In Tennessee, new state rules took effect this year restricting the use of older formulations and increasing civil penalties. The State Dept of Agriculture can choose to take enforcement actions for any misapplication, including but not limited to suspension, revocation of application certification, penalties up to \$1,500 per acre, and even possible criminal prosecution.⁹ In Missouri, due to the volume of Dicamba related complaints, the State Dept of Ag limits the number of complaints formally investigated. It does not determine yield loss or property damage loss and does not order payment of any kind for damages or losses.¹⁰ Any state-imposed fines do not go to the farmer who is hurt but to the school district where the damage occurred. Affected farmers would have to pursue repayment through civil court.¹¹ In Arkansas, state regulators banned Dicamba in April 2018 following a record 1,000 complaints in the previous growing season. However, the EPA ended the statewide ban. Arkansas now uses a pesticide matrix to enforce abuses with fines ranging from \$1,000 up to \$25,000.¹² However, it seems that so far little action has been taken against abusers.



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⁷"EWG's Farm Subsidy Database," EWG Farm Subsidy Database | | Home, accessed November 15, 2019, <https://farm.ewg.org/subsidyprimer.php>.

⁸"Specialty Crop Grants," National Sustainable Agriculture Coalition, last modified October 10, 2008, <https://sustainableagriculture.net/publications/grassrootsguide/local-food-systems-rural-development/specialty-crop-grants/>.

⁹"Pesticide Incident Report," Missouri Department of Agriculture (MDA), accessed November 15, 2019, <https://agriculture.mo.gov/plants/pesticides/incidentreport.php>.

¹⁰Ibid

¹¹Jonathan Ahl, "Missouri-Grown Fruits and Vegetables Face A Threat from Weedkiller's Chemical Drift," KCUR, last modified March 11, 2019, <https://www.kcur.org/post/missouri-grown-fruits-and-vegetables-face-threat-weedkillers-chemical-drift#stream/0>.

¹²Arkansas Department of Agriculture News, Programs, Policies, and Updates | Arkansas Department of Agriculture, accessed November 15, 2019.



Key Partners

During Phase I, we identified several potential partners who would be integral to implementing these changes and developing a specialty produce region in the mid-Delta. They include, but are not limited to:

- **AgLaunch:** A non-profit that works to connect entrepreneurs with growers to develop and advance innovative agricultural solutions and create farms of the future across the mid-Mississippi Delta region
- **Winrock International:** This international organization was founded in Arkansas by Winthrop Rockefeller and still operates extensively in the area. They have several relevant initiatives, but one is looking to introduce higher-value crops and to promote smallholder farmers. They are especially interested in exploring new business models with us and feel that this is their niche.
- **Southern Bancorp Bank and Southern Bancorp Community Partners:** These CDFIs are based on the goal of boosting economic mobility in the delta regions of Arkansas and Mississippi. The bank and SBCP work together and independently to complete many big farm loans and loans to small and lower-resource farmers. SBCP is extremely interested in growing capacity in the latter area of lending.
- **Professors Aaron Shew and John Nowlin of Arkansas State University:** Agricultural economist and geographer, respectively, who are already studying the interaction between climate change and the changing geography of farming, as well as innovations and sustainability in agriculture.
- **Professors Phillip Owens, Jose Franco, and Amanda Ashworth of USDA ARS and University of Arkansas:** Soil scientists and agroecologists with expertise in soil and environmentally sustainable cropping, these professors are already leading efforts in testing new varieties and innovating farming through their dual roles with an area university and the USDA's Agricultural Research Services.
- **Drs. Kelly Cartwright and Lanny Ashlock of The Natural Soybean and Grain Alliance:** The NSGA is an agriculture non-profit located in Arkansas that helps to build out specialty crop industries throughout the region and was instrumental in developing an edamame industry in the state of Arkansas. Their knowledge and experience in building support and infrastructure for new crops would continue to provide key learnings in Phase II.
- **USDA Agricultural Marketing Service:** The mission of the AMS is to create domestic and international marketing opportunities for US producers of food, fiber, and specialty crops.
- **NASDA:** The National Association of State Departments of Agriculture is a non-profit, non-partisan association representing commissioners, secretaries, and directors of departments of agriculture across all 50 states and four US territories.
- **Cushman & Wakefield | Commercial Advisors (CW|CA):** A top international real estate firm involved in agribusiness, the Delta region office is actively growing this area of their business. CW|CA seeks to assist with the specific real estate needs of the agriculture community. The team works alongside farmers desiring to buy/sell/lease real estate including agricultural, commercial, and industrial land and buildings. Their expertise and innovative solutions include strategic planning, site selection and development, financial analysis, and lease and sale transaction services.
- **The Common Market:** The Common Market is a nonprofit regional food distributor with a mission to connect communities with good food from sustainable family farms. They work to improve food security, farm viability, and community and ecological health. Currently operating in the mid-Atlantic, the Southeast, and Texas, The Common Market is expanding to other US regions, however, they focus on urban areas and would not open their own entity in the area. They are excited about the proposed work and happy to provide advice and consultation on setting up an aggregator in the area.



What's Next: The Next California, Phase II

Proposed Work

The Next California, Phase I examined the potential of the mid-Delta to grow specialty produce in commercial quantities to ease some of the pressure on California and to pro-actively shift agriculture to a location where it would be not only more environmentally sustainable but also beneficial to farmers and to the local community. We believe that this region holds a lot of potential. While California will continue to be a key agricultural state, we envision a more distributed food system where areas are able to grow what is best suited to local climates, food is produced closer to consumers with less waste, and economically depressed areas can benefit from higher-value produce. Looking ahead, Phase II of this work will move beyond basic research to develop the individual pieces necessary to implement a pilot. Specifically, we will work to answer key additional questions that need to be explored before a pilot could start, elicit further stakeholder buy-in with firm commitments, and design a specialty produce pilot program in the region. Our goal is that this new model could serve as an example for other regions around the country – so that the mid-Delta is just one of many “Next Californias.”

Phase II will include additional research and background work to build upon some of the questions developed in Phase I, with a strong focus on creating market demand and bringing large-scale buyers on board, developing and deepening relationships with local stakeholders, and finally, designing an actual pilot program.

Additional Research and Fact-Finding

To start, we will work to answer any outstanding questions that would be integral to partners and to conducting a pilot. This will include a deeper dive into innovative business models and economic development opportunities, including better understanding labor needs and potential, but will also address additional questions around seed varieties, sourcing and supply chain concerns, and unintended consequences.

There will need to be significant investment in infrastructure in the region to support a new and expanding specialty produce industry. While this could be funded in a traditional model, such as through banks or USDA grants/loans, cooperatives or even more unusual models will be explored further and could exist in combination with more traditional models. We will specifically work to find ways to develop new business models that are equitable but also profitable to all involved in the process, including local communities, smallholder farms, minority farmers, and workers. These will include but not be limited to:

- State or federally funded centrally located infrastructure that vests equity to workers for dedicated harvesting/processing and/or to landowners for value that is added through aggregation or downstream
- Low interest rate loans which, as they get repaid, vest equity to labor and/or producer groups
- Long-term contracts from buyers which could be used as collateral to leverage investments
- Social impact bonds

Our goal is to create both an environmentally and financially sustainable system that can expand across the region and serve as an example to other areas of the country or beyond. This means including historically or currently economically disadvantaged groups. As we explore innovative business models, we will delve into the potential of the different models to promote and include minority farmers. Today, minority farmers remain scattered in some of the poorest regions of the state and are largely smallholder farmers with little ability to support themselves with the low margins of commodity row crops at such small scale.

We will also work to further understand labor concerns. While we have already explored the hurdles to local and migrant labor, we are eager to explore other alternatives, such as paying local, domestic labor more than they make now, but less than the “all-in” cost of migrant labor (including travel, lodging, transportation, etc.) to boost the labor pool. We would also like to explore equity through value-added processing such as the idea laid out above, aggregating labor to take some of the burden off farmers and to provide year-round positions for workers, or other innovative approaches.

We will also explore and support potential technological solutions to labor hurdles. While robots that can choose and pluck ripe strawberries and peaches currently remain out of reach, we expect that solving labor concerns in the long-term will include automation and robotics. AgLaunch already has an existing model for acceleration and adoption of technology in the region (such as AgLaunch365 and the Row Crop Challenge). They attract and support early stage start-ups that pilot their technology on farms, learning as they grow. Farmers receive equity in the companies for testing and providing feedback. The mid-Delta could become a hub for automated harvesting innovation by building on this model and offering a “Next California Challenge” with AgLaunch and other partners to source early ideas and potential solutions for picking specialty produce. This automation could also lead to new, well-paying jobs as these robots are manufactured, deployed, and managed – and ripple effects would be felt as farmers produce





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more with less, opening the door to value-added production and opportunities to make use of less-than-perfect produce that otherwise would go to waste.

As part of our goal to encourage resiliency, we will continue our work on the potential to test and develop different seed varieties to create a competitive advantage and open new markets. While the land grant universities and non-profits like Agricenter are very interested in this project, we will explore more details and possibilities around funding, length of time, crop priorities, IP protection, and more. To help determine top priorities, we will work with major corporations to evaluate their supply chains and determine which of our target crops are providing the most risk/opportunities for them.

During this research portion, we will also work to understand unintended consequences, or at least ensure we are asking the right questions. For example, if fewer commodity row crops are grown in this region, will somewhere else pick up the slack? And would that potential shift translate into additional land conversion or other poor environmental outcomes?

Building relationships, growing market demand

As the second prong of Phase II, we will continue to invest in the relationships we have developed on the ground, including developing markets, promoting local champions, and ultimately bringing our on-the-ground partners together to develop a detailed business plan. This plan will provide a roadmap to develop specialty produce and boost financial resilience in the region and will serve as a model for other areas across the country.

For potential markets, we have begun initial conversations with major US brands. We will continue those conversations, as well as engage additional large firms with local footprints, and regional players that could serve as a stepping-stone to national partners, to discuss the possibility of buying locally and investing in infrastructure. It will also be important to explore how the supply chains of these businesses are affected by the current model and if they would be willing to invest to secure a more climate resilient strategy.

More and more companies are developing or considering actions to de-risk their supply chains in the face of a changing climate, and we see this as an opportunity to begin to define and elevate within-supply-chain emissions (Scope 3) and 'onsetting' as concepts and potential business strategies. This is becoming more important to these companies in preparation for future legislation around carbon markets or cap and trade, to position to consumers and shareholders, and to secure potential co-benefits, including carbon "onsets/insets" or supply chain climate resilience. WWF will explore how purchasing produce from the mid-Delta could change some of these numbers and bring new products for producers to sell and new opportunities to companies to address the embedded carbon in their products, including possible carbon credits/offsets through Scope 3 emissions as well as

similar opportunities from input use, soil management, water, transportation, food waste and more. This analysis will also tie into our work on innovative financing opportunities (e.g. mechanisms such as long-term contracts, shared infrastructure and inputs, etc.) as potential assets that can be used to access cheaper credit from conventional lenders as well as social impact investments or green bonds. Finally, avoided and sequestered carbon will not only improve the financial position of producers, it will also make them more resilient in the face of climate change.

We will also work to explore all channels that might work well in this region, with an additional eye on value-added markets with reduced emissions. For example, while humidity, with the pests it brings, will be a hurdle to growing “perfect” fruits and vegetables, this is less of a concern for a crop that is juiced, jellied, canned, pureed, etc. This is one of the reasons why Florida dominates the juicing market, and Memphis already has some of the infrastructure that is needed for this type of processing. It could also serve as an opportunity to reduce food waste and use seconds (less perfect produce) to generate income for farmers and employment for the region.

Designing a pilot

Finally, with the above issues clarified, we will design a pilot. This will include economic modeling demonstrating some of the opportunities and hurdles and how those could change along with outside factors. It will also model the pitfalls and benefits to growers, businesses, communities, and other key partners. Professor Aaron Shew at Arkansas State will lead the modeling effort, with the support of his team, and it would be conducted in partnership with University of Arkansas Professor Marty Matlock and his Resiliency Center. They are not only located in our target region with long-standing, deep ties to the region, but are renowned experts in this field. We will also develop mini business plans for relevant groups and a roadmap of the next few years to move this industry forward. This will be developed in tandem with on-the-ground partners to ensure buy-in from day one. By the end of this phase, we will like to have laid the groundwork for growth of the industry and see our partners poised to take next steps.



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