

Solar Water Well Systems

Oklahoma Black Historical Research Project, Inc.



Enhancing Agricultural Production

For Native American & Socially
Disadvantaged Farmers & Ranchers

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Project Summary

From 2017 to 2020, the Oklahoma Black Historical Research Project, Inc. worked in partnership with the Oklahoma Tribal Agriculture Advisory Council, Langston University, Oklahoma State University, the USDA Natural Resources Conservation Service (NRCS), and the Rural Coalition to promote the use of solar water well systems on farms and ranches in Oklahoma. Some of the benefits of solar water well systems are the reduced cost from using energy from the sun rather than electricity to provide water to livestock. The State of Oklahoma had drought conditions each year. Although Solar powered water well systems have been in used for several years, OBHRPI staff recognized that most Native American and other Socially Disadvantaged Farmers and Ranchers the OBHRPI staff worked with, did not fully understand the technology and the benefits of using it in their operations.

The main objectives of the CIG Project are to:

1. Introduce Native American and other Small Socially Disadvantaged farmers to Solar Powered Water Well Systems.
2. Complete installation of regional Solar Water Well Systems for Demonstration projects, fully compliant with the USDA Environmental Quality Incentive Program (EQIP).
3. Establish a baseline of Ag production for first year using Solar Water Systems.



Benefits of Solar Water Well Systems

Farmers can save money and reduce water pollution by using renewable energy sources, such as solar power for livestock water wells and for drip irrigation. Solar energy can be an excellent option in remote areas where the costs of extending transmission lines are high. Most farmers in Oklahoma are in remote rural areas. Extending transmission lines over ¼ mile usually costs \$5 per foot. At that rate, a 1-mile transmission line extension will cost more than \$25,000. Solar energy is also a good option when only a small amount of water needs to be pumped and a shut off valve can be installed in a water tank to ensure a certain level of water is achieved for livestock. (*“Using Renewable Energy to Pump Water,”* J. Enciso and M. Mecke. Texas A&M Agrlife Extension, July 2007).

The main advantage of using solar energy is there is not energy cost to pump the water. Solar energy provides more water in the summer when water consumption is high due to the heat. The system can be portable as is shown on Page 2 where the OBHRPI staff demonstrates a portable solar well system at a Conservation Workshop. Water is usually stored in a tank, so the water quality is much cleaner than a pond, for example, the cattle do not stand in the tank, and the tank contains a lot less sediment.

About our Project

All Small Socially Disadvantaged farmers and ranchers who participated in the project were EQIP eligible. The Cover Story: Mr. Phillip Campbell is a Veteran Socially Disadvantaged farmer in Luther, Oklahoma, located in rural Oklahoma County. He was selected as a Farmer of the Year in 2018 by the OBHRPI for his leadership, work with USDA Programs, collaboration with OBHRPI and support of Oklahoma underserved farmers, ranchers, rural residents, and youth.

He began working with his local conservation district following his retirement. He has a passion for learning about conservation issues and spreading the word about conservation programs in our area and state. As a result, he has embraced his leadership role as a district director and commissioner as an advocate for natural

resource conservation by hosting field days on his farm, attending various annual meetings and participating in the 2018 Statewide Conservation Leadership Class. He states the following, “My desire is to provide assistance and mentorship to new and underserved landowners by providing them with information about resource management and the knowledge of programs available to them. I serve as a Conservation and Agriculture Reach Everyone (CARE) Ambassador for the 2501 Program, which is an effort of the USDA Office of Advocacy and Outreach to increase participation of socially disadvantaged farmers/ranchers in USDA programs. My future goals within the conservation district and conservation associations are to continue as a district director for Oklahoma Association of Conservation Districts as well as a commissioner for the Oklahoma Conservation Commission, where both positions have afforded me the opportunity to share my experience of conservation and agriculture with others across the state and country. One of my future goals is to continue to assist the Oklahoma Association Conservation District with outreach efforts, including within the veteran community.” [NACD Next Generation Leadership Institute. 2020 NGLI Cohort – NACD (nacdnet.org)]

OBHRPI assisted Phillip with a solar water well system demonstration project for his cattle. On September 24, 2019, a Local Farmer Led Field Day was held at Campbell Farm that featured rotational grazing, soil management, composting, and the benefits of solar water well systems.

A Previous installation of a Solar Water Well System was on a 300 acre cattle farm in North Central Oklahoma. The system supplies water for the rancher’s cattle and eliminated the need to manually transport water from one location on the property to the livestock water tanks. Unfortunately, like many of our nation’s small agriculture producers, the owner, Mr. Frank Caldwell, is a senior citizen with declining health. He had suffered a stroke and had little assistance with his operation. Without this water source, he would be forced to reduce, if not fully shut down his operation. The farm is located near Dover, Oklahoma, where Frank raises cattle, goats, and several small grains. He owns 380 acres of land and a cattle herd averaging 130 head.

The electrical cost of providing power to his home’s well was approximately \$4000. The power source for his home’s well was adjacent to his house. The power source for tanks in the field was approximately ¼ mile from the nearest electrical source. Mr.

Caldwell was transporting water approximately two miles from his home water well supply to the field's tank which holds 3,000 gallons for his cattle. Prior to the installation of the Solar Powered Water System, **this was a daily activity**. He expressed that having the system was such a blessing and a relief for him and although there were some cloudy days, he was never without water for his cattle.



Frank and Mathilda Caldwell

He is the president of the East Dover Farmers and Ranchers Organization and he has shared his experience with other Socially Disadvantaged farmers and ranchers. Several of them are now working with the USDA NRCS.

Local NRCS technicians assisted with the demonstration projects to ensure that the solar water well systems met NRCS regulations.

The OBHRPI staff delivered presentation at field days, workshops, community meetings, and conferences sharing information and performing demonstrations as shown in the pictures on the next page.

Activities



Conservation Workshop



Community Meeting



Gumbo Festival



Nation to Nation Conservation Conference



Field Day



20TH Small Farmers Conference

Impact

OBHRPI was able to achieve Objective No. 1 by introducing 6,454 Native Americans and other Small Socially Disadvantaged farmers along with agriculture professionals to Solar Powered Water Well Systems. Twelve Zoom Webinars were held and more than 1,363 hours were spent on farm visits and calls with farmers.

Objective No. 2 – Demonstration Projects were established at the following farms (All participants were EQIP eligible):

- Kevin Guess, Okfuskee County
- Phillip Campbell, Oklahoma County
- Alvin Lee, Seminole County
- Ray Penn, Logan County
- Earrack Cotton, Wagoner County
- Ted Alexander, Creek County
- Demedray Williams, Okfuskee County
- Nick Jones, Seminole County
- Rickie Guess, Oklahoma County
- John Hargrave, Seminole County
- Earl Davis, Oklahoma County
- Kwame Mboya, Logan County
- Earl Seay, Oklahoma County
- Wayne Chandler, Oklahoma County
- A Portable Solar Water Pump System for Demonstrations

Objective No. 3 – During the first year, four focus meetings were held by OBHRPI to identify common barriers shared between SDA producers that discourage their applying for programs in which they are eligible. The focus meetings were held in Okfuskee, Kingfisher, Oklahoma, and Seminole Counties. Eighty socially disadvantaged farmers participated in a survey. Michael Shelton, OBHRPI Outreach Specialist assisted Sandra Wade-Penn with the evaluation. The survey revealed the following:

- When asked what prevents you from seeking the services of any USDA agency, 40% responded that they need more information and knowledge about the agencies.
- Sixteen percent had no clear title to their land.
- Twenty-four percent responded that it took too much time to fill out the paperwork and it was difficult to fill out the forms.
- Eight percent responded that the local conservationist lacked the knowledge to give them technical assistance.
- Eight percent because of denials and 8% were timid.
- Sixty-eight percent were aware of the NRCS and its' programs, 29% sought out its' services, and 23% found that NRCS's services were favorable (that is 79% of them sought out NRCS's services).

At the start of the project, the EQIP Cost Share covered a percentage for the cost of drilling and casing separately from solar, windmill, or electricity. Over the course of time, as OBHRPI worked with farmers, their demand for one complete unit influenced - the NRCS offered the cost share on one complete solar water well unit. An example is as follows:

- In East Central Oklahoma, one NRCS Team reported that they had the following solar water wells established under EQIP:
 - Bristow, Creek County – 10; Chandler, Lincoln County – 4; Okemah, Okfuskee County – 2; and Shawnee, Pottawatomie County – 2 for a total of 18. Of the 18, 13 were in the Historically Underserved Category.
 - All deliverables were sent to the CIG Office in the appendices of semi-annual reports that included agendas, sign-n sheets, and lists of farmers participating in the project.



Ted Alexander's Farm



Earrack Cotton's Farm



Solar Water Well System at Kevin Guess' Farm - Willard Tillman conversing him.



Demedray Williams' Farm

Challenges

During the period of Covid – 19 Coronavirus, the OBHRPI staff used the USDA’s model for operations by wearing masks, making appointments with farmers, and using social distancing and frequent handwashing. Twelve Virtual Zoom meetings were held due to Covid – 19 Coronavirus. The OBHRPI staff contacted Socially Disadvantaged farmers by other means during the virus and held a Zoom meeting about the USDA Relief Program on May 29th and August 27th, 2020, and held locally led webinars on November 5th and 12th 2020.

What’s Next

The OBHRPI staff will continue its outreach and technical work to assist Native American and other Small Socially Disadvantaged Farmers and will promote USDA programs and solar water well systems giving demonstrations and sharing success stories. We meet new farmers, some of which have retired from their jobs and moved to a rural area to start farming, others own family land and now want to farm on it. Our website is www.obhrpi.org and we have a page of You Tube, OBHRPI – You Tube, <https://www.youtube.com/suer/obhrpi>.

About the Equipment

As part of the evaluation of this property’s plans and future irrigation needs, OBHRPI consulted with several solar water well companies in Oklahoma. They included Pumps of Oklahoma, located in OKC, Oklahoma, which specialized in the Grundfos Stainless Steel Submersible Pumps and third-party solar panels.

Pumps of Oklahoma



CIG Solar Water Well Systems' Project Partners

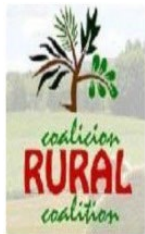
OTCAC – The Oklahoma Tribal Conservation Advisory Council



The USDA provided technical assistance, delivered presentations and provided essential information that was necessary to carry out the project. The USDA NRCS strives to reduce soil erosion, enhance water supplies, improve water quality, increase wildlife habitat, and reduce damage caused by floods and other natural disasters.



Langston University's Department of Agriculture assisted with planning and facilitation of conferences. Langston University is an 1890 Historically Black University. The Department of Agriculture there contains the renowned Kika de la Garza Goat Institute.



Rural Coalition has worked for 40 years to assure that diverse local, regional, and national organizations from all regions, ethnic and racial groups and genders can work in solidarity with issues that affect us all.

This project was funded through NRCS Conservation Innovation Grants (CIG). CIG is a competitive grant program that stimulates the development and adoption of innovative approaches and technologies for conservation on agricultural lands. CIG NRCS partners with public and private entities to accelerate technology transfer and adopt promising technologies.