

# CONSERVATION INNOVATION GRANTS

## Final Progress Report

Grantee Name: Solomon Valley Resource Conservation and Development Area, Inc.	
Project Title: In a Market-based crop rotation, teff will maximize the use of soil moisture and increase the annual income for dry land farmers in Kansas	
Agreement Number: NRCS 69-3A75-7-123	
Project Director: Teresa Webb	
Contact Information: 320 South Sixth Street Stockton, KS 67669	Phone Number: 785-425-6647 E-Mail: <a href="mailto:teresa.webb@ks.nacdnet.net">teresa.webb@ks.nacdnet.net</a>
Final Report - Project End Date: Sept. 30, 2010	

The following were the objectives set before beginning the teff project.

**Project Objectives:** The objectives of this market-based project include:

- 1) Expand teff, a drought tolerant cereal grain and forage crop, from test plots to marketable sized fields
- 2) Provide farmers in Graham County and north central Kansas with the knowledge, guidance and equipment to plant, grow, harvest, and market teff
- 3) Increase annual income for dry land farmers in north central Kansas
- 4) Increase depth of soil moisture in cropping rotation

How has the project done? Were the objectives met? The best way to answer that is to go through them one by one.

### 1) **Expand teff, a drought tolerant cereal grain and forage crop, from test plots to marketable sized fields**



*The Flail-Vac Seed Harvester was demonstrated at the CIG Teff Project Field Day Aug. 1, 2008.*



*This photo of a teff seed head and seed taken by RC&D Program Assistant, Teresa Webb, received North Central Region Honorable Mention in the Sustainable Agriculture Research and Education (SARE) New American Farm Photo Contest in 2008.*

Before the project started, the only teff grown in the state of Kansas that we know of was grown in research plots. Sarah Evert worked for two years researching teff as part of her graduate studies at Kansas State University. Ms. Evert proved that teff could be grown in Kansas, and more specifically, the Nicodemus/Graham County area. However, her research, like most research, was done on a test plot basis. Objective 1 was to move from test plots to field size plots. The project has accomplished this objective. In 2008, fifty acres of teff were planted by five producers. One of the more specific goals in the project action plan was to have six to eight producers planting 80 acres of teff for the three years of the

project. Unfortunately the goal was not met in 2008.

However, in 2009, 94 acres of teff were planted by seven producers. In 2010 there were 226 acres planted by six producers so the objective was clearly met in these years. Teff was produced on a field scale, rather than a test plot scale.

In breaking down the objective even more, notice that teff is referred to as a cereal grain and a forage crop. By the end of the project, the focus was mainly on teff production for forage targeting the horse, weaning calf and specialty livestock producers. The project attempted to produce teff for grain, but the difficulties in harvest proved substantial. The project purchased a flail-vac harvester in 2008 which was used to harvest the grain. How-

ever, the flail-vac proved to be an unsuccessful implement. Its major flaw was the uptake of too much plant material along with the grain. This extra plant material carried with it an abundance of moisture that required removal before further cleaning, storage, or sale of the seed could be accomplished. The method of plant material removal was too laborious to be profitable.



*Teff producer, Gil Alexander opens the Flail-Vac Seed Harvester dropping seed and excess plant matter on the raised screen to allow for hand separation during the Aug. 28, 2009 Field Day.*

## **2) Provide farmers in Graham County and north central Kansas with the knowledge, guidance and equipment to plant, grow, harvest, and market teff**

It's been said that you truly learn something when you have to educate others about a topic. This saying holds true for the teff project as it was an all-around learning process. The project coordinator had to learn an abundance about teff so that he was able to help the producers. This was accomplished in a few ways. First, the coordinator researched as much information online as could be found. Although this research was useful, most of the education came from actually visiting a teff producer in Hydro, OK named Dean Smith. Mr. Smith has been growing teff for



*Project Coordinator, Josh Coltrain, and teff producers Gil Alexander and Gary Alexander adjusts the drill settings for the small teff seed.*

at least 15 years and was very gracious in helping guide us along. The project coordinator visited Mr. Smith's farm on four occasions. Two producers also visited Mr. Smith's location on one of those trips. Lemlem Kebede, with Workinesh Spice Blends, Inc., Burnsville, Minnesota purchases teff grain from Mr. Smith. Ms. Kebede and Mr. Smith agreed to donate Teff seed stock to the project in exchange for Workinesh Spice Blends receiving the opportunity to purchase all grain produced from that seed.

Some guidelines for growth that the project has developed are as follows:

Planting Time:	Two weeks after the frost free date. In the Graham County area, the target date would be May 15
Seeding rate:	Uncoated seed – 5 to 6 lbs/acre Coated – 8 to 10 lbs/acre
Seeding depth:	¼ inch or less
Seedbed preparation:	The more firm a seedbed, the better.
Fertilizer requirements:	30 to 60 lbs of nitrogen/acre, phosphorus if regularly needed



*CIG Teff Project Field Day, Aug. 5, 2010.*

These guidelines should work in any situation where a producer would want to produce teff. Depending on the producers goals, teff should be able to be grown, not only in north central Kansas, as the goal states but in any climate with 70 to 80 consecutive days of frost free conditions. However, teff requires warm temperatures to achieve maximum yields.

One way the project tried to provide knowledge was through field days attended by approximately 90 area producers and interested individuals. In each of the three project years a field day was held to distribute as much information as possible. One

of the advantages of field days is that people that are interested enough in attending are usually very good “sponges” of the information that was provided. Along with the field days, other informational meetings were held. These occurred when teff experts came to Graham/Rooks County and gave presentations on teff growth or even critiques of the teff that was growing in the field. On August 7, 2009 Dr. Tareke Berhe, Regional Director, Crops Extension, Special Advisor to Teff Research at the Sasakawa Africa Association gave an informative talk on teff at the Nicodemus National Park Service visitors’ center. Dr. Berhe also visited three fields of growing teff where he was able to determine that the teff planted for the project is from multiple varieties, none of which are suited to delivering the outcomes that area teff farmers are wanting for grain or forage.

On September 8, 2010, Michael Sporcic, CIG National Technical Contact person and a Conservation Agronomist, Central National Technology Support Center (CNTSC) in Fort Worth, Texas, visited a teff project producer’s field. Sporcic has been overseeing the CIG teff project for the past three years and wanted to visit the project area in person before submitting his final report. Also in attendance where Willie Durham, Texas, USDA; Jerry Lemunyon, nutrient and pest management specialist, CNTSC Fort Worth; Kefyalew Desta, Assistant Professor of Sustainable Agricultural Systems at Oklahoma State University; Lyle



*Dr. Tareke Berhe, Regional Director, Crops Extension, Special Advisor to Teff Research at the Sasakawa Africa Association inspecting the teff crop in a teff project producer’s field Aug. 2009.*



September 8, 2010 visit to project teff field.

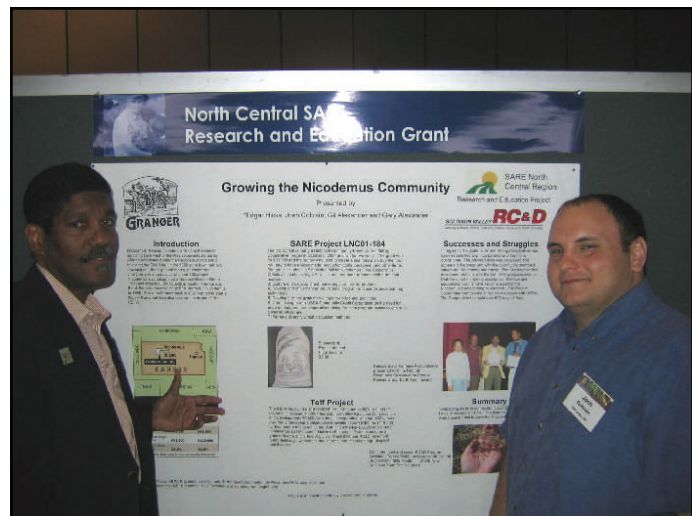
Frees, Natural Resource Specialist, Kansas NRCS; Darla Juhl, RC&D Coordinator; Sherry Brown, RC&D office trainee; Charles McNeal, teff producer; and Mike and Teresa Webb, teff producers and hosts. This visit was helpful for both producers and project personnel to see from an outside point of view the project's accomplishments.

Press releases were written for each field day and given to Mary Schaffer in the NRCS State Office to distribute through USDA and NRCS list serves and to regional and multi-state newspapers and agriculture publications.

Another way information was distributed was through a quarterly newsletter developed by the Solomon Valley RC&D staff. Within the newsletter, the project coordinator wrote a column detailing teff project activities. A hard copy of this newsletter is mailed to 140 RC&D members and supporters across Kansas. It is also available on the RC&D's website, [www.solomonvalleyrcd.org](http://www.solomonvalleyrcd.org).

Although not targeted at growers in North Central Kansas, another way that the project disseminated information was presenting posters. The first poster presented was at the Sustainable Agriculture Research and Education (SARE) Annual Conference in Kansas City in 2008. The project coordinator, the marketing consultant, and two producers attended the meeting and presented a poster dedicated to the teff project and the Kansas Black Farmers Association (KBFA). The other poster presented was at the Soil and Water Conservation Society (SWCS) Annual Conference in St. Louis in 2010. The project coordinator and the Solomon Valley RC&D Coordinator attended the meeting and presented the poster during the CIG Showcase. Both poster presentations gave excellent opportunities to answer any questions anyone would have.

Edgar Hicks, project marketing consultant, made connections to teff markets and shared information on the project throughout the United States. Mr. Hicks' efforts are attributed with the project receiving on average one call a month from prospective grain buyers and interested growers from across the United States and several foreign countries.



Edgar Hicks, project marketing consultant, and Josh Coltrain, Project Coordinator, presented a teff themed poster at the SARE Annual conference in Kansas City March 25-27, 2008.

Mr. Hicks shared information regarding the teff project at the following meetings:

- USDA-SARE administrative council meeting, November 18, 2010 - Detroit, Michigan
- Nebraska Unicameral (Ag committee Hearing) on LR 453 "Nebraska Food Desserts", October 22, 2010 - Lincoln, NE
- Nebraska State Historical Society conference, September 30, 2010 - Ponca, Nebraska
- Standing Rock Indian Reservation, September 14, 2010 - Fort Yates, North Dakota
- FFA/Nebraska State Fair/Grange booth, September 4, 2010 - Grand Island, Nebraska
- CFTC Ag Advisory Committee, August 5, 2010 - Washington, DC
- National Topical Stamp Show, June 26, 2010 - Denver, Colorado (during philatelic presentation on Ethiopia)
- Nebraska Rural Development quarterly meeting, April 20, 2010 - Thedford, NE
- Golden Hills RC&D regional meeting, April 14, 2010 - Orient, Iowa
- Nebraska Great Plains RC&D meeting, March 15 & April 12, 2010 - David City, NE
- Growing Power (Will Allen) meeting, February 12, 2010 - Milwaukee, Wisconsin
- Nebraska Department of Education (ag education workshop) December 1, 2009 - Omaha, NE
- Federal Grain Inspection Service (FGIS) advisory committee, 2009
- Langston University Eighteenth Annual Farmers Conference, May 31, 2009 - Langston, OK
- 20th Annual Sustainable Agriculture Research and Education (SARE) Conference in Kansas City March 25 - 27, 2008
- Morningside College, February 21, 2008 – Sioux City, Iowa

### 3) Increase annual income for dry land farmers in north central Kansas

This objective has proven to be one of the more difficult to obtain. There are a multitude of buyers who are willing to purchase grain teff. However, the amount that those buyers will pay for the teff seems to be a moving target. The first year of the project, some teff seed was sold to Workinsh Spice Blends, Inc., Burnsville, Minnesota. The producer was paid \$0.50 per pound of teff. The main issue with that price was that the producer was only able to produce between 200 to 300 lbs of clean teff grain per acre. At \$0.50, these yields are not sufficient enough to increase the annual income of dry land producers as the goal states.



Josh Coltrain visits with a participant about the Teff Project Poster he presented at the Soil and Water Conservation Society (SWCS) Annual Conference in St. Louis, MO in 2010.

However, the forage side has shown some promise for increasing the annual income of producers. It has been reported to the project that high quality teff hay can sell for \$12 a small square bale in Colorado hay auctions. If a producer can produce two ton an acre over a year, an amount that seems possible, the income can be impressive. For example, if the bales weigh 50 lbs (probably too low), the net income would be \$960/acre; if the bales would weigh 70 lbs (probably a little high), the net income would be \$685/acre. Since the cost of inputs is not cost prohibitive, these net amounts could increase the producer's income. However, this cost/bale price would have to be obtained.

#### 4) Increase depth of soil moisture in cropping rotation

This was another goal that was difficult in obtaining. Weather is unpredictable. The amount of rainfall during the growing periods for two of the three years of the project was higher than average. For example, according to the National Weather Service, there was 1.89 inches more precipitation in 2008 than average in Hill City. That number jumps to 10.01 inches higher in 2009. In 2010, the rainfall was 5.7 inches below normal. One of the reasons teff was chosen was for its drought tolerance. In researching about the plant, it was learned that it is also tolerant to water-logged conditions. There were stretches of time that the plant had to test its limits for both.

The amount of moisture in the soil profile was measured by producers using the USDA NRCS Pamphlet Program Aid 1619 titled Estimating Soil Moisture by Feel and Appearance. However, since the moisture was above average, no difference was seen between teff fields and other ground. This portion of the grant may need more research.



*Teff project producers Gary Alexander and Gil Alexander checking to see if the 2009 crop is ready to harvest for grain.*



*Michael Sporcic inspecting a project teff field's regrowth after being harvested for forage.*



*Vara Prasad, Kansas State University, visits with teff project producer Gil Alexander at the Aug. 2010 Field Day.*



*Teff project enthusiasts and Kansas Black Farmers Association members listen during Dr. Berhe's presentation of Teff "Teff, A Small Grain Cereal with High Potential as an Alternative Crop for the Plains"*