

Project Title: Whole Soy Food Acceptability and Viability Study

Organization: B & B Legacy Farms, LLC

Principal Investigator Name: Karen Ballard

Report Period: 4th Quarter Report - January - March 2023

Project Status:

Ongoing. 4th Quarter Report (January-March)

Project Period: January 1, 2023-March 31, 2023.

This project will produce a feasibility study for the potential development of a collaborative, whole, vegetable soy food system.

Objectives of the project include:

1. Evaluation of the agronomic viability and profitability of food-grade soy cultivars that can be conventionally harvested through a meta-analysis of data from Arkansas, Mississippi, Louisiana, Missouri, and Texas.
2. Evaluation of direct product acceptability of whole soy products through key informant interviews, surveys, and focus groups.
3. Evaluation of regional market opportunities through key informant interviews with school nutrition program directors and USDA food and nutrition officials.
4. Dissemination of study results to increase knowledge of producers and consumers regarding the value and sustainability benefits of regional soy food production and consumption.

Progress Milestones: Foundational Research & Development

- a. Nutritional analysis of six non-GMO food grade varieties.
- b. Sensory testing with industry representatives at the 2023 National Conservation Systems Cotton and Rice Conference (January).
- c. Analysis of fall and spring whole soy food sensory testing results.
- d. Evaluation of market development opportunities through key informant interviews and review of 3rd party resources.

Non-technical project status:

Key performance results by objective during the fourth quarter:

Objective 1.

Evaluation of the agronomic viability and profitability of food-grade soy cultivars that can be conventionally harvested through a meta-analysis of data from Arkansas, Mississippi, Louisiana, Missouri, and Texas.

- Nutritional analysis of six non-GMO vegetable soybean varieties.
- Collection of 2022 yield data for non-GMO vegetable soybean field trials in southern states continues.

Objective 2.

Evaluation of direct product acceptability of whole soy products through key informant interviews, surveys, and focus groups.

- Food samples were prepared (soybeans and rice and roasted soy nuts) and utilized for taste tests in support of the MSSB/USB educational booth at the 26th Annual National Conservation Systems Cotton and Rice Conference in Baton Rouge, LA (January 29-31, 2023).
- Taste Tests surveys were completed by 33 Conservation Conference participants from: Louisiana (5), Arkansas (8), Mississippi (7), Missouri (3), Texas (5), Georgia (2), North Carolina (1), Alabama (1), and Tennessee (1).
- Analysis of Conservation Conference taste test data for *Roasted Soy Nuts* and the *Soybeans and Rice* entrée reflected the highest approval rating for the Soybeans and Rice entrée (between study groups) and a lower comparative approval rating for the Roasted Soy Nuts. Both overall taste approval scores were high, however, there was 73% agreement that the entrée sample was “great.”

2023 Conservation Conference - Industry Respondents

Whole Soy Product Acceptability - Taste

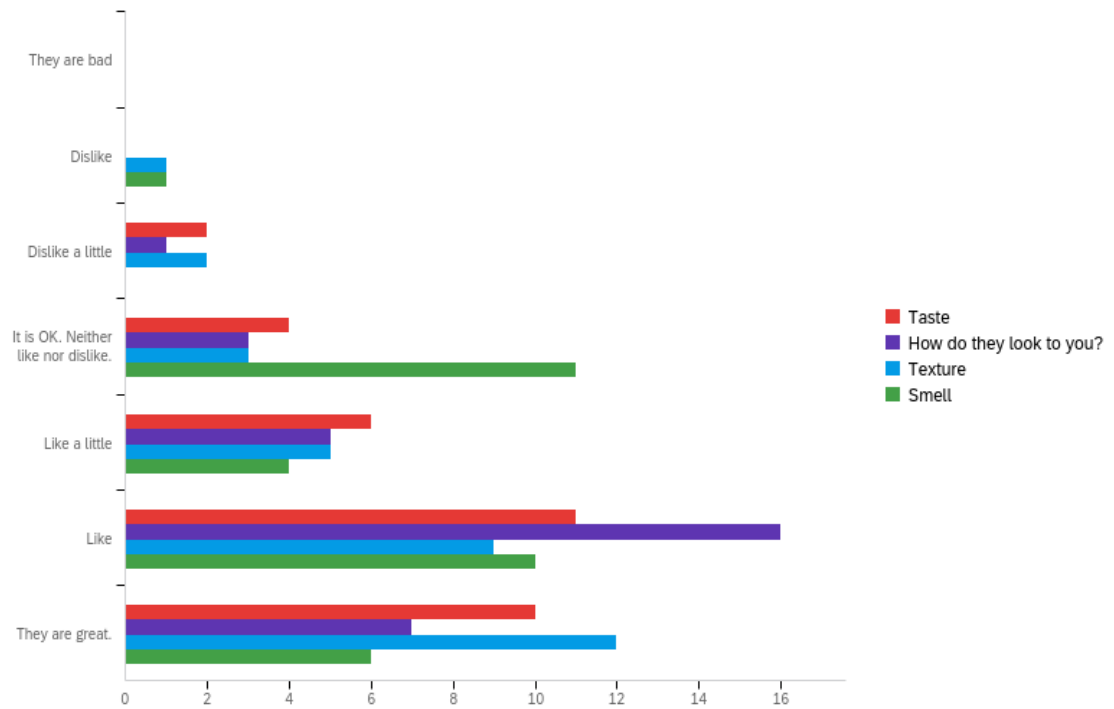
(% approval ratings)

Roasted Soy Nuts

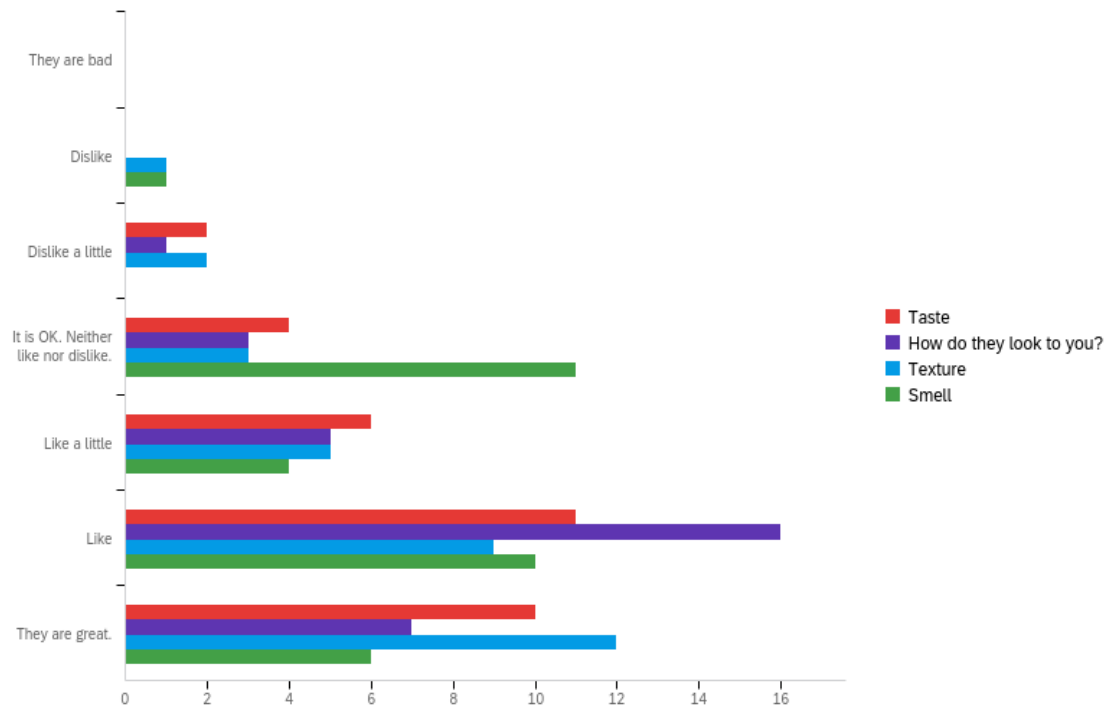
	Like a Little	Like	They are Great	Approval
Roasted Soy Nuts	18%	33%	30%	82%
Soybeans & Rice	3%	21%	73%	97%

Conservation Conference Industry Respondent Feedback: Acceptability Charts

Tell us what you think about the Soy Nuts you tasted.



Tell us what you think about the Soybeans and Rice you tasted.



- Analysis of taste tests and sensory testing (during the 3rd quarter) was completed during the 4th quarter. 3rd Quarter sites. Locations & Sample size:
 - LA Farm to School Taste Tests: n = 43
 - Winnsboro (LA) Sensory Testing Group: n = 10
 - McCrary Jr/Sr High School (AR): n = 65

Fall 2022 Group Comparisons

Whole Soy Product Acceptability - Taste

(% approval ratings)

Roasted Soy Nuts

	Like a Little	Like	They are Great	Approval
LA Farm 2 School	7%	29%	56%	92%
Winnsboro Sensory Testing	11%	22%	56%	89%
McCrary Jr/Sr HS	19%	32%	6%	57%

Black Soybean Salsa

	Like a Little	Like	They are Great	Approval
LA Farm to School	3%	13%	84%	100%
Winnsboro Sensory Testing	11%	22%	67%	100%
McCrary Jr/Sr HS	11%	28%	43%	82%

Soybeans and Rice

	Like a Little	Like	They are Great	Approval
LA Farm to School	NA	NA	NA	
Winnsboro Sensory Testing	0	11%	79%	90%
McCrary Jr/Sr HS	29%	17%	31%	77%

- **McCrary High School Study Highlights**

Study Date: November 15-16, 2022

Study Sample Size: n=65

***Purpose of the study:** The evaluation of student acceptability of whole soy foods. Students and school personnel participated in taste testing traditional snack foods, an entrée, and dessert. Food samples were prepared utilizing minimally processed whole soybeans.*

Taste tests were conducted with whole soy food recipes, including roasted soy nuts, Cajun Style Soybeans & Rice (entrée), black soybean salsa, soy hummus, and soy bread pudding.

Students and school personnel evaluated each soy food item based on taste, appearance, texture, and smell. Following completion of a survey conducted during the taste tests, students participated in an informal debriefing.

What we learned from students and teachers.

The school Child Nutrition Director, Wellness Committee, administrators, and teachers co-planned and helped to conduct this study. Participants included: two students in the 7th-8th grades, 30 students in the 9th-10th grades, 30 students in the 11th-12th grades, and three school personnel.

*What did they think? **Ninety-seven percent** (62) of respondents **identified soy foods** they **would like to have as a school snack or lunch item.***

The top three soy food dishes picked by students?

- *Black Soybean Salsa, followed by a two-way tie between Cajun Soybeans & Rice, and Roasted Soy Nuts.*

Note: See Attachment A. Report to McCrory High School Wellness Committee. McCrory High School Taste Test Evaluation – Whole Soy Foods (March 8, 2023).

Objective 3.

Evaluation of regional market opportunities through key informant interviews with school nutrition program directors and USDA food and nutrition officials.

Email discussions, Zoom meetings, and content review were conducted with market influencers regarding expansion of whole soy food distribution through USDA foods and DOD Fresh.

- March 7, 2023. Zoom meeting with Ally Mrachek, Associate Community Programs Director, Healthy Food Systems, University of Arkansas Medical Sciences (UAMS). Discussion regarding collaboration with formatting recipes for school nutrition program needs.
- March 10, 2023. Zoom meeting with Lindsey Cartwright, State Local Procurement Manager, Farm to School Program. Arkansas Department of Agriculture. Discussion regarding producer resources.

- March 15, 2023. Email discussions with Stephanie Spencer and Zoom meeting with Dr. Keary O'Connor from Plant Based TeleHealth (Food as Medicine).
- March 23, 2023. Email discussions and Zoom meeting with Stephanie Spencer regarding July webinar featuring whole soy foods with Chef Julia Dunaway.
- ***USB Specialty U.S. Soy Database for sourcing soybeans for use in soy foods.***
<https://soydatabase.ussoy.org/>

During this past quarter a review was conducted of the USB Specialty U.S Database for sourcing soybeans for use in soy foods. This database is a marketing asset available to farmers seeking new direct market contacts.

The USB U.S. Soy database provides quality attributes such as oil, protein content, amino acid content, and origin. The protein level range (DRY) varies greatly between varieties included, with a scale from 31-50.

Search filters include intended use, type, size, and hilum color. The Intended Use category included: High Oleic, Miso, Natto, Soy Milk, Soy Sauce, Tofu, and General Use. The database also provides a supplier list for sourcing soybeans used in food production. A supplier summary-quick reference guide was created by location and listed certifications (see below) for Mid-South producers. Based on supplier location in the database, only two Mid-South member states have producers/companies currently utilizing this resource for market expansion.

<https://soydatabase.ussoy.org/suppliers>

Supplier List Summary – Quick Reference Guide (1/2023)

<i>Suppliers</i>	<i>Location</i>	<i>Certifications*</i>
1. Bluegrass Farms of Ohio, Inc.	Ohio	SQF, Global Gap, Kosher, Organic, IP, Non-GMO Project
2. Brushvale Seed	Minnesota	Non-GMO Project, FSMA, Soybean Export, Sustainability
3. Citizens LLC	Michigan	None listed
4. Clarkson Grain Co., LLC	Illinois	Organic, AIB, Kosher
5. Consolidated Grain & Barge Co	Covington, LA	Non-GMO Project, USDA Organic, FSMA
6. Grain Millers, Inc.	7 locations: MN, WI, IN, IA &	BRC AA Rating to GFSI/FSMA Standards,

	Yorkton SK/Canada	Kosher, NOP Organic, Non-GMO Project.
7. HC International	Fargo, ND	USDA Organic, Sustainability, IP, Non-GMO Project
8. Healthy Food Ingredients	20 storage fac, 4 processing plants & 2 gluten-free facilities across US	Organic, Non-GMO Project, Gluten-Free, IP
9. IOM Grain	Portland, Indiana	None listed
10. Ketterling Farms	Marion, ND	Non-GMO
11. KG Agri Products, Inc.	Ohio	Organic, Kosher, Non-GMO Project
12. Knewtson Soy Products, LLP	Minnesota	None Listed
13. Meadowland Soy	Mapleton, MN	None Listed
14. Michigan Agricultural Commodities	Michigan	BRC Certified
15. Montague	Virginia	None Listed
16. Richland IFC, Inc.	Breckenridge, MN	Sustainability, Non-GMO, IP Handling, AIB HACCP
17. SB&B Foods, LLC	Casselton, ND	Non-GMO Project, USDA Organic, FSMA
18. Schwartz Farms	Cortland, Ohio	Sustainability, Non-GMO Certificate, IP Handling, Transportation Certificate
19. Scoular	Corp Office: Ft. Worth, Texas**	Organic Certified, FSSC 22000 (GFSI Recognized), Non-GMO Project
20. Star of the West	Fairgrove, Michigan	None Listed
21. Stonebridge Ltd	Cedar Falls, Iowa	None Listed
22. The DeLong Co., Inc.	Clinton, Wisconsin	None Listed
23. The Redwood Group	Mission, Kansas	Organic, SQF-Level 2, Kosher, Non-GMO Project
24. Trans Globe	Woodstock, GA	None Listed

*Certification Acronyms

- Safe Quality Food (SQF)
- Identity Preserved (IP)
- (FSMA)
- (AIB) (HACCP)

- (BRC)
- FSSC 2200

**1400+ employees/100+ facilities in North America and Asia. 9.7 billion in sales (22). 1.3 billion bushels traded.

Objective 4.

Dissemination of study results to increase knowledge of producers and consumers regarding the value and sustainability benefits of regional soy food production and consumption.

- Board Presentation at the 26th Annual National Conservation Systems Cotton and Rice Conference on Monday, January 29, 2023.
- Conference presentation at the 26th Annual National Conservation Systems Cotton and Rice Conference on Tuesday, January 31, 2023.
- Preparation and presentation of McCrory High School Student Sensory testing results with McCrory School System Wellness Committee. See Attachment A. Report to McCrory High School Wellness Committee. McCrory High School Taste Test Evaluation – Whole Soy Foods (March 8, 2023).