



SOUTH CAROLINA DEPARTMENT OF AGRICULTURE

2021 Request for Pre-Proposals

Poultry, Rendering, Pet Food, Swine, Feed Ingredients Industry Segment

GRANT MONEY IS ANTICIPATED AVAILABLE through the SCDA Agribusiness Center for Research & Entrepreneurship Competitive Grant Program (ACRE CGP).

Introduction:

The South Carolina Department of Agriculture has created the Agribusiness Center for Research & Entrepreneurship Competitive Grant Program (ACRE CGP). Through this program, it is anticipated that grant funding will be available, pending anticipated industrial memberships in the ACRE CGP. Upon budget confirmation, this program will offer grants for innovative research solutions that have entrepreneurial potential for solving agricultural challenges that limit agribusiness progress in our state. If the combined state funding and industrial membership funding are received, is anticipated that up to \$750,000 will be available in fiscal year 2020-2021 for projects in the Industry Segment related to poultry and rendering as well as animal feed and pet food enterprises. Projects must offer real solutions for challenges and have potential to be moved into new agribusiness-related enterprises in South Carolina.

It is recognized that with new discoveries and integration of innovative cutting-edge technologies, the food, feed and agricultural industries can make rapid leaps forward in food and feed safety, environmental protection and economical production of safe, wholesome and useful agricultural products. The Entrepreneurship Center program will work to help move these new technologies and innovations to the market through entrepreneurial efforts. The long-term goals of the ACRE program are: 1) to make South Carolina the leader in answering research challenges for the global food, feed and agricultural industries; 2) to assist current South Carolina agribusinesses in becoming more successful; 3) to attract and/or create new businesses in South Carolina via new solutions from research discoveries and innovations; and 4) to support research at South Carolina's colleges and universities.

The poultry and poultry co-product (rendering) industries and the associated animal feed and pet food industries comprise the largest segment of South Carolina agribusiness. In 2014, the USDA National Agricultural Statistics Service reported that 8.54 billion broilers and 238 million turkeys were annually produced nationwide. Additionally, layer hens generated 99.8 billion eggs. Residual tissues from poultry slaughter are processed via rendering to create a number of products including animal feed and pet food ingredients. All proposed solutions to challenges must consider the vast scales of production utilized in the poultry and animal co-product industries and consider market-driven economics. **Researchers submitting practical, solution-oriented pre-**

proposals offering economical and realistic benefits to the poultry and associated poultry co-product industries have the greatest chance of success; pre-proposals offering no benefit to these industries have no chance of being funded.

For 2021-2022, the ACRE will seek fresh, new solutions for the poultry and poultry co-product industries and will later work to move into all segments of the food, feed and agricultural industries. Researchers who submit a pre-proposal to this program are asked to thoroughly understand current methods in use in the poultry and co-product industries to ensure the proposed research does not repeat previously studied methods. Pre-proposals which were previously submitted to ACRE CGP and not selected for funding are discouraged. The ACRE Director of Research will be happy to answer any questions and assist researchers in further understanding the current industry practices.

Request for Pre-Proposals:

The Agribusiness Center for Research and Entrepreneurship Competitive Grant Program (ACRE CGP) is conducting this request for pre-proposals for the 2021-2022 research program in anticipation of funding. All projects must solve industry challenges and have the potential for entrepreneurial development. The overarching goal of this grant program is to increase agribusiness in South Carolina through assistance solving challenges for existing industries and leading to formation of new start-up companies.

All pre-proposals are due electronically (in WORD format) by 10:00 pm on Wednesday, May 12, 2021. The pre-proposal format is attached. Please e-mail pre-proposals to ACREgrants@scda.sc.gov. Late pre-proposals will not be accepted.

Submitted pre-proposals will undergo a two-stage review. In the first stage, pre-proposals will be evaluated on: 1) offering innovative, new and realistic solutions to economically and safely address challenges in the industry and 2) offering potential for economic development in South Carolina through entrepreneurship by the principal investigator or by others using the new technology. Pre-proposals selected for the second stage of evaluation will be reviewed by agricultural industry experts at the ACRE CGP Research Committee meeting on late May to early June, 2021 (schedule and location to be announced later). The Principal Investigator(s) of a selected pre-proposal will be invited to present a short overview of the project to the ACRE CGP Research Committee and to participate in a discussion with the Research Committee. Applicants selected for second stage review will be contacted after May 14, 2021 to schedule appointments with the Research Committee.

The purpose of the ACRE CGP Research Committee review is to allow an opportunity for researchers to interact with the industry experts. This is designed to be a learning experience for both the researcher(s) and the industry personnel. Since these are pre-proposals, it is likely that research discussions between researchers and industry personnel may lead to suggested modifications of the project to better fit industry needs.

Applicants will be notified if their pre-proposal or a requested modified pre-proposal is selected by the ACRE CGP Research Committee for further development after the Spring/Summer 2021 ACRE CGP meeting. At that time, full proposals will be submitted through regular university or college Sponsored Program channels prior to final submission to ACRE CGP to begin the project with an anticipated start date as soon as possible prior to July 1, 2021. If your pre-proposal is for a multi-year project, please list each annual total direct cost. If selected, however, a project will be funded for **only one year** and subsequent years will be dependent on adequate progress toward goals and selection for funding by the Research Committee based on submission of another pre-proposal to the next year of competition. As per ACRE CGP policy, no graduate or undergraduate tuition, tuition differential or indirect will be paid on any ACRE CGP grant. Applicants not selected for funding will be notified as soon as possible after the late May or early June ACRE CGP Research Committee meeting. The decisions of the ACRE CGP Research Committee will be final.

All successful applicants will be required to submit progress reports twice per year prior to the Fall and Spring ACRE CGP Research Committee meetings and to meet with the committee to discuss the project progress. The Fall ACRE CGP Research Committee meeting typically will be held in late-October to early-December and the Spring Research Committee meeting typically will be held in May to early July (location to be determined).

Successful applicants will be featured in regular press releases on the research progress. Understanding the need to protect intellectual property, press releases will require university review to ensure potential patent rights are not jeopardized.

Any researcher who does not complete a Commissioner's Grant project, as outlined in the proposal and as determined by the ACRE CGP Research Committee, will be required to return the funds or his/her college or university will lose eligibility to receive a Commissioner's grant for a five-year period.

Success rate in the 2021-2022 RFP will depend on the number of submitted requests and the merit of the proposed research for benefiting the rendering industry. The following are topics of interest to the poultry, rendering, animal feed and pet food industries. **These are listed in no particular order of preference or priority.** If you have additional research ideas you feel would be of benefit to the poultry and rendering industries which are not listed below, please contact the ACRE CGP Director of Research at ACREgrants@scda.sc.gov to discuss.

- 1) The rendering industry processes deadstock and offal to produce animal feed and pet food ingredients. The industry needs a way to detect and remove pentobarbital. Although the rendering industry has never purchased a single milliliter of pentobarbital, it has become one of the industry's biggest problems. Veterinarians euthanize animals and owners call the rendering company to dispose of the carcass. However, they do not always tell the truth as to how the animal died. Therefore, the contaminated carcass can become one source of pentobarbital in the rendering stream. The industry is currently funding research on rapid detection at the time of carcass pick-up. However, low levels of pentobarbital have been detected in offal from food animal slaughter. The industry does not understand how animals destined for food are reporting positive residues for pentobarbital in their

offal. FDA has placed a zero tolerance on pentobarbital residues in rendered products. Pentobarbital is not destroyed by the thermal processes used in the rendering industry. A study is needed to determine where the low levels of pentobarbital are entering the rendering stream or if the current LCMS detection method is flawed. Additionally, the industry needs a method of removing pentobarbital and especially from the separated fat.

- 2) Renewable diesel, which is different from biodiesel, is of extreme importance to the production of green fuels as well as to the rendering industry. There are a number of tests the renewable diesel industry uses to determine the suitability of recycled animal fats and recycled cooking oils for use as feedstocks in their processes. The presence of excessive metals “poisons” the catalyst bed used in the production of renewable diesel which is a multimillion-dollar event in terms of replacement of the catalyst bed and the downtime incurred. Renewable diesel producers and their supply chain partners are pushed to preferentially choose materials that score well on the spreadsheet below, leaving some of the more sustainable materials behind (such as brown grease and mixed animal fats). Additionally, some pure species materials do not score well with poultry fat as one such example. The California Air Resources Board and Low Carbon Fuel Standard selectively reward low carbon intensity feedstocks with higher credits. Materials truly made from waste thus score much higher than soybean oil and can justify higher prices and higher inclusion levels if the fat recycling industries can deal with the metals issues. There are huge expansions planned and underway by numerous companies to produce this green fuel. The rendering industry needs researchers to find ways to remove metals from lipid feedstocks so more recycled can be used to make renewable diesel.

Characteristic	Unit	Limit	Method
Moisture and volatile	wt-%	0.6	ISO 662
Insoluble Impurities	wt-%	0.1	ISO 663
Unsaponifiable residue	wt-%	1.5	ISO 16809
FFA	wt-%	7	ISO 660
Oligomers	wt-%	5	ISO 16931
			ASTM D
Total Metal Content	mg/kg	30	5185
			ASTM D
Total Phosphorous Content	wt-ppm	20	5185
			ASTM D
Total Nitrogen Content	wt-ppm	80	5762
Organic Solvents	mg/kg	150	ISO 15303
Chloride	mg/kg	50	UOP 779
Chloride	mg/kg	50	EN 16994
Also the poly test method and limits for AF is:			
PE	mg/kg	100	ISO 6656

- 3) The poultry industry has major labor shortage problems. It needs mechanical/robotic/automated methods of conducting processes such as catching chickens. A poultry processing plant needs to catch 28,000 chickens per hour, transport them to the processing plant and process those birds. Currently, the job of catching the chickens is done manually and is a very difficult and labor-intensive task. A mechanical or robotic or automated method of catching chickens is needed.
- 4) The poultry industry needs mechanical/robotic/automated methods of conducting the processes within the slaughter and processing facility. Automated methods of cutting the birds into parts, placing parts in trays, etc. are needed.
- 5) The egg industry also has labor shortages and needs automated methods for moving the eggs.
- 6) The poultry industry needs a new design for chicken trays to allow the used tray materials to be recycled. The trays must be inexpensive, lightweight, strong enough to support the products, and sanitary. The trays must not absorb moisture and must maintain an attractive and clean package appearance.
- 7) The rendering and pet food industries need information to improve the stability of pet foods and rendered animal feed ingredients and especially from fat. Lipid oxidation is a major concern and can greatly impact pet food quality and shelf-life. The industries need new natural preservatives for stabilizing fats and preventing lipid oxidation. Natural antioxidants such as polyphenolics are needed. A list of plant extracts and how they work to prevent lipid oxidation is needed.
- 8) The poultry industry needs to know the impact of feed processing and particle size on ingredient utilization by chickens and turkeys.
- 9) Lameness is causing elevated mortalities in poultry. It is the major cause of mortality of chickens after 5 weeks of age and can be a major animal welfare concern. Most of the lameness is bacterial related, but also can be related to micro fractures in the growth plate of the long bones. The industry needs ways to prevent lameness in chickens and turkeys.
- 10) Research on food safety issues and in particular related to specific *Salmonella* types is needed. Methods of reducing *Salmonella* through natural methods are needed.
- 11) The poultry industry needs new natural ways to prevent *Campylobacter*.
- 12) High levels of phosphorus in poultry litter prevent it from being used as a fertilizer and applied to land. Methods of reducing phosphorus or balancing nitrogen to phosphorus are needed.
- 13) The number one health concern for poultry is necrotic enteritis which is caused by initial damage from coccidia followed by *Clostridium perfringens*. The disease causes high mortality. The poultry industry needs a new way to deal with coccidiosis in birds. Due to increasing consumer demand for no drug usage, many of the effective approaches used for coccidial control may not be used in antibiotic-free broilers. Antibiotic-free broilers now comprise approximately 20% of the poultry market. Fresh, new ideas for coccidial control are needed. A wholly new way to control coccidia is sought, whether to control it externally to prevent initial infection or internally in the already infected bird. Any control mechanism developed must not impact antibiotic-free broiler status.
- 14) The poultry industry needs a new way to inhibit or kill *Clostridium perfringens* to prevent necrotic enteritis in antibiotic-free broilers. Similar to Challenge 17 (above), the desire for antibiotic-free broilers leaves the poultry industry with limited options for control of

Clostridium perfringens. Necrotic enteritis may be associated with coccidiosis, also. Any control mechanism developed must not impact antibiotic-free broiler status.

- 15) The poultry industry is interested in the use of nutraceuticals to modulate intestinal microbiota and the immune system as an alternative to therapeutics.
- 16) Epigenetics: The poultry industry needs to understand the role of parental nutrition in shaping offspring health and performance in poultry.
- 17) The poultry industry would like ideas defining how nutritionists will formulate diets in the next 10 years with the increasing cost of raw materials, continued pressures to reduce feed costs and emphasis on nutrient environmental excretion.
- 18) Research is needed to determine the next limiting amino acids after threonine for poultry. The requirements of these next limiting amino acids will have to be evaluated not only relative to lysine, but also as to minimum intake and impact of their use under practical broiler production conditions.
- 19) Utilization of trace minerals in poultry will be determined by a better understanding of their interaction with the immune system and performance, as well as on the quality of their sources including potential residue contamination. In addition, information regarding further differentiation between organic and inorganic trace mineral sources would be beneficial to producers.
- 20) With the recent concerns over the African Swine Fever virus in Asia, an evaluation is needed of the potential threat in the US of this virus and especially for transmission via rendered animal feed ingredients. Validation is needed - in advance of the potential presence of this virus in the U.S. - to prove the thermal processes used in rendering and in the animal feed and pet food industries destroy the virus. Sound scientific evidence is needed to ensure panic does not occur that could negatively impact the rendering, animal feed and pet food industries. Potential ways to reduce the threat of African Swine Fever in the U.S. are needed.
- 21) Ideas are needed on what the poultry processing plant of the future will be. What new advances could be incorporated into the next processing plants to reduce stress to the birds, protect the safety of the products, reduce worker stress, increase efficiency, reduce waste, reduce energy consumption, improve water usage, etc.? This pre-proposal requires a high level of understanding of current poultry processing facilities and food safety along with new, cutting edge ideas for the future of poultry processing.
- 22) The poultry industry needs an understanding of the veterinary and animal care aspects as well as the legal aspects in order to be in compliance with new standards and legislation for ensuring animal welfare and well-being.
- 23) A video or other means of communication is desired to portray agriculture on social media in a positive manner. For instance, this is needed for explaining the proactive practices that modern U.S. agriculture conducts to ensure proper animal care and welfare as well as to ensure food safety. The U.S. agricultural industry generates food and feed products to supply to a significant portion of the entire planet. This project also should serve as a mechanism to educate the public on the potential jobs available in agriculture. For this project, teams should work with a partner who is familiar with agriculture and in consultation with the Director of Research for ACRE CGP.
- 24) Educational materials are needed to explain to poultry processing and rendering employees why it is important to keep foreign products such as gloves out of the rendering co-product stream. This is recommended to be something with humor – perhaps a video with no

narration so that it will be understood across all languages. Perhaps this could be an undergraduate project? For this project, teams should work with a partner who is familiar with the poultry industry agriculture and in consultation with the Director of Research for ACRE CGP.

- 25) Labor shortages are significantly impacting the poultry processing industry. With the US being at full employment and wage inflation lagging behind a bit, this will continue to be the biggest challenge the poultry industry faces in the day-to-day operations of integrated facilities. If robotics could be developed to handle labor intensive operations such as placing of individual chicken parts into trays for packaging, labor could be better utilized in other, likely higher paying, positions. It is requested that a comprehensive study be performed by a combination of industrial, mechanical and robotics engineers to observe each human activity in the processing plants and evaluate the possibility of modifying the activity or using some level of automation to perform a part of or all of the activity.
- 26) Improved methods to remove ammonia and water from poultry houses are needed. In general, air movement through poultry houses is approximately 600 ft/min. Most poultry houses are 54 feet wide by 10 feet tall and 600 feet long. All of the air inside a poultry house is moved within one minute using conventional ventilation. However, excessive moisture and heat remain issues. Methods of inexpensively removing water and moisture are needed.
- 27) Quaternary ammonium compounds are used extensively as disinfectants in poultry processing operations. However, these disinfectants are subsequently conveyed to wastewater treatment where they interfere with microbial digestion processes. A safe, inexpensive method to neutralize quaternary ammonium compounds in the millions of gallons of wastewater generated daily by poultry processing is needed.
- 28) Safe, inexpensive and effective alternative methods of disinfection inside poultry facilities (i.e. walls, floors, drains, equipment) are needed. The methods must not impact subsequent wastewater treatment. Improved environmental microbial population control methods must be safe for use with food, safe for workers, safe for equipment and facilities, and not cause issues with disposal.
- 29) Improved methods of processing millions of gallons of wastewater are needed. Currently, most wastewater is treated using a dissolved air flotation system involving use of a chemical coagulant to remove the majority of protein and fat from the water by a skimming mechanism. This process significantly reduces the organics in the wastewater but leads to subsequent problems in disposal of the skimmings due to chemical composition as well as free fatty acid formation and protein degradation. Processing plants treat millions of gallons of wastewater per day under seasonal variations in ambient temperature. Initial infrastructure costs, daily cost of operation, ability to rapidly process large volumes of wastewater per day, ease of operation, size of the necessary footprint and reliability are among the considerations needed for new wastewater technologies. If the adopted wastewater technologies fail during use, the industries do not have options for storing millions of gallons of wastewater and release of untreated wastewater will lead to environmental penalties. Therefore, reliability is imperative. Anaerobic digesters and filtration systems have been extensively reviewed by this industry and have failed to find significant utilization. New, novel ideas for wastewater treatment are needed. Improved methods are needed to separate proteins and fats from the waste water with little to no deterioration and no hazardous chemicals. Improved methods are especially needed that

will generate proteins and fats which are safe and of high quality for recycling into animal and pet food. The methods must be able to rapidly treat wastewater equivalent or better than current rates achieved by dissolved air flotation methodology.

- 30) A phenomenon known as “woody breast syndrome” causes palatability and texture issues in poultry. The condition does not pose any food safety risk. However, woody breast is a muscle abnormality that causes chicken breasts to be tough. It is estimated that up to ten percent of all breast meat may be impacted by woody breast syndrome. Understanding the phenomenon and finding a solution to prevent its occurrence are needed.
- 31) Woody breast can be detected and affected products can be removed. However, this takes considerable labor. A mechanical/robotic/automated method of detecting and removing woody breast products.
- 32) Another product defect is known as “stringy spongy” and is related to the collagen type and how it matures. This phenomenon has not been researched much. Currently there is some work out of Italy where the phenomenon is called “spaghetti meat.” It is noted on small to big birds. More information is needed to understand this meat quality issue.
- 33) Improved methods are needed to rapidly determine the sex of birds. Numerous methods have been attempted but all are labor intensive or not sufficiently rapid or accurate.
- 34) Methods are needed to grow birds to uniform size so product portions are consistent, which is especially needed for food service utilization.
- 35) Improved mechanical catchers and counters are needed for moving birds from the poultry house to truck. Proposed methods must be humane, reduce stress and prevent injury to the birds. Accurate bird counts are needed.
- 36) During a very limited number of days per year, the environmental temperature during truck transport is too warm or too cold for safe and humane transport of broilers. Truck transport in open cages is the standard practice of moving birds to processing facilities. An innovative and inexpensive method of keeping the birds cool in summer or warm in winter during transport is needed for the typically 10-20 days per year when environmental conditions are dangerous to the birds. This must be something easily used with minimum labor and cost for the few days per year needed.
- 37) Additional research on plant processes to reduce the incoming load of *Salmonella* on live broilers to a level that meets the pathogen reduction performance standards would be beneficial.

ARCE-2021 Pre-Proposal Format Instructions

Please use font size 12 (Times New Roman preferred) with margins set at 1 inch. Single-space all text. There are no page limits on pre-proposals. Please delete all notes listed in red on this format template.

All pre-proposals are due electronically **by 10:00 pm on Wednesday, May 12, 2021**. Proposals **MUST** be submitted in WORD format and not in a pdf version. Do NOT use embedded/linked files such as Endnotes or footnotes which will complicate combining many documents into a single booklet for the reviewers. Please do not number pages.

Save the file name of this document as follows, adding your university or college name and the name of the Principal Investigator: *ACRE 2021-University or College Name-PI First Name Last Name*

Please e-mail pre-proposals to ACREgrants@scda.sc.gov.

LATE PRE-PROPOSALS will not be accepted.

2021 ACRE Pre-Proposal

TITLE OF PROJECT (Please replace with your title)

Principal Investigator(s):

Name, Title
Department of ?????
Mailing Address
University Name
City, State Zip
Phone: ???-???-????
E-mail: email@?????.edu

Collaborators:

Name, Title (Delete if no collaborators)
Department of ?????
Mailing Address
University Name
City, State Zip
Phone: ???-???-????
E-mail: email@?????.edu

Date Submitted:

May 12, 2021

Duration of Project:

?? months

Approximate Total Direct Cost:

As this is a pre-proposal, do NOT include a budget but instead state your total direct costs only. If your pre-proposal is chosen for full proposal development, you will then include a full budget and the full proposal will be sent through your Office of Sponsored Programs for approval. If your pre-proposal is for a multi-year project, please list each annual total direct cost. If selected, however, a project will be funded for **only one year** and subsequent years will be dependent on submission of a new pre-proposal to the next competition, adequate progress toward goals and selection for funding by the Research Committee. The decisions of the ACRE CGP Research Committee will be final.

As per ACRE CGP policy, no graduate or undergraduate tuition, tuition differential or indirect will be paid on any ACRE CGP grant.

This is a PRE-PROPOSAL that has not yet been approved by your Sponsored Programs – so only include the total of projected direct costs.

Project Summary

Provide an overview of the project in LAY terminology. It is very important this summary is clearly understandable by both technical AND non-technical industry personnel. The ACRE CGP industry reviewers have advanced degrees in science, engineering and/or business. However, it is likely the reviewers' fields of study are different from your field of study. Make sure all terminology is properly defined and use language understandable to a lay audience.

Project Description

1. Objective(s)

Include a list of one or more objectives.

2. Review of Related Research/Literature Review

Include a brief literature review or other documentation of previous work. Please provide a short review of your current work, too. Remember to keep this review understandable for both a technical and non-technical audience.

3. Experimental Procedures

Provide an experimental plan for each objective.

4. Projected benefits and economic opportunities resulting from the project

Provide a brief explanation of why this project is significant to the poultry and poultry co-product industries. This is VERY important!! Explain economic costs of your proposed solution.

References

Please include references for cited research. Do NOT use Endnotes or other embedded reference software.

Timetable

Please use the following format:

July 1, 2021 Provide step-by-step goal to be accomplished

??? to ??? Provide step-by-step goal to be accomplished

??? to ??? Provide step-by-step goal to be accomplished

Needs from Industry

If you need the industry to provide you with samples, please describe the type, amount and frequency in this section. If you need access to industry facilities, please describe in detail those needs including a description of what tasks you will perform in the facilities, how long and how frequently. If you do not have any needs from the industry, please indicate "not applicable."

Other Sources of Funding for Conducting this Project

Please provide information on where you will seek additional funding for this project. The ACRE CGP funding is designed to be seed money to leverage additional funding. Please provide information on how you will attempt to leverage additional funding for your project.

Are there potential intellectual property (IP) outcomes from this project? If so, please indicate and list all sources of funding (plus percentage of contribution to the total) that will be involved in generation of this IP.

It is very important to determine which agency(ies) contributed to research leading to new product development as it can have an impact on future licensing agreements. Please indicate if you believe wholly new intellectual property development could occur or if this research is an extension of existing research and/or intellectual property you have developed.

Please provide a brief description of how you intend to move any new technologies created by you through this project into the market. What do believe would be needed to make your technology a marketable invention? Would you be interested in developing this as a new entrepreneurial venture? Do you know any companies/industries that would be interested in licensing this technology? How will moving this technology into the market benefit the South Carolina agribusiness community?

The South Carolina Department of Agriculture through its ACRE program will be working to develop entrepreneurial ventures. If you believe your project could be moved successfully into the market, provide your thoughts/plans on how you would proceed and what would be needed for this to be successful. Please indicate what you think would be the target market, target potential size of the market, etc.

Curriculum Vitae

Please include a short 1 to 2 page current Curriculum Vitae in a separate WORD file for all Principal and Co-Principal Investigators and Collaborators.

Because the pre-proposals will be collated into a single booklet for the ACRE Research Committee, **do NOT use embedded/linked files such as Endnotes or footnotes which complicate combining many documents. Please do not number pages.**

All pre-proposals are due electronically (**in WORD format**) by **10:00 pm on Wednesday, May 12, 2021**. Please e-mail pre-proposals to ACREgrants@scda.sc.gov. **Late proposals will not be accepted.**

If you have any questions, please contact the ACRE CGP Director of Research at ACREgrants@scda.sc.gov.

Thank you very much.