AUTHORIZATION REQUEST FOR FY 2022

CBB Budget Category: **Consumer Information**

Name of Contractor: **American Farm Bureau Foundation for Agriculture**

Name of Organization Subcontracting:

Start Date: **10/1/2021**

End Date: **9/30/2022**

AR OVERVIEW

AR Purpose and Description:

"An investment in knowledge pays the best interest."
~Benjamin Franklin~

Primary Goal:

Provide science teachers with high-quality immersive experiences and materials to teach science through the lens of beef production thereby increasing agricultural literacy in teachers and students resulting in increased consumer trust in the beef industry.

The American Farm Bureau Foundation for Agriculture (AFBFA) is driven by its mission to build awareness, understanding and a positive public perception of agriculture through education. Over the course of the last six years, on behalf of the Beef Checkoff, AFBFA has expanded its reach and engagement in science classrooms across the country. The goal of this AR is to continue building awareness and understanding of the cattle industry through science education.

Conceptual shifts in education have driven teachers to find relevancy and authenticity in the lessons they teach. Traditional textbook companies cannot keep up with the rapid rate of information distribution in the 21st Century nor can they address the new ways in which teachers engage with their students. As such, more and more teachers are creating their own curricula, turning to the internet for research, content, and guidance. As agriculture is highly relevant, and connects with everyone's lives, it is a great context from which to teach students how science is applied in the real world. More and more examples of lessons featuring agriculture as context can now be found online. However, these resources tend to be one-sided, or inaccurate, and they are being implemented with little to no support.

As educators take on the challenge of building curricula, a unique opportunity exists to create collaborations between industries. The benefits to the cattle industry from

working with non-traditional partners like educators are broad, ranging from a more educated consumer base to a clearer understanding of beef's sustainability practices to an expanded talent pool. These collaborative efforts ensure that accurate information about the cattle industry reaches classrooms and that more people understand the industry's efforts in land stewardship, animal care, and sustainability.

Educating students and teachers about scientific concepts through the lens of beef production results in higher levels of critical thinking and an increased ability to discern misleading paradigms. Further, this deeper understanding leads to a more positive perception of the beef industry. This program's ability to build beef demand and protect beef's image was made apparent from the following data collected via a 2021 survey of science educators:

> "Overall, those educators who have attended an event or participated in one of AFBFA's programs tend to have more positive perceptions of the beef industry as a result of the information they learned. Of educators who have attended at least one of the programs:
>
> - 92% state that AFBFA programs have furthered their students understanding of the importance of the beef industry to society (versus 81% who had not participated)
> - 82% have a positive perception of how cattle are raised for beef production (versus 71% who had not participated)
> - 85% believe that the beef industry is very important to society (versus 76% who had not participated)
> - Those who have attended a program are, on average, 8 points more likely to trust positive statements about beef production than those who had not attended"*

This AR is designed to continue advancing the education initiatives that have been established to further relay the importance of the cattle industry to society. This proposal is organized into two tactics. Tactic A builds on the previous successes of past programming. Tactic B represents a contractor partnership between AFBFA and the National Institute for Animal Agriculture (NIAA).

* –Data is sourced from AFBFA's third-party "External Program Review Report," which is managed through the Checkoff Evaluation Committee.

Funding	Direct Costs	Implementation	Total
CBB/BPOC Funding Request:	$833,400	$92,600	$926,000

Other Potential Funding	Direct Costs	Implementation	Total
Federation of SBCs Pledges: (Informational Only)	$	$	$
Other Funding: (Informational Only)	$76,500	$13,500	$90,000

Beef Industry Long Range Plan (LRP) Core Strategies Addressed by this AR

Drive Growth in Beef Exports	Grow Consumer Trust in Beef Production	Develop & Implement Better Business Models & Value Distribution Across All Segments	Promote & Capitalize on the Multiple Advantage of Beef	Improve the Business & Political Climate of Beef	Safeguard & Cultivate Investment in Beef, Industry Research, Marketing & Innovation
☐	■	☐	☐	☐	☐

PROGRAM INFORMATION FOR THIS AR

Tactic A

Tactic Name: Immersive professional development and accurate science education materials for STEM educators

Tactic Description:

Tactic A continues the work that was begun in prior years with the goal of expanding reach and impact. This AR will build the capacity of teachers to work directly with agricultural literacy groups in their states to deliver immersive events similar to the national On The Farm STEM event as well as develop the skills of educators to deliver professional development around beef-funded education materials at their local or regional education centers, creating a system in which state ag. literacy groups could take the lead in planning and executing these types of events and could rely on “beef-trained” teacher facilitators.

Tactic A focuses on three categories: Professional Development, Education Resources, and Evaluation. Throughout all three categories, this program plans to expand its reach by providing the resources and materials needed to those facilitating these efforts at the state/local level.

The Need

The need to provide support and resources to educators that promote scientifically accurate, unbiased messaging about the science of beef production is at an all-time high. Teachers and students are receiving information from educationally trusted sources that do not represent agriculture accurately or in a balanced way, and beef production might be at the forefront of the misinformation.

As the Next Generation Science Standards (NGSS) are implemented in 44 states across the country, science teachers are facing a new educational landscape in which they must alter or rewrite their curricula. This new direction from the NGSS requires teachers to connect students with more tangible, real-world context. Agriculture continues to prove it is a great context for science education with this regard. However, as teachers turn toward the internet for information when designing lessons, they are faced with sorting through misinformation and propaganda from various groups pushing agendas.

Furthermore, NGSS requires teachers to approach challenging topics such as climate change and sustainability. Making sense of such challenging and nuanced topics such as these requires collaborative efforts and accurate information. There is a need to provide such opportunities as too often the loudest voices prevail, and teachers and students are exposed to inaccurate and/or misleading information. To achieve balance, and to ensure accuracy of information, a concerted effort must be made to engage teachers in the conversation around these topics.

The cattle industry is doing many great things rooted in science to work toward a sustainable future and we intend to introduce teachers, and therefore students, to those efforts and concepts. This connection will lead to a deeper understanding and appreciation of the beef industry as current and future consumers become better equipped to sort fact from fiction.

The Proposed Solution

The proposed tactic is working under the assumption that school will return as usual in the fall. However, we've considered each item carefully to make sure they can be executed alternatively if in-person experiences are not an option and school takes an alternative format during the FY22 AR timeframe.

To maximize the number of educators who are reached with the program, this tactic will focus on strengthening relationships with State Beef Councils (SBCs). AFBFA and select teachers from its expansive network will work with SBCs to implement some aspects of this initiative to obtain a broader level of participation and further reach of resources. AFBFA will work at a national level to train facilitators that are prepared to lead additional state-level events put on by SBCs. This will create more opportunities for teachers to be reached in their own localities and strengthens connections to key industry leaders.

AFBFA proposes the following activities to continue building and supporting a community of science education influencers:

In-Person Professional Development

1. On The Farm STEM – National Event
    - Teams of middle school teachers will engage in extensive training on the Next Generation Science Standards and apply their learning through an immersive experience that connects teachers, cattle producers, and industry experts. This national event will serve to grow the pool of educators eligible to join the On The Farm Train-the-Trainer Program (described in the following bullet). These teachers will work as a team to accomplish the following:
        - Gain an understanding of the relevancy of cattle production to society and science education
        - Design materials for the On The Farm STEM Open Education Resource (OER) platform.
        - Implement materials across their district's middle school science curriculum

2. On The Farm STEM Train-the-Trainer Program
    - This event will identify 10 – 12 teachers to enter a yearlong program to learn how to facilitate the connections between science and cattle production. Teachers would receive Continuing Education Units (CEU) for participation in the program. Based on the successful On The Farm STEM program, this initiative is designed to empower state ag. literacy groups to host immersive science education events in their own states. Applicants would be sought through State Beef Councils and state Farm Bureau networks, along with AFBFA's network of past On The Farm STEM participants and open applications. Nominating entities would have direct access to facilitators to plan and host state and local experiences.

      State Beef Councils, selected science teachers, and AFBFA will collaborate to achieve the following results through this initiative:
        - Train teachers on NGSS connections and how to contextualize science education through the lens of cattle production
        - Produce a facilitator guide that state ag. literacy groups can use to plan and deliver events
        - Formalize an instructor led training that teachers can use when facilitating education and industry connections
        - Teacher fellows and SBCs deliver 6 state-level On The Farm STEM events

3. On The Farm STEM – State Events
    - This event, delivered by State Beef Councils (SBC), introduces science teachers and administrators to the scientific concepts that drive the cattle

industry. This immersive tour would link science teachers and influencers directly to beef farmers and ranchers, industry scientists, and other industry experts. This training will build capacity of teachers who have awareness and understanding of beef production and deliver accurate science experiences in the K-12 classroom while strengthening connections at the state level.

Virtual Professional Development

1. Professional Development Livestream Events
    - These two half-day online events continue the success from FY20 and FY21. Guest speakers from the industry are brought in to provide context to the application of scientific principles in the beef industry. These experts are non-biased and help the teachers to understand the challenging concepts that they may have never discussed or experienced otherwise. Connecting teachers to these experts ensures that they are receiving accurate information directly from the source rather than an opinion piece found online.

2. *"Science through the Lens of Agriculture"* Webinar Series – Beef Focused
    - This series of webinars is proposed to feature the materials created by AFBFA as a contractor to the Beef Checkoff. An observation from the FY21 third-party external program review (managed through the Checkoff Evaluation Committee) was that teachers are hungry for more materials and guidance on the implementation of those materials. This series of webinars will promote and support teacher efforts to include beef-funded education materials in their classroom.

3. eLearning Courses
    - Asynchronous learning opportunities in the form of eLearning modules have become even more desired after the COVID-19 pandemic highlighted a need for more resources for remote learning. Courses will be designed for teachers to engage with best practices in science education using interesting, engaging, and accurate science as context from the cattle industry. A module will also be created to support Farm Bureau and SBC members that helps volunteers understand how to promote the already funded resources in classrooms.

Educational Resources

1. Classroom Resources (Lessons, Assessments, Teacher Guides, Etc.)
    - According to the external review of AFBFA programming, 9 out of 10 teachers reported a high interest in obtaining more materials that feature agriculture and beef production as a context for teaching science.* AFBFA will maintain/update existing materials while creating additional beef-science resources, including:

i. Iterative improvement of current units of instruction based on user feedback to make them better as a larger scope of students and teachers engage with the beef-science units of instruction. Keeping the units current and improving will ensure better implementation.

Evaluation

1. Year 2 of Longitudinal Study
    - Research and report the impact of different educational experiences and resources. Measurements on usage, efficacy, knowledge acquisition and learning, behavior and perception change, and other measures, of both teachers engaged with this programming. Analyzed results will be provided to CBB and Beef producers to gauge the return on expectations of the beef-science programs and resources. These evaluation measures will reach beyond that of PEM Data Reports to provide a clearer picture of this program's impact both in education and its influence on the perception of the cattle industry.

Communications and Promotions

1. National Science Teaching Association
    - Continue strategic partnerships and promotion within the educational community to target educational influencers and key opinion leaders to broaden the network of people engaging with the beef-science units and professional development opportunities. This will be completed by engaging with the National Science Teaching Association (NSTA) along with direct engagement with district and state curriculum administrators.

2. Educational Articles and Publications
    - Draft publications such as white papers, blog posts, articles, etc. for educational publications making the case for incorporating agriculture in general science education. Use these articles and publications to share the success of these programs.

3. Cattle Ranching Podcast Episode for Kids
    - Produce a podcast episode and a self-guided eLearning module accompaniment for the AFBFA podcast series "*Kids Ask, Farmer Says*" featuring cattle ranching. This podcast series targets primary students from kindergarten through third grade and share a positive message of agriculture while connecting the audience to producers.

4. Volunteer Engagement

- Engage and equip volunteers (Farm Bureau and other organizations) to use beef resources in classroom visits and school engagements. As part of a broader effort to engage local volunteers passionate about ag literacy, AFBFA is committed to equipping volunteers with strategies and tools to use the developed beef resources in classroom visits and administrative meetings and as part of the overall community support movement with educators using beef-science in their curriculum.

* Prompted by the Beef Checkoff Evaluation Committee - External Program Review Report distributed by CBB Staff

Measurable Objectives
(For tactics $100,000 or less two measurable objectives are required, and for tactics over $100,000 at least three to five measurable objectives are required by the Checkoff Evaluation Committee):

- Maintain an average satisfaction score of 4 or higher on a 5-point Likert scale for all professional development events.

- 80% of teachers that participate in professional development events or use Checkoff-funded AFBFA educational materials will report a positive perception of the beef industry.

- Engage 3 or more state beef councils to host an immersive On The Farm STEM event in their state.

Performance Efficiency Measures

Educator Reach Goal: 2,000,000

Educator Engagement Goal: 170,000

Key Opinion Leader Reach Goal: 75,000

Key Opinion Leader Engagement Goal: 7,000

LRP Initiatives Addressed by this Tactic

Drive Growth in Beef Exports	Grow Consumer Trust in Beef Production	Develop & Implement Better Business Models & Value Distribution Across All Segments	Promote & Capitalize on the Multiple Advantage of Beef	Improve the Business & Political Climate of Beef	Safeguard & Cultivate Investment in Beef, Industry Research, Marketing & Innovation
☐ Drive adoption of traceability ☐ Identify & address export customer needs and values ☐ Collaborate with targeted partners to promote U.S. beef in foreign markets ☐ Invest in research, marketing & education programs	☐ Measure, document, improve & communicate the net environment impact of beef production ☐ Educate medical, diet & health professionals about beef & beef production ■ Align and collaborate with traditional & nontraditional partners to tell the positive story of beef production ☐ Engage positively in the sustainable nutrition conversation ☐ Expand efforts in education the general public about BQA program & it's impact on animal well-being ☐ Expand BQA program to include verification ☐ Develop a direct-to-consumer beef safety campaign	☐ Use innovative methods & technologies to value carcasses based on eating satisfaction & red meat yield	☐ Promote the role of beef in a health & sustainable diet ☐ Implement a marketing campaign that communicates beef's advantage compared to alternative proteins ☐ Develop targeted marketing programs focused on the highest opportunity market segments ☐ Cultivate collaborative promotion partnerships ☐ Promote innovative online marketing, packaging & shipping solutions to enable the direct marketing of beef ☐ Engage consumers in a memorable beef eating experience ☐ Develop a more interactive & exciting beef purchasing experience ☐ Promote underutilized beef cuts & new variety meat product	■ Demonstrate beef's positive sustainability message & key role in regenerative agriculture ☐ Defend beef's product identity ☐ Ensure beef's inclusion in dietary recommendations ☐ Drive continuous improvement in food safety ☐ Develop crisis management plans	☐ Attract innovative & intellectual capital into the beef industry ☐ Encourage the cooperation & collaboration of existing industry advisory committees to identify & prioritize research efforts

Committee(s) to Score this Tactic

Consumer Trust	Domestic Marketing	International Marketing	Nutrition & Health	Safety & Product Innovation	Stakeholder Engagement
■	☐	☐	☐	☐	☐

Tactic B

Tactic Name: Expand, connect, and support the community of science education influencers

Tactic Description:

Tactic B describes a collaboration between AFBFA and the National Institute for Animal Agriculture (NIAA). The aim of Tactic B is to engage teachers through the NIAA and the Antibiotic Symposium to design classroom resources and experiences for science teachers across the country.

A select cohort of educators will participate in the Antibiotic Symposium to identify key concepts for student exploration. Teachers will enter a collaborative program that pairs them with industry experts over the course of a year to ensure content accuracy. Industry mentors will form partnerships with teachers and their students to discuss science concepts. The knowledge and skills gained while at the Antibiotic Symposium and gained throughout their mentorship will be put to use helping the next generation of consumers and influencers better understand antimicrobial resistance in humans and animal agriculture.

These teachers will then be equipped to develop classroom materials to engage students in understanding how antibiotics work in animal agriculture; specifically, in beef cattle. Teachers will also be prepared to deliver professional development for other teachers looking to contextualize their science courses with these materials.

The Need:
Misconceptions of bacteria, antibiotics, and antibiotic resistance are widespread. Unfortunately, the responsible use of antibiotics in beef production is one of the most misunderstood topics amongst influencers and consumers and one that causes severe reactions. Farmers and ranchers are feeling pressure like never before around perceived links between antimicrobial resistance in humans and food animals, and they have been working hard to engage in meaningful conversations with influencers and consumers.

Understanding antimicrobial resistance begins with understanding bacteria, natural selection, and evolution. These topics are explored in many high school biology courses and are an important concept found in the Next Generation Science Standards (NGSS). There are too few connections in the typical high school science classroom involving

animal agriculture for students to extend their learning and better understand the responsible use of antibiotics in beef production.

This lack of exposure at a young age further continues these widespread misunderstandings; creating an environment in which consumers do not have the knowledge and skills to think critically about misleading publications, food labels, and more.

The Proposed Solution:
The NIAA and AFBFA, like many animal agriculture leaders, sees the future of responsible antibiotic use will be shaped by consistent, effective communication, scientific collaboration, and increased efforts to educate a broader audience about these topics. Approaching science through the context of animal agriculture will result in more people being able to make sense of the complicated topic of antimicrobial resistance. This proposed tactic seeks to provide educators with the tools, content knowledge, and support to introduce these concepts to students in high school biology courses.

AFBFA and NIAA are proposing the following:

<u>Teacher Development Program</u>

1. NIAA Antibiotic Symposium
    - NIAA and AFBFA will work to recruit teachers to attend and participate in the National Antibiotic Institute. These teachers will collaborate with AFBFA and NIAA to create a framework for future educator involvement in the Symposium. Working alongside AFBFA, NIAA, and industry experts, these teachers will identify topics for classroom integration while establishing peer mentorships with experts to ensure content accuracy.

2. Peer Mentorship and Support
    - Establish mentorship relationships between teachers and industry scientists and experts. This relationship will support teachers as they implement various topics into their classrooms, connecting more students and teachers to these topics and allowing for dialogue and understanding. Throughout the year, AFBFA will work with these experts to host virtual seminars and lectures to enhance teacher knowledge about the science of antibiotics in cattle production.

Resources and Support Materials

1. Classroom Materials
    - Identify potential classroom materials to be developed by teachers for teachers that can be used to engage students in making sense of the science of antibiotics and antimicrobial resistance. These materials will use beef cattle as the context for student exploration, creating deep engagement with these complicated topics and ensuring a better public understanding of bacteria, antibiotics, and antimicrobial resistance while addressing misconceptions of antibiotic use in the cattle industry.

2. Facilitation Materials
    - Identify potential facilitation materials for future professional development to be delivered to other teachers. These handbooks and guides will also be made available to State Beef Councils as well as other ag. literacy groups to assist in their efforts to engage and support teachers.

Measurable Objectives
(For tactics $100,000 or less two measurable objectives are required, and for tactics over $100,000 at least three to five measurable objectives are required by the Checkoff Evaluation Committee):

- Identify and outline 3 high school classroom resources to build a deeper understanding of antibiotic use in beef production.

  Identify and outline at least 3 facilitation guides, support materials, etc. for future teacher professional developments exploring antibiotics as context for science education.

Performance Efficiency Measures

Educator Reach Goal: 30,000

Educator Engagement Goal: 1,000

Key Opinion Leader Reach Goal: 2,000

Key Opinion Leader Engagement Goal: 250

LRP Initiatives Addressed by this Tactic

Drive Growth in Beef Exports	Grow Consumer Trust in Beef Production	Develop & Implement Better Business Models & Value Distribution Across All Segments	Promote & Capitalize on the Multiple Advantage of Beef	Improve the Business & Political Climate of Beef	Safeguard & Cultivate Investment in Beef, Industry Research, Marketing & Innovation
☐ Drive adoption of traceability ☐ Identify & address export customer needs and values ☐ Collaborate with targeted partners to promote U.S. beef in foreign markets ☐ Invest in research, marketing & education programs	☐ Measure, document, improve & communicate the net environment impact of beef production ☐ Educate medical, diet & health professionals about beef & beef production ■ Align and collaborate with traditional & nontraditional partners to tell the positive story of beef production ☐ Engage positively in the sustainable nutrition conversation ☐ Expand efforts in education the general public about BQA program & it's impact on animal well-being ☐ Expand BQA program to include verification ☐ Develop a direct-to-consumer beef safety campaign	☐ Use innovative methods & technologies to value carcasses based on eating satisfaction & red meat yield	☐ Promote the role of beef in a health & sustainable diet ☐ Implement a marketing campaign that communicates beef's advantage compared to alternative proteins ☐ Develop targeted marketing programs focused on the highest opportunity market segments ☐ Cultivate collaborative promotion partnerships ☐ Promote innovative online marketing, packaging & shipping solutions to enable the direct marketing of beef ☐ Engage consumers in a memorable beef eating experience ☐ Develop a more interactive & exciting beef purchasing experience ☐ Promote underutilized beef cuts & new variety meat product	☐ Demonstrate beef's positive sustainability message & key role in regenerative agriculture ☐ Defend beef's product identity ☐ Ensure beef's inclusion in dietary recommendations ☐ Drive continuous improvement in food safety ☐ Develop crisis management plans	☐ Attract innovative & intellectual capital into the beef industry ☐ Encourage the cooperation & collaboration of existing industry advisory committees to identify & prioritize research efforts

Committee(s) to Score this Tactic

Consumer Trust	Domestic Marketing	International Marketing	Nutrition & Health	Safety & Product Innovation	Stakeholder Engagement
■	☐	☐	☐	☐	☐

SUPPLEMENTAL INFORMATION FOR THIS AR

1. **Please explain changes from FY 2021 approved AR:**
   The focus on expanding SBC connections and providing the resources from a national level to support state-level efforts will ensure better, localized support and implementation.

   AFBFA has greatly expanded its virtual offerings in this year's AR. This effort is to support teachers in asynchronous learning opportunities that can be enhanced by state-level ag. literacy groups and SBCs. This change was made to expand reach at the national level while deepening engagement at the local level.

2. **List any proposed vendors/agencies that will be used to complete the work in this AR.**
   Instructional Design and Project Management: Vivayic, Inc. (Lincoln, NE)
   www.vivayic.com

3. **Will all work with vendors/agencies be competitively bid?**
   No
   If not, why not?

   This program will leverage an ongoing relationship between AFBFA and Vivayic, Inc.. Vivayic's agricultural education experts fulfill the responsibilities of the Foundation Education Director.

4. **Please list any relationships between this AR and projects previously funded by the Beef Promotion Operating Committee (BPOC):**

   This AR extends the reach and impact established through AR1708-CI, AR1606-CI, AR 1509-CI, AR 1921-CI, AR 2021-CI, and 2121-CI

5. **If applicable, explain how this AR can be extended by State Beef Councils.**

   State Beef Councils (SBCs) will play a large role in the proposed AR. SBCs will deliver the professional development immersive events at the state-level. SBCs will lead and assist in the teacher recruitment efforts and event planning. AFBFA will generate support materials for these events and assist in training both teachers and SBC personnel to deliver these immersive On The Farm STEM workshops/farm tours.

DETAILED BUDGET SUMMARY

AR# 2221-CI

CBB/BPOC Funding Request:

Committee Name	Tactic	Tactic Name	Funding Source	Direct	Impl.	Total
Consumer Trust	A	Immersive professional development and accurate science education materials for STEM educators	BPOC	$ 751,950	$ 83,550	$ 835,500
Consumer Trust	B	Expand, connect, and support the community of science education influencers	BPOC	$ 81,450	$ 9,050	$ 90,500
AR Totals				$ 833,400	$ 92,600	$ 926,000

Federation of SBCs Pledges/Other Funding: ***(Informational Only)***

Committee Name	Tactic	Tactic Name	Funding Source	Direct	Impl.	Total
Consumer Trust	A	Immersive professional development and accurate science education materials for STEM educators	SBCs & AFBFA	$ 76,500	$ 13,500	$ 90,000
Consumer Trust	B	Expand, connect, and support the community of science education influencers	N/A			$ -
AR Totals				$ 76,500	$ 13,500	$ 90,000

Summary of Prior Year AR Budgets and Expenses:

FY 2021 Approved Budgets	CBB/BPOC	FSBCs	Other Source(s)	Total	Direct Cost	Impl.	Total
AR Totals	$ 670,996	$ -	$ 6,000	$ 676,996	$ 588,476	$ 88,520	$ 676,996

FY 2021 Actual Expenses (through June 30, 2021)	CBB/BPOC	FSBCs	Other Source(s)	Total	Direct Cost	Impl.	Total
AR Totals	$ 358,900			$ 358,900	$ 315,804	$ 43,096	$ 358,900

Historical Summary of Budgets and Expense: *(includes all funding sources listed in original AR)*

	Total Approved Budgets			Total Actual Expenses		
	FY 2020	FY 2019	FY 2018	FY 2020	FY 2019	FY 2018
AR Totals	$ 748,300	$ 700,000	$ 494,809	$ 630,176	$ 610,193	$ 425,470