The National Academies of SCIENCES ENGINEERING MEDICINE
GULF RESEARCH PROGRAM

Capacity Building 1 Final Report

Project Title: Building organizational capacity through a community-based citizen science program for monitoring environmental contamination in Louisiana coastal parishes
Award Amount: $202,174
Awardee: Interfaith Sponsoring Committee, Bayou Interfaith Shared Community Organizing (BISCO)
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Project Key Personnel:

- Ramya Chari, PhD, Policy Researcher, RAND Corporation
- Christine Chaisson, PhD, Executive Director, The LifeLine Group
- Sue Ann Sarpy, PhD, President, Sarpy and Associates, LLC
- Alicia Neal, Executive Director, Groundwork New Orleans
- Donald Bogen, Jr., Community Organizer, Interfaith Sponsoring Committee, BISCO
- Sharon Foret, Community Organizer, Interfaith Sponsoring Committee, BISCO
- David Gauthe, Community Organizer, Interfaith Sponsoring Committee, BISCO
- Maria Brodine, Environmental Program Coordinator, Groundwork New Orleans

I. PROJECT SUMMARY (from proposal)

In the aftermath of a disaster, communities often lack information about environmental contamination harms that could be used to guide prevention and recovery activities. Historically, communities have depended upon government and other institutions to collect environmental data, analyze results, then communicate findings in meaningful ways. Along this chain of events lies multiple points where conflict may occur between community needs and institutional actions or where communications can break down. For disadvantaged communities in particular, the end result may be findings deemed irrelevant and non-credible, and an erosion of trust in societal institutions and their ability to protect the public. Today however, new technologies are enabling communities to engage in scientific processes in ways that were previously closed. The emergence of community-led citizen science, where lay individuals or "non-experts" lead or participate in data collection and research activities, offers great promise for promoting equitable cross-boundary collaborations, fostering scientific literacy, and empowering community-based actions around environmental risks. Interfaith Sponsoring Committee, BISCO, in partnership with Groundwork New Orleans, the RAND Corporation, The LifeLine Group, and Sarpy and Associates, proposes to build organizational capacity and enhance community health and well-being through promotion of citizen science in coastal Louisiana communities. Specifically, the objectives of our project are to: 1) develop and pilot test a training program aimed at creating a network of citizen scientists for environmental contamination monitoring; 2) develop avenues for communication and

dissemination of project activities to stakeholders; and (3) strengthen collaborative partnerships to enable sustainable exchange networks for knowledge, skills, and resources.

II. PROJECT SUMMARY (from final report)

In the aftermath of an oil spill or natural disaster, communities often lack important information about potential environmental contamination harms that could be used to guide proactive protection, mitigation, and recovery activities. Historically there has been dependence upon government and other institutions to deploy and collect environmental data, analyze and interpret results, then communicate findings in meaningful and relevant ways. Along this chain of events, there are multiple points where conflict may occur between community needs and government actions or where communications may break down. The end result may be findings that are deemed irrelevant and not credible. As opposed to a model of dependence. New technologies are now enabling community groups to engage in the disaster science process in ways that were previously restricted. In particular, citizen science, where community members lead or participate in data collection and research activities, offers great promise for promoting equitable cross-boundary collaborations, fostering scientific literacy, and empowering community-based actions. The main objectives of our project were: 1) to develop and pilot test a community-based citizen science program for monitoring environmental contaminants post-disaster; 2) to develop models for interpretation, communication, and dissemination of citizen science data to multiple stakeholders in ways that enhance impact; and 3) to strengthen collaborative partnerships to enable sustainable exchange networks for knowledge, skills, resources, and capabilities.

Our project proposed to bring together community members, community organizations, and technical experts to develop and test a citizen science environmental monitoring program. We established a network for knowledge exchange between partners so that BISCO and community members benefited from technical assistance while leading grassroots citizen science activities around disaster-related environmental contamination. Citizen science exploded after the Deepwater Horizon oil spill, with the public engaging in development of low-cost technologies for environmental monitoring. Advances in smartphone applications and wearable sensors were giving communities tools to gather data on environmental contamination in a more local and timelier fashion than governmental or institutional structures allowed. However, much citizen science data is currently unused, communicated poorly, and its validity questioned by experts. Our project became the first of its kind that we know of to: 1) integrate grassroots and institutional partnership mechanisms for training and technical assistance; and 2) to provide educational components on interpreting data and communicating with decision makers and stakeholders. Our results should assure scientists and federal agencies of the validity of citizen scientist efforts, furthering the use of such data and enabling faster turnaround for answers to questions of safety. Through pilot testing and evaluation, we identified factors critical to replication and scaling up of the program so it could serve as a model for other areas facing similar challenges. By increasing literacy and technical capabilities, a citizen science program will empower our community to take actions in responding to environmental contamination threats posed by natural disasters and oil and gas operations. The impact can help our communities to heal faster if contamination is found, and if not found can do wonders to help the emotional state of the community itself.

III. PROJECT RESULTS

Accomplishments

We wanted to address the need for a timely and accurate determination of issues in our soil, air, or water by an oil spill or other source of concern. Our project brought together community members, organizations, technical experts and scientists to develop materials, train citizens and pilot test a citizen science environmental monitoring program. We established a network of diverse citizens ranging from high school and college students, to local emergency personnel and an MD, so that these persons benefited from training and technical assistance to complete tests of air, soil and water in environmental conditions of possible contamination.

We recognized the need for the inclusion of a professional evaluator for success. The evaluation was designed to assess the training program from the perspective of the community and academic partners. Results revealed that the citizen scientist training program accomplished communication, collaboration, and affiliations between community groups, and scientific experts. The participants reported high levels of satisfaction with the training program, diversity among participants, and meaningful gains in knowledge and scientific literacy, and higher levels of community involvement. The group asked for an extension so they could test out their newly learned skills and begin a baseline of soil testing in three parishes covered by the grant. We successfully completed that and all members who participated have been encouraged that their training was excellent and needed. A contributor of supplies as expressed interest in continuing his work with us and will continue to supply us with testing materials as needed. The other contracted scientists are also interested in continuing this work as is the evaluator.

Implications

Community members of a diverse group can be trained as Citizen Scientists and be reliable sources of timely and accurate information to provide to those in charge of a large scale disaster, so the Officials can, in a timely manner, address the matter with even more accurate details. In order to be trained and provided with supplies there has to be funding set aside for an ongoing group of community members to be ready for any disaster. This training is a necessity all along the shores of the Gulf and other oil bearing sites and also in other areas of the country where such disasters could occur because of tornadoes, hurricanes or chemical or other disasters. We've just begun with the first group of Citizen Scientists but this should be an ongoing training and those trained would need recertification after a certain time period and ongoing new training as information is made available.

Unexpected Results

While developing our grant application we located several low cost tools to test soil, air and water. Once we began the project, our contractor scientist realized that the tools we had selected would not be credible for the scientists who would review our work as Citizen Scientists. This partner faced numerous challenges in locating affordable, scientifically credible equipment, receiving many negative responses. When Mr. Charles Fator of Hanby Environmental was reached, he believed in our goals and committed to seeing it thru and agreed to provide us with the reliable tools we needed. He and 3 staff members flew to our training, shipped all of the equipment, and paid for all their expenses. Because of the funding of this grant, we were able to collaborate with Mr. Fator who provided his certified training on soil and

water to 32 persons; valued at $40,145.00, and his donation of equipment for the training, as well as equipment for future testing valued at $31,150.00.

Project Relevance

The following audiences would be most interested in the results of this project:

- Researchers
- Educators
- Community Leaders
- Local Government Officials
- State Government Officials
- Federal Government Officials
- Non-Profit Private Sector
- For-Profit Private Sector
- Other: Funders

Soil, air and water testing should be and is a concern of all of those checked above. Knowing there is a solution to a quick and timely and accurate response to some of their questions and concerns after a disaster should be enough to peak their interest in Citizen Scientist. Three presentations have been made by our partners and they have received positive interest in this work. This has included funders in our area who have inquired of this work and shown an interest in seeing it continue.

Education and Training

Number of students, postdoctoral scholars, or educational components involved in the project:

- Undergraduate students: 0
- Graduate students: 2
- Postdoctoral scholars: 4
- Other educational components: 26

We had a very diverse group of citizens in our training class. We had 1 high school student, 14 high school graduates, 10 college graduates, 2 graduate students, 1 master's level professional, 3 PhDs and 1 MD.

This was very important to our decision to have citizens from various educational backgrounds as well as diversity in sex, race, and financial status and from various local areas as well as city and rural participants.

IV. DATA AND INFORMATION PRODUCTS

This project produced data and information products of the following types:

- Information Products
- Scholarly publications, reports or monographs, workshop summaries or conference proceedings
- Curricula for education and training

DATA

Data Management Report:
N/A

Relationships between Data Sets:
N/A

Additional Documentation Produced to Describe Data:
N/A

Other Activities to Make Data Discoverable:
N/A

Sensitive, Confidential, or Proprietary Data:
N/A

INFORMATION PRODUCTS

Information Products Report:
See attached Information Products Report.

Citations for Project Publications, Reports and Monographs, and Workshop and Conference Proceedings:
Fator, Charles, Chaisson, C., Chari, R., Gauthe, S., Sarpy, S.A., & Cook, R. (2018). Community Collaboration to Advance Citizen Science: A Success Story in Louisiana; Slide presentation and Paper Presented at the National Environmental Monitoring Conference. New Orleans, LA. Sponsors of the conference are US EPA AND TWO Laboratory accreditation Organizations, NELAP, and NELAC.

Sarpy, S.A., Stachowski, A., Chari, R., Chaisson, C., Gauthe, S., & Fator, C. (2018). Evaluating the Effectiveness and Feasibility of a Citizen Science Training in Enhancing Community Health and Organizational Capacity in Disaster Response and Recovery. Paper presented at the ICEHS Disaster Response and Emergency Preparedness session of the 146th American Public Health Association Annual Meeting and Exposition. San Diego, CA.

Sarpy, S.A., Stachowski, A., Chari, R., Chaison, C., Gauthe, & S., Fator, C. (2018). Expanding the Role of Citizens in Disaster Response and Recovery: Evaluating a Citizen Science Training Program for Environmental Monitoring in the Gulf South. Paper presented at the 31st American Evaluation Association Annual Conference. Cincinnati, OH.

Websites and Data Portals:
N/A

Additional Documentation Produced to Describe Information Products:
Sharon S. Gauthe; Project Director, Guidebook for Creating a Citizen Science Training will be emailed to grantor.

Chari, Ramya; Chaisson, Christine; Curriculum for Citizen Scientist Training will be emailed to grantor.
Sarpy, Sue Ann, Evaluation for Project will be emailed to grantor.

Other Activities to Make Information Products Accessible and Discoverable:
Information will be available on BISCO website as soon as all are completed. At this time, a special site is available only to the members of the class who were certified. It is a few videos of our original training.

Confidential, Proprietary, Specially Licensed Information Products:
N/A

V. PUBLIC INTEREST AND COMMUNICATIONS

Most Unique or Innovative Aspect of the Project
We recognized the need for a depth of expertise of partners, including the inclusion of an independent and professional evaluator for sustainable and ongoing success. The evaluation was designed to assess the training program content, administration, effectiveness and benefits from the perspective of the community and academic partners. Results revealed that the citizen scientist training program accomplished communication, collaboration, and affiliations between community groups, scientific experts, and target stakeholders. The participants and trainers reported high levels of satisfaction with the training program, diversity among participants, and meaningful gains in knowledge and scientific literacy, as well as higher levels of community involvement.

Most Exciting or Surprising Thing Learned During the Project
One of our partners faced numerous challenges in locating affordable, scientifically credible equipment, receiving many negative responses. When Mr. Charles Fator of Hanby Environmental was reached, he believed in our goals and committed to seeing it thru. He and 3 staff members flew to our training, shipped all of the equipment, and paid for all their expenses. Because of the funding of this grant, we were able to collaborate with Mr. Fator who provided his certified training on soil and water to 31 persons; valued at $40,145.00, and his donation of equipment for the training, as well as equipment for future testing valued at $31,150.00.

Most Important Outcome or Benefit of Project
Our project has produced Certified Citizen Scientists in specific equipment that can be used in the future, as we had hoped when beginning this project. These trained persons committed to an ongoing plan to test soil after the initial 12 month grant to begin a baseline of soil samples for any future disaster in our area. These samples covered three parishes and the results are now filed online at Hanby Environmental. Our work has been shared at three conferences and the location of these presentations will be shared in this report for your review. These presentations are sharing the process and creating interest in promoting this type of community efforts throughout the country.

Communications, Outreach, and Dissemination Activities of Project

On Feb.13, local newspapers wrote articles about the project. The title of the article under the Area news in brief section was entitled "Learn to monitor soil like a scientist". The newspapers were the Daily Comet and the Houma Courier.

A local newspaper editor sent out a reporter to cover our efforts and a front page article appeared in the two parishes newspapers. The article appeared on line in the Houma Today.com on Oct. 6, 2018 and the next day was in their newspapers The Daily Comt and The Houma Courier.

The BISCO Facebook page and individual trainees' Facebook pages followed our efforts with interesting responses of approval for our efforts.

The conference presentations by Sue Ann Sarpy on her evaluation efforts, and Hanby Environmental on their partnering with us were also well received with questions about how to continue this work and words of praise for our efforts in this new to them concept of Citizen Scientists.

Ramya Chari of the Rand Corporation is also preparing her materials used to create a presentation and hopes to see this move further along with more opportunities to work together in the future; as is the other members of our team listed above.

Information Products Report

InfoProductType	DigitalResourceType	Title	FileName	Creators	PublicationYear	Publisher	RepositoryName	DOIorPersistentURL	DatasetReference
InfoProductType	*Software and Source Code*	*Gravity Simulations*	*AppleFalling.gravsim*	*Galieli, Galileo; Newton, Isaac*	*1701*	*Royal Society*	*Really Big Digital Repository for Models and Simulations*	*doi: 10.1000/grav.2000*	*doi: 10.1000/grav.1000, http://www.nodc.noaa.gov/cgi-bin/OAS/prd/accession/details/000000*
Models and Simulations									
Workshop or Conference Proceeding	Other Resource Type	presentation	Community Collaboration to Advance Citizen Science: A Success Story in Louisiana	Fator, Charles	2018	Fator, C.,Chaisson, C., Chari, R., Gauthe, S.,Sarpy, S.,Cook,R.	Hanby Environmental - Houston, Texas presented National Environmental Monitoring Conference, New Orleans, LA		http:// apps.nelac-Institute.org/nemc/208/docs/pdf/Tuesday-Citizen%20Science-13.3-Fator.pdf
		Presentation Evaluating the Effectiveness and Feasibility of a Citizen Science Training in Enhancing Community Health and Organizational Capacity in Disaster Response and Recovery	Evaluating the Effectiveness and Feasibility of a Citizen Science Training in Enhancing Community Health and Organizational Capacity in Disaster Response and Recovery	Sarpy,SA, Stachowski, A., Chari R., Chaisson, C., Gauthe,S., Fator, C.	2018	Sarpy,SA, Stachowski, A., Chari R., Chaisson, C., Gauthe,S., Fator, C.	ICEHS Dusaster Response and Emergency Preparedness 146 th APHA Annual Meeting and Exposition San Diego, CA		
		Presentation	Expanding the Role of Citizens in Disaster Response and Recovery: Evaluationg a Ciitizen Science Training Program for Environmental Monitoring in the Gulf South	Sarpy,SA, Stachowski, A., Chari R., Chaisson, C., Gauthe,S., Fator, C.	2018	Sarpy,SA, Stachowski, A., Chari R., Chaisson, C., Gauthe,S., Fator, C.	31 st American Evaluation Association Annal Conference , Cincinnati, OH		