

Value of International Projects to Faculty in the United States: Examples of Participation by Individuals at North Carolina State University with the Peanut Innovation Lab.

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The Feed the Future Peanut Innovation Lab is designed to enhance both international and domestic projects that address needs by peanut growers and the broader agricultural community that can be addressed through research and outreach. These programs are tailored to fit local needs in the broader context of both USAID country mission emphasis and the capacity of Peanut Innovation Lab partners. In recent years, the Peanut Innovation Lab focus has been designed to increase cooperation at all levels of production and processing peanut within and across countries. For example, value chain projects in Haiti, Ghana, and southern Africa (Malawi, Mozambique, Zambia) encompassed research at both pre-harvest and post-harvest steps to mitigate aflatoxin contamination. These projects attempted to be both broad in scope and adequate in depth to explore mechanisms of possible solutions. In the case of Haiti and southern Africa, partners in the private sector were involved, and this interaction enabled a greater emphasis on scale up of known interventions. Establishing and fostering partnerships across countries and among scientists and practitioners was a critical element of the goal and success of these programs. In the case of Ghana, strong and long-term relationships between scientists at North Carolina State University and the Council for Science and Industrial Research (CSIR) institutions including the Crops Research Institute (CRI) and the Savanna Agricultural Research Institute (SARI) and (KNUST) have led to improvements in peanut production and pest management across Ghana. For example, two lines provided by ICRISAT tested beginning in 2002 and were ultimately released in 2012 (Yenyawoso and Otuhia) and are now being distributed to farmers. More recently, the impact of interventions throughout the village supply chain was compared at field, drying and storing steps. Results revealed challenges and benefits at each step and provide farmers with which choices to incorporate based on their logistical and economic constraints. Additionally, these interactions have been important to US participants in several ways including: publications of findings in the peer-reviewed literature, presentations and interactions at professional conferences, publication of book chapters, and documentation of extramural funding. In 2018 a book chapter across all aspects of aflatoxin mitigation was published involving 31 co-authors across all countries and most elements of the Peanut Innovation Lab. A recent book chapter published on weed management in peanuts included authors from the US and Ghana. In both instances interactions and a cooperative spirit among Peanut Innovation Lab made these contributions possible. A portion of budgets from Peanut Innovation Lab funding are used for research focused on issues faced by farmers in North Carolina and the broader US peanut industry.

There are also areas that may contribute in subtle but valuable ways to participant's knowledge as a scientist. Observing specific germplasm and how it performs under specific environmental conditions and soil condition grown with and without input adds to our understanding of peanut production. Working with issues such as groundnut rosette virus provides insight into tomato spotted wilt virus and our research into field contamination by aflatoxin allows us to serve as valuable resources to the U.S. industry.

Research and Extension faculty and their programs at North Carolina State University are viewed favorably by the North Carolina Peanut Growers Association (NCPGA) and this organization provides generous support. However, acreage in North Carolina is limited and funding from sources other than the NCPGA, including the Peanut Innovation Lab helps fill in the gap needed by research and extension programs in the state. For example, when tomato spotted wilt first became economically important in North Carolina funding from the Peanut CRSP, a precursor to the current Peanut Innovation Lab was critical in addressing this issue. The research conducted by a graduate student funded in part by the Peanut CRSP resulted in rapid development and implementation of a risk index for tomato spotted wilt built on the success of a similar index developed in the southeastern US. More recently, modification and enhancement of a Peanut Risk Tool developed at North Carolina State University (originally support financially by a USDA-CAR grant and the NCPGA over a decade ago) have benefited from the resources provided by the Peanut Innovation Lab. The Peanut Risk Tool has been maintained but needed improvement in scope and in format allowing greater ability for timely updates and modification. The risk tool will be used by farmers and their advisors in North Carolina and surrounding states and will also be created in a format that can be used by other institutions both domestically and internationally. This update and improvement will benefit farmers in North Carolina and surrounding states directly and would not be possible without support through the Peanut Innovation Lab. Over the years, funding associated with international projects such as the Peanut CRSP and Peanut and Mycotoxin Innovation Lab has funded students at North Carolina State University working on peanut pest management issues in the Virginia-Carolina area ranging from host plant resistance to thrips biology and ecology.

In addition to professional development by participants in the US and abroad, these interactions document broader impact by faculty as they move through the promotion and tenure process at North Carolina State University (they serve as an example of scholarship.) Linkages with other institutions and organizations are created through these interactions that otherwise would not be possible. Currently, faculty at North Carolina State University are involved in an Agriculture Diversification project (Palladium and University of Georgia) and tobacco leaf growers in Malawi with Limbe Leaf and Pyxus. As these companies transition away from tobacco production in Malawi, peanut is one of the key alternative crops that fit the landscape. Faculty at North Carolina State University are involved in this transition through research and extension efforts with these groups and other local partners (ICRISAT, LUANAR, DARS-Chitedze). These interactions serve as a reminder to participants that there is a significant need for knowledge and technology around the world with respect to peanut. Participants at North Carolina State University find that the work they are a part of can be life giving providing a vehicle to experience something new and energizing at the same time. Gains in agriculture in the US often seem incremental at this point in time while involvement in the Peanut Innovation Lab can bring a sense of greater contribution and impact. Interactions with scientist from other cultures possessing the same goals relative to agriculture and improvement in the lives of farmers and their communities create a broader and deeper perspective. Participants are also reminded of the basics that form the foundation of peanut production in the US. For example, fundamental practices such as liming and adjusting soil pH to appropriate levels impact influence response of peanut to other inputs such as gypsum and inoculant. On numerous occasions discussions in Peanut Innovation Lab countries outside of the US have stimulated similar discussions of fundamental practices with the US farming audience. Based on responses from farmers in the US, it is important that farmers be reminded of these basic elements of production, especially

given the uniqueness of peanut compared with other crops these farmers grow. In the US context, scientists often focus within their discipline and it is rare that they will spend a great deal of time thinking in broad terms throughout the entire industry. Time is limited and resources in the US often allow greater specialization of scientists with minimal need to know many of the concepts throughout the entire supply chain and the technical aspects that influence those concepts. However, when be involved in other countries where knowledge is limited, US participants find themselves addressing issues across almost all elements of the peanut industry. This requires a greater understanding across the peanut industry as those issues arise. Being forced to be prepared to address these questions and seek out potential findings also enables the US scientist more effective in the overall US context.

Perspectives can be brought to formal classrooms settings as wells as through informal interactions with colleagues and the broader community. The Peanut Innovation Lab is a forum that enables these interactions to occur. For example, a series of lectures (3 to 5 per semester) in the undergraduate course entitled “World Population and Food Prospects” (STS 323) have occurred since 2005 using case studies from several USAID-funded projects including the Peanut Innovation Lab and its precursors. Lectures and subsequent discussions with students and other faculty and staff highlight the challenges and benefits of these projects in the context of global development efforts. Recently a survey of student perspectives on what needs to take place to reduce the negative impact of hunger on a global scale was published in a popular academic journal that included a decade of input from approximately 4,000 undergraduate students. This contribution was initiated and fostered because a faculty member was involved in Peanut Innovation Lab projects. A bridge between agriculture and human health has been established between North Carolina State University and University of North Carolina through discussions concerning challenges in Malawi. These experiences and expertise developed through a long-term association with international crop production has created opportunities train other through lectures in international nutrition classes at the Gillings School of Global Public Health at UNC Chapel Hill.

In addition to professional relationships developed as a result of through the Peanut Innovation Lab, participants from both North Carolina State University and institutions in Ghana have established life-long friendships that go well beyond the tangible benefits to the project. A strong presence in Malawi for more than six years is starting to build similar friendship and professional collaborations that benefit everyone involved. Participation in the Peanut Innovation Lab also provides the participant to step away from the grind of everyday activities of programs in the US, in a positive manner no matter how important and rewarding the “local work” may be. Time is often available on long flights and quiet evenings and mornings to think, read and listen more broadly in a manner that helps one grow as a person. Learning from experiences through international travel and work can inspire one to write creatively for a broader audience about other cultures and their essential contributions to agriculture and broader society. These lessons continue to be shared well beyond the academy.

Of course, US participants in the Peanut Innovation Lab must remember the context of this work to their current position. Projects associated with the Peanut Innovation Lab likely are not the central focus of most participants from the US. Making sure elements associated with one’s Statement of Mutual Expectations are taken care of. Local clientele must receive the service and interaction they deserve and expect. If they do, the faculty member can pursue many other

projects including those similar to the Peanut Innovation Lab. Faculty can move in many directions as long as administration and clientele perceive that the job one was hired to accomplish is being addressed in an adequate manner. This is important to consider no matter how satisfying Peanut Innovation Lab participation becomes.