

Board for International Food and Agricultural Development (BIFAD)

*Collaboration: Leadership, Innovation and Sustainable Technology to
Meet the Demands of Global Agriculture*

Public Meeting at North Carolina A&T State University

May 20, 2016: Public Meeting (live streamed)

Welcome and Opening Remarks

BIFAD Chairman Dr. Brady Deaton officially opened the meeting by welcoming the live and webcast audience to the BIFAD Public Meeting. The meeting was held in the Alumni-Foundation Event Center at North Carolina Agricultural and Technical State University (A&T) in Greensboro, North Carolina.

The Board has been at A&T since Wednesday working and engaging in visitation and outreach across the community. BIFAD members were impressed with the campus and the region of the state. During their time at A&T, they visited the facilities on the Kannapolis research campus and had the opportunity to talk with the scientific community concerning opportunities for internationalization of students and faculty. Board members experienced campus culture and discussed international research and career opportunities with students and faculty.

Chairman Deaton outlined the meeting agenda, which included perspectives from BIFAD members on their work, updates on Feed the Future and Global Open Data in Agriculture and Nutrition, and panels on A&T leadership in international agriculture North Carolina's biotechnology industry.

Chairman Deaton indicated that the meeting would inform BIFAD in its advisory role to USAID in international development work. The linkage between universities and USAID's international foreign assistance has been a key purpose of BIFAD since its inception in 1975.

The five participating BIFAD Board Members introduced themselves.

- Dr. Brady J. Deaton, BIFAD Chairman, Chancellor Emeritus of University of Missouri, Columbia, Missouri; Executive Director, Deaton Institute for University Leadership in International Development
- Dr. Harold L. Martin, Sr., Chancellor, North Carolina A&T State University, Greensboro, NC
- Dr. Pamela K. Anderson, Director General Emeritus, International Potato Center, West Palm Beach, Florida

- Dr. Cary Fowler, Former Executive Director, Global Crop Diversity Trust, Rhinebeck, New York
- Mr. James M. Ash, Partner and Chair of Food and Agribusiness Unit, Husch Blackwell LLP, Kansas City, Missouri

Chancellor Harold Martin welcomed participants to the public meeting. He mentioned that A&T had enjoyed hosting members of BIFAD, and he appreciated the opportunity for the Board to observe activities at A&T. He mentioned that 2016 is A&T's 125th year of being a land-grant university following the passage of the 2nd Morrill Act in 1890, and it has been an incredible year celebration that has included sharing significant contributions through instruction, research, and broad-based community service and engagement. . One of the celebratory 125 special outreach projects Chancellor Martin was engaged in was to read to children from 1st to 5th grade in local elementary schools. He emphasized the critical importance of sharing with young and talented students and their teachers what goes on outside the walls of the institution and the value of examples of future possibilities before them. He expected that important works would be shared at the meeting, and he encouraged participants, including those joining via webcast, to ask questions. He thanked participants and challenged them to be more inspired and to make a difference in communities and regions after the meeting.

Chairman Deaton thanked Chancellor Martin for emphasizing the interactive nature of the meeting being webcast with the support of staff from A&T, USAID and APLU. He also introduced and thanked Clara Cohen, interim Designated Federal Officer for BIFAD, Kristin Franklin, Chanel Bell and Mark Varner with APLU.

Old and New Business

ADS 252/253 Working Group Status Report

Working group committee Chair James Ash reported on the group's examination of the USAID visa granting process. The working group was established a year ago when a group of universities raised questions about the processes for obtaining visas for visiting foreign nationals through USAID. He thanked group members Eric Crawford (Michigan State), Jan Hopmans (UC Davis), Chris Pankuk (Washington State), Tag Demment (APLU), Clara Cohen (USAID), and Mark Varner (APLU) for their service on the group. Internal review of USAID visa processing policies is ongoing, but input from university community thus far has revealed substantive, procedural, and communication issues. The working group developed a matrix, typing visa requirements and limitations with functional characteristics of foreign nationals visiting US universities under USAID financed projects and vetted this matrix with the Agency. The committee believes that the matrix will provide a common framework from which to work. It could also be the basis of an assessment tool to help universities determine which visa path is most appropriate for which foreign national. Next steps are to listen to the broader university

community and confirm that they have a complete list of issues. The results will then be discussed with USAID as the Agency is making revisions of current policies.

Chairman Deaton thanked Mr. Ash for his leadership and then introduced Rob Bertram for the next presentation.

Update on Feed the Future

Rob Bertram, Chief Scientist, Bureau for Food Security, USAID

Rob Bertram thanked Chancellor Martin and expressed gratitude for the great visit to A&T and to the staff of A&T, who had been incredible hosts. Bertram thanked Chairman Deaton and the BIFAD members for their continued leadership and guidance at USAID.

Feed the Future has partnerships with A&T in the areas of food processing technologies (in Senegal and Kenya), horticulture (in Cambodia and Nepal), and small-scale irrigation and mechanization technologies (through the Sustainable Intensification Innovation Lab). Partnerships like these support the science, research, and technology that are a hallmark of Feed the Future, and this focus is supported by the new USAID Administrator Gayle Smith. The work of Feed the Future is distinct from food aid and food assistance in that the goal is to make partner countries more self-sufficient. Universities are also important because of their unique ability to develop the capacity of partner countries to identify and solve their own problems.

President Obama led the effort in 2009 to gain commitments for funding that totaled \$22.5 billion (\$3.5 billion from US) over five years in support of two main goals—to reduce both poverty and stunting by 20 percent. Reducing stunting is a heavy lift and requires holistic thinking with a focus on nutrition, gender, and other factors. This feeds back into poverty reduction goals as women are important economic leaders, and better fed people are more economically successful. Good progress has been made in these first few years. Stunting has been reduced by 14 percent in Bangladesh, 33 percent in Ghana, and 25 percent in Kenya. Poverty in Bangladesh and Uganda has been reduced by 16 percent, and in Honduras, incomes of over 100,000 people have grown by 55 percent. Other donors, national partners, and the private sector also deserve credit for these gains. Dr. Bertram said that there is much to learn about how agriculture can drive nutrition outcomes. It is not only about food but also water and women's status. It takes time for effective agricultural policies to be implemented and productive, and Feed the Future is hitting its stride and delivering results at scale. It is also important to institutionalize governmental efforts to ensure their consistency across changing administrations. For example, PEPFAR, President's Emergency Plan for AIDS Relief, started in one administration, and the following administration embraced it. Institutionalizing the approach of Feed the Future has been an important priority for USAID. The Global Food Security Act (GFSA), which has moved forward through both houses of Congress, would institutionalize the whole-of-government approach. With encouragement from BIFAD, our work with other agencies has matured in new levels of cooperation. For example, the partnership between

USAID and United States Department of Agriculture (USDA), in collaboration with other actors, like the Departments of State, the Department Treasury, and the Millennium Challenge Corporation, has yielded progress in combating new diseases that could pose a threat to the United States.

Dr. Bertram indicated that developing sustainable financing is the other big piece of Feed the Future's work. Congress would like to see USAID's funding as catalytic, and public money can't be the only source of funds, as evidenced by donor partners in Europe that are currently under great stress in development assistance. Feed the Future is looking hard at generating systemic partnerships with a whole range of development actors. National governments in developing countries need to step up and invest. We also need a vibrant private sector. Civil society groups are needed to help ensure transparency and inclusive growth. These groups are attentive to the needs of marginalized communities that have not historically had the attention of their national leadership.

For example, Senegal has suffered from a moribund seed sector. Feed the Future partnered with the country to develop the first seed certification lab, which led to an explosion of growth in the private sector. This produced 10,000 tons of rice, maize, and millet benefiting 180,000 climate-vulnerable farmers, which will provide food for approximately half a million people. There is also a major effort called the New Alliance for Food Security and Nutrition. Ten African countries have stepped up to make major policy reforms to effect significant changes. As a concomitant reaction, 180 companies, two-thirds of them in Africa, have signed letters of intent to invest almost \$8 billion. Syngenta has also pledged \$500 million over ten years to recruit 700 new employees and build a \$1 billion business in agro-dealer development in sub-Saharan Africa (SSA).

Dr. Bertram stressed the importance of the private sector investing in these efforts not just for reasons of philanthropy or corporate social responsibility, but because it is also good for business in the long term, which ultimately benefits the entire community. Feed the Future contributes only a small portion—less than 10 percent compared to private capital flows—of development assistance funding, but it can help energize private sector investments and help ensure they lead to inclusive growth.

Our momentum would be sustained were the GFSA to pass. It has both bicameral and bipartisan support, and Dr. Bertram hoped that President Obama will be able to sign the GFSA while he is still in office. The United States is uniquely capable of making substantial contributions because of the strength of its partnerships with universities, civil society groups, and the private sector.

Dr. Bertram observed that we cannot not just rest on our laurels and wait for this to happen. Administrator Smith had spoken with the BIFAD about the implications of urbanization and the 'youth bulge', which is a huge factor in SSA, and issues about fragile states. A series of

dialogues are being held to make sure Feed the Future does not operate in isolation and that going forward it takes advantage of the best thinking, new evidence and approaches to be as effective as possible. Partnerships with institutions like A&T are vital to Feed the Future's continued progress. Dr. Bertram indicated that institutions like A&T bring a unique blend of technical excellence and cutting-edge science with soft skills such as conflict resolution, negotiation, and working to develop groups across disciplines.

Chairman Deaton introduced Jaime Adams for the next presentation.

Update on Global Open Data for Agriculture and Nutrition (GODAN) Initiative

Jaime Adams, Senior Advisor for International Affairs, Office of the Chief Scientist, Office of the Secretary, US Department of Agriculture

Ms. Adams indicated that population growth is expected to double the demand for food, feed, and fiber. Use of open agriculture and nutrition data is a powerful tool and resource for long-term sustainable development, improving economic opportunities for farmers, and contributing to the health of all consumers. More-effective and available data can also be a driver for realizing and tracking progress toward the Sustainable Development Goals (SDGs), especially SDG 2—end hunger, achieve food security and improved nutrition and promote sustainable agriculture. Closing the hunger gap requires information that is often in locked in government, private sector and civil society data sets that need to be available to global citizens.

GODAN was launched in 2013 and is a rapidly growing initiative with over 260 partners including national governments, NGOs, and organizations from the private sector. The statement of purpose can be found at www.godan.info. GODAN supports the proactive sharing of open data to make information on agriculture and nutrition available, accessible, and usable. Their focus is on building high-level support among governments, policy makers, and international organizations and businesses while also raising awareness and support among the general public. Collaboration and cooperation between stakeholders and the food/agriculture sector is encouraged in hopes of reducing duplication and creating synergies to expedite solutions to such global challenges as food insecurity and malnutrition.

Ms. Adams mentioned that GODAN is a US Government (USG) priority, and USDA has been working with a consortium of partners in the USG, including USAID, since its inception. Administrator Gayle Smith is regularly briefed on GODAN's progress and suggested that GODAN should have a summit. The governments of the United Kingdom, the United States, and Kenya, as well as PUSH and the One campaign will hold a summit on September 15–16, 2016 in association with the UN General Assembly to highlight the value of open data for agriculture and nutrition. 'Save the date' announcements went out on the day of the BIFAD meeting, and the GODAN website has a link with more information. This will not be a pledging conference, as action is expected between now and September in the policy and technology deliverable arenas.

There will be an exhibit hall, space for lightning presentations, and a high- level meeting hosted, hopefully, by the UN Secretary General at UNGA. Heads of state will be encouraged to recognize open data as a global public good in floor speeches the following week.

Chairman Deaton introduced Dr. Valerie Giddings as moderator for the first panel session.

PANEL #1: NC A&T Faculty Panel - “NC A&T Leadership in International Agricultural Innovation”

Dr. Valerie Giddings, Interim Associate Dean for Research in the School of Agriculture and Environmental Sciences introduced the faculty panelists.

Dr. Manuel Reyes, Professor in Department of Natural Resources and Environmental Design, School of Agriculture and Environmental Sciences and lead Principal Investigator in ‘Save and Grow’ Projects of USAID since 2005 in Vietnam, Indonesia, Philippines, Cambodia, Nepal, Honduras, Guatemala, Ethiopia, Tanzania, Ghana and United States - “Saving Resources and Growing Food is Inseparable: The Paradigm to Guide Policy and Funding”

Dr. Reyes described the importance of adopting a paradigm in which saving natural resources and growing food are inseparable, based on a FAO topic in 2011 “in order to grow, agriculture must learn to save”.

He said that even with recent emphasis on sustainability, agriculture is still a ‘grow and not save’ industry and showed photographic examples in numerous country contexts, in which forests are cut and replaced with agriculture (e.g., the Philippines, Vietnam, Thailand, Indonesia, Cambodia, Nepal, Honduras, Guatemala, Tanzania, Ghana and Ethiopia). He said that growing food without saving natural resources is happening worldwide, and there is a need to ‘save and grow’ to prevent losses of rainforest, soil, and marine habitat and to prevent widespread water insecurity and famine.

Dr. Reyes recommended to BIFAD that more investments were needed in innovative education, research, and extension programs. He said he appreciates that USAID is partnering with US universities

He said that ‘grow and save’ are inseparable, and he provided results from A&T-led research funded by the USAID SANREM Innovation Lab for 10 years. He showed pictures of successfully growing maize with permanent soil cover. Income was 8 times more than conventional tilled systems with an added advantage of erosion control in sloping lands. He also indicated that their efforts included the establishment of Save and Grow Conservation agriculture with Trees Center in the Philippines. However, SANREM funding limitations prevented the planned scale up of the programs.

Dr. Reyes provided other examples that ‘save and grow’ is applicable to vegetable crops. The A&T-led research with the USAID Horticulture Innovation Lab in Central America found that onion and cucumber yields in conservation agriculture systems were higher than yields under tilled systems. In another A&T-led research program, ‘grow and save’ farmers in Cambodia were able to increase yields and income with less labor in weeding than conventionally tilled systems. Dr. Reyes showed pictures of healthy vegetables with good weed suppression and erosion control from conservation agriculture plots. The number of farmers using the ‘grow and save’ approach increased from 15 to 100 since its inception in 2013.

Dr. Reyes also mentioned that saving people and growing people are inseparable. He showed examples of people being positively impacted as a result of A&T-led projects under USAID. He mentioned that the lives of farmers were improved, and students from foreign countries have graduated from PhD programs. Some students are in the process of finishing up with their studies and have focused on urban, poor and underserved communities.

In closing, Dr. Reyes emphasized that saving resources and growing food are not only inseparable but also doable. He appealed to BIFAD to emphasize that ‘save and grow’ is one approach to integrate into USAID’s guide for policies and funding. He also said that A&T has developed a niche on ‘save and grow’ as part of ‘what Aggies do’. He indicated that A&T is ready for the challenge that lies ahead.

Dr. Osei Yeboah, Professor and Interim Director of the Leonard C. Cooper, Jr. International Trade Center - *“Investing in Efforts to Address Food Security and Rural Poverty for Sustainability in Developing Countries”*

Dr. Yeboah described projects in Ghana and the Philippines that conduct research, education, and outreach on improving food security and poverty reduction. The Ghana project was focused on evaluating food storage technologies for farmers in the three northern regions designated as Feed the Future zones of influence, with low input-output farming systems. In SSA, 20–30 percent of cereals are lost in storage, and farmers cannot afford the most expensive and effective alternative cereal storage systems. In partnership with the Savannah Agricultural Research Institute, A&T researchers investigated other storage technologies and conducted present value economic analysis to evaluate how much farmers would save over time. With the improved technology, storage efficiency increased and farmer incomes also rose because grains could be stored until prices were higher. The project trained extension personnel on procurement of effective storage tanks and integrated pest management, but the outreach and subsequent adoption was limited due to fund availability. He suggested that BIFAD recommend that USAID focus funding on development of extension capacity in these regions so research and education can have broader impacts. A budget for the next phase of the Ghana project to extend it to

legumes and other grains was not approved by USDA's Foreign Agricultural Service, but it is needed.

The second project, in the same region of Ghana, was about strengthening the peanut value chain and empowering women. With its many uses, the peanut has an elastic price demand that does not necessarily result in lower prices with increase output. It is accessible for women who can sell it for cash or readily process it into a value-added product. Most households produce less than one ton of peanuts each year, so one goal of the project was to work with farmers and select optimal varieties to improve yields. Another goal was to address issues with pre- and post-harvest processing and planting timing that increased the amount of carcinogenic aflatoxins in the peanut. They also wanted to work with chemical input suppliers to improve their recommendations to farmers, but they did not have the funding for training extension personnel.

The third project is being conducted in collaboration with Dr. Reyes on conservation agriculture in the Philippines and Cambodia. As the project economist, Dr. Yeboah conducted an economic evaluation of alternative crop rotations, analysis of savings from conservation agriculture methods, and quantification of adoption rate. The project resulted in a five-fold increase in cassava yields and correlated with lower incidence of breast cancer attributable to decreased used of chemical pesticides. The adoption rate was higher in the Philippines than in Cambodia resulting from partnership with a technical university in the Philippines.

He recommended that USAID and USDA-NIFA put more focus on the demand side of food security, not just supply. Factors that need to be addressed include: 1) biofuel demand and the conversion of arable land to corn production, 2) the impact of fluctuating exchange rates, oil prices, speculation and commodity trading, 3) increased demand for higher protein diets by middle-income populations, and 4) trade barriers such as tariffs and quotas. There should be more effort to provide market infrastructure and to develop markets so that farmers have more options for the sale of goods. Also, educational projects, such as those offered by the L. C. Cooper, Jr. International Trade Center, are needed. These develop curriculum and train students in soft skills of international trade and agricultural policy and development.

Dr. Anthony Yeboah, Professor and Chairperson of the Department of Agribusiness, Applied Economics and Agriscience Education - *“Adopting a Cohesive Land-Grant Approach to Facilitate International Agricultural Research and Development”*

Dr. Yeboah described how integrating research, extension, and education, which is the land-grant model, can improve the impacts and outcomes of farming systems research (FSR). Through his experience with a FSR and extension project in Mali, he observed that the success of the work hinged on this type of integration and that its benefits could touch many different aspects of the farm families. The project's success was fostered by collaboration with the local Rural Polytechnic Institute for Training and Applied Research. Faculty participated in the research

design process and students spent almost a year working on the projects. He stated that the land-grant model is important because: 1) it supports the integration of research, extension, and education, which has been effective in the United States and can work well in other countries; 2) it develops human capacity here and abroad by training scientists, students, and farmers; and 3) it provides opportunities for the 1890 Land-Grant institutions to form partnerships with the private sector. He identified the shift of emphasis from funding agricultural projects to democracy and health care projects as a challenge. Employing a holistic approach to agricultural development that integrates research, extension, and education can effectively support democracy and health, as well as address issues of sustainability in agricultural research. He also stressed the importance of forming interdisciplinary partnerships across campuses and with the private sector.

Panel #1: Question/Answer/Comment Period by BIFAD Members

Dr. Giddings thanked panelists for their presentations.

Dr. Deaton took questions from Board members.

Mr. Ash commented on the impact and role of extension services in delivering research solutions to farmers and asked panelists if they could help identify reasons why extension was successful and robust in some regions of the world but ineffective or non-existent in others. Dr. O. Yeboah stated that some projects do not have enough funding to hire and train extension agents in areas where there are not already extension personnel at the research institution. It is not so much about the region, but about funding. Dr. Reyes said partnering between the Feed the Future Innovation Labs and the flagship agriculture projects of large contractors like Chemonics and Fintrac can enable the deployment of research results as they are discovered. Dr. A. Yeboah stressed that the blame is not on USAID. In some countries, the extension sector is not well developed and can be a constraining factor. Involving extension personnel early in the process will also improve outcomes because extensionists can give practical advice to scientists as research plans are formulated. Dr. Reyes suggested that carving out a portion of the Chemonics and Fintrac contracting for university research would be very beneficial.

Dr. Deaton commended the panel for the continued focus on basic concepts, such as ‘save and grow’, and the issues of rainforest loss and soil erosion. He requested BIFAD staff to get the hard data on these topics.

Dr. Anderson stated that the issue of conservation in production agriculture is important to the communities that BIFAD represents, and it has been on the agenda in some form since the 1990s. The issue is the lack of metrics and data to support accelerated investment, especially in this moment of evidence-based decision making. She asked the panelists what they are doing to develop standardized metrics for sustainability and in turn to gather and use the data to justify increase of allocations. Dr. Reyes responded that they have been gathering data from the

SANREM Innovation Lab in Cambodia and CIRAD projects since 2004 on the impacts of conservation agriculture on grain and vegetable yield, rainforest loss, and soil conservation. The data supports use of conservation agriculture and agroforestry on steep farm lands to conserve resources and that it not only increases yield, but it also sequesters carbon. Dr. Reyes said they can provide data on grains and vegetables. Dr. O. Yeboah commented that social science factors impact adoption rate of conservation practices and an interdisciplinary approach is needed to capture the elements that influence conservation outcomes, not just biophysical factors.

Dr. Deaton thanked panelists and dismissed meeting for a break until the next panel.

PANEL #2: North Carolina Biotechnology Center Industry Panel - *“Sustainable Technology Development to Meet Demands of Global Agriculture”*

Dr. Deaton reconvened the meeting by thanking Chancellor Martin for the hospitality shown during this meeting and for opportunity to visit the International Civil Rights Museum. He then introduced Scott Johnson as moderator of the next panel.

Mr. Scott Johnson, Vice President of Agricultural Biotechnology at the North Carolina Biotechnology Center, said the panel would focus on topics around the challenges the private sector faces when innovating and adapting to consumer markets and demands within varied cultural and political environments across the globe. He then introduced the panelists.

Dr. Nic Bate, Group Leader for Agronomic Traits, Syngenta

Dr. Bate provided his perspective as a research leader at Syngenta about the company’s commitment to sustainability. Syngenta’s Good Growth Plan (GGP) is an ambitious stake in the ground for the company to deliver sustainable agricultural solutions globally. The plan is unique in that for each challenge it addresses, a target and a means to measure it have been identified. There will be annual audits on progress and adaptation needs. He said that when facing the challenge of feeding a growing population with finite resources, it is important to consider the range of experiences not only between developing and developed nations in obtaining food, and but also between small-scale and large-scale farms in producing food. Under the GGP, Syngenta will focus on six commitments in three categories over the next five years: 1) making crops more efficient (more food, less waste); 2) helping biodiversity flourish; 3) rescuing more farmland (more biodiversity, less degradation); 4) empowering smallholders; 5) helping people stay safe; and 6) looking after every worker (more health, less poverty). A key component of the plan is measurability because “what gets measured gets done.” Syngenta is measuring progress via data collected with a network of over 1,000 reference farms. An additional several thousand benchmark farms typical to their respective geographies serve as reference points for comparison.

Dr. Bate discussed the first goal of increasing average productivity of global crops by 20 percent without consuming more resources. This means minimizing inputs while maximizing outputs. Though research has been aimed at high-productivity farmers, Syngenta is also investigating how solutions can be leveraged elsewhere. Metrics for this include not only land productivity, but also efficiency of nutrient, pesticide, water, and energy use. As an illustration, abiotic stress management is the largest unmet grower need with over \$200 billion in global losses resulting from issues with drought, heat, nutrition, and cold. In answer to that issue, Syngenta has structured its R&D pipeline to reflect the challenge, delivering short-, medium-, and long-term solutions to farmers based on chemistry, genetics, and natural products. Examples include a non-genetically modified organism (GMO) variety of drought-tolerant wheat for artisanal bread and an amino acid treatment containing ISABION(R) biostimulant to improve recovery from transplanting stress in cold environments.

Dr. Bate discussed the second goal of enhancing biodiversity on 5 million hectares of farmland as one of the most challenging in terms of measurement and tracking progress. Addressing the conflict between the need for increased food production and biodiversity requires more efficient use of good farm land and the retention of marginal and peripheral lands for biodiversity purposes. Metrics include the hectares of farmland with adequate field margins, species protection areas, new diverse habitats, and reforestation. He gave an example of a partnership between Syngenta and the largest US potato grower to encourage biodiversity in land around farms. Syngenta is providing seeds, technical assistance, and partnering capability so this work can serve as a nucleus for sharing experiences. Progress on this and other commitments has been independently audited and is available on Syngenta's website, www.goodgrowthplan.com.

Partnerships are crucial to developing sustainable solutions. Though farmers are the primary focus, other partners must leverage their strengths for the GGP to be successful. Governments provide long-term vision, NGOs can provide the conscience and reality check, universities provide innovative breakthroughs, and the private sector provides the drive to deliver solutions to market. The Realizing Increased Photosynthetic Efficiency (RIPE) Consortium, funded by the Bill and Melinda Gates Foundation, offers an example of a new model for collaboration. Through this partnership, Syngenta has access to a consortium for agriculture not only in developed nations, but also smallholder farmers in developing nations.

Dr. Gregory Kelly, COO, SoBran BioScience - Contract Research - *“Accelerating Biotechnology Development and Sustainable Agriculture*

Dr. Kelly described SoBran, a 30-year-old professional services firm with contract research as one of its business lines. The contract research can provide preclinical safety and efficacy testing to the biotechnology industry. Next month, SoBfan is opening a preclinical laboratory in Greensboro, NC to focus on studies on large animals, medical device development, and

veterinary medicine, which will complement their existing preclinical facility situated adjacent to John Hopkins University.

Dr. Kelly described the regulatory landscape SoBran addresses in biotechnology development. The company adheres to the animal welfare requirements administered by the USDA and the National Institute of Health's (NIH) Office of Laboratory Animal Welfare. When products are designed to become a drug or food product for humans or animals, SoBran also adheres to the practices and procedures administered by the Food and Drug Administration. Voluntarily, SoBran adheres to the regulatory provisions of the Association for Advancement and Accreditation of Laboratory Animal Care (AAALAC) and to the quality management standards of ISO 9000–2008.

Dr. Kelly said that significant advancement in sustainable agriculture will likely involve the increased use of genetically modified crops and/or livestock. This was highlighted in the preceding discussions as well as the recent report on GMOs by the National Academy of Sciences (NAS). A contract research organization (CRO) such as SoBran has a role in commercialization of these organisms by testing for product safety and effectiveness. CROs conduct testing with good plant or animal models in a statistically valid manner. He mentioned that SoBran established a specialized role by developing a focus on assisting academic researchers in both basic research and technology transfer offices. Faculty and staff in technology transfer offices often have limited experience in regulatory and economic hurdles in biotech development. CROs can ensure that product evaluations are risk-based and grounded in the best science possible.

Dr. Kelly also talked about the pathway to market of biotech products. The pathway of genetically engineered organisms has a similar developmental pathway to drugs. Product development begins with an idea, which is often a result of basic research. The idea is then validated. Lab-based studies are followed by clinical or field trials to show if the concept provides a statistically valid benefit. He emphasized that any product development is expensive and requires the influx of capital.

Dr. Kelly indicated that there are various check points in the development process to determine if a product is safe and/or effective. Each step of product development is regulated by not only scientific and safety evaluations, but also by financial checkpoints. The concept to be validated starts in the laboratory, and if it involves animals it is regulated by the USDA and NIH Office of Laboratory and Animal Welfare. Answering the question "Does it work?" is the initial checkpoint for early cost and benefit analysis. Answering questions about safety is regulated by the Food and Drug Administration (FDA) and/or US Environmental Protection Agency (EPA).

The biotechnology regulatory landscape in the United States is governed by the USDA, EPA, and FDA often overlapping jurisdiction and requirements. Internationally, it is even more

complex. Dr. Kelly indicated that the USDA regulates organisms and products that are known or suspected to be agricultural pests and diseases, and this includes GMOs. EPA regulates pesticides and many GMOs are developed to express properties that kill or inhibit pests. EPA is also the ‘catch-all agency’ for products not regulated by other agencies. The Toxic Substance Control Act regulates chemicals in the environment and microorganisms that are considered to be toxic substances. The FDA is responsible for ensuring safety and proper labeling of all plant-derived food and animal feeds including GMOs. The FDA adopts a consultative process with product developers compared to other agencies. The FDA encourages early and frequent meetings to ensure safety and regulatory requirements are resolved early in the process, saving time and money for all involved.

Dr. Kelly said that international regulations are complex, intertwined and evolving. He suggests that there is a need to continue developing guidelines, as exemplified by the International Committee on Harmonization (ICH) and the Cartagena Protocol on Biosafety. These guidelines attempt to have appropriate legal frameworks that function at the international level through a legally binding international biosafety protocol. He said harmonization is important because it is fundamental to effective and efficient product development.

In the United States, harmonization of regulations is being planned. In July 2015, an Executive Office of the President announced the start of an interagency process to modernize the biotechnology regulatory system. A major role was to place regulatory processes for a particular product in a single agency to the greatest extent possible. This is not the case today, and reviews are made by multiple agencies.

In conclusion, Dr. Kelly said that the process is not easy, and the road to market is long with many regulatory and financial and scientific hurdles to overcome. There is a need to work together to solve global food problems.

Kathy Flores, General Manager, Perdue Farms Specialty Crops, “*Helping Customers Prosper with Flexible, Forward-Thinking Solutions for Agriculturally Based Products from a Uniquely Trusted Name*”

Ms. Kathy Flores talked about Perdue Agribusiness which started 95 years ago with egg production. It has since moved into most segments of agribusiness. One of them has been specialty crops. Perdue works on not only breeding crops, but also transport and storage. The company places emphasis on farmers having reliable genetics for crops in order to produce and to ensure success in production. She mentioned the importance of location so that the produce will not lose its value in transport. Ms. Flores also said that it is critically important to have sustainability and reliability in the supply chain. She also talked about the importance of having reliability in certifications. Certifications should have the same meaning in both domestic and

international contexts. Lastly, she indicated that she appreciated working with researchers and regulators for their help in their regulatory and research issues.

Panel #2: Question/Answer/Comment Period by BIFAD Members

Dr. Fowler commented that he was struck by the association of goals and metrics in the GGP and the mechanisms for collecting data to make judgements and decisions moving forward. He hoped there would be some opportunities for Syngenta to sit with USAID, other government agencies, land-grant universities and civil society to look at the data together so that they could figure out what had worked. Dr. Bate responded that the approach to the GGP, with a focus on metrics and traceability, is something the private sector is typically good at. The private sector can share these results with the greater community and provide meaningful deliverables. There is a lot of data already provided on the GGP website, and Syngenta would be happy to answer questions or provide more granularity as needed.

Dr. Martin asked Dr. Bate a question concerning the significant investment from USAID and the collaboration with Innovation Labs. Dr. Martin asked how Syngenta's agenda for the future is being driven by those investments and work so that efforts are not repeated. Dr. Bate responded that it probably starts with each group sharing what is being done and creating a division of goals. That way, each member can contribute according to its strengths. As a member of the research community at Syngenta, he is not well equipped to answer on all topics, but he indicated that it is important to ask and investigate.

Dr. Anderson asked Dr. Kelly if the order of asking questions should be reversed before investing so many resources. In the developing world, as they go down a path of biotechnology, farmers may lose capital investments because a technology or product is not reliable or sustainable, resulting in no market. Dr. Anderson suggested that it would be wise to figure out market analytics first. Dr. Kelly replied that people believe a market exists for any idea being investigated, but it is hard to know how a product will perform until it is actually on the shelves. For example, Syngenta's golden rice was a good product that had significant worldwide demand but then ran into marketplace hurdles.

Dr. Deaton asked Ms. Flores if she had any specific comments concerning when USAID should act as the interface between industries and agencies in other countries around issues of reliability and certification. Ms. Flores stated that regulations can sometimes change while work is in progress and after all the regulatory and market analysis has been done. She gave an example of a regulatory change for a grape crop that was made without any industry input. The product was being processed, and customers were waiting for the product. They had to stop the program for several months, resulting in the product being pulled from shelves. She said it is especially important to engage smaller companies that may not have their 'ear to the ground' for regulatory changes.

Public Question/Answer and Comment Period

Dr. Deaton opened the floor to comments and questions from audience members.

Gerard Morrison, a 1998 A&T alumnus from the agriculture business department and an aspiring agricultural ambassador, said he is an advocate of collaboration and research at historically black colleges and universities (HBCUs). He indicated that he would like to see more international collaboration between HBCUs like A&T and sister institutions in places like Zimbabwe and South Africa. Mr. Morrison said that there is a wine district outside of Capetown, and someone should also look into medicinal benefits of wine against cancer and heart disease. He asked how can we facilitate more collaboration and create opportunities for economic development and career creation, both here and abroad.

Dr. Joshua Idassi works with North Carolina Cooperative Extension at A&T. He has been working in Tanzania, Ethiopia, and other African countries. Dr. Idassi stated that in the United States, there is successful documentation and sharing of project results, but there is a need for more translation support in various languages for successful technology transfer in developing nations. In these countries, the youth are the ones utilizing information and communications technology. He asked how USAID plans to reach these individuals and provide information in areas that are being left behind.

Mr. Ashani Hamilton, animal science graduate student at A&T, asked what private sector and USAID are doing to better educate the general public about the benefits of biotechnology. He indicated that the scientific community understands the benefits, but consumers need greater appreciation of biotechnology for its continued success.

Dr. Deaton asked the BIFAD Board members to respond to any of the questions asked.

Dr. Martin responded to Mr. Hamilton by encouraging him to engage with the School of Agriculture and Environmental Sciences on the various pre-college initiatives to help educate young people on career opportunities in the fields of agriculture and biotechnology. A&T is also collaborating with the NC Center for Biotechnology to share career and research opportunities with A&T students. He asked SoBran representatives to also comment on emerging collaboration between the company and the A&T community.

Dr. Kelly commented that one of SoBran's business lines works with academic institutions and helps them to commercialize their research results. This helps put the results of federally funded research in the hands of consumers. He stated that he is troubled by lack of scientific and technologic knowledge in general society, and he cited a recent Wall Street Journal article in which 52 percent of people surveyed said they would not be willing to consume organically

grown crops that contained DNA. He said we need to do a better job with STEM education so people have a better understanding of risk-benefit analysis, especially with regard to technology.

Dr. Bate responded that companies often have a vested interest in adoption of new technology, so the education of the public can become tricky. The higher education community, especially students, can play an important role as a voice of reason by adding a strong, science-based perspective to public discourse. Regarding the discussion of technology push versus market pull, Dr. Bate indicated that you often don't know what will happen with the technology until it is already on the market. The challenge to innovators is to start the journey with new ideas and see where they go.

Mr. Jim Ash commented on the question concerning the delivery of information in different languages and the delivery of various messages across the generations that are implementing it. Language, culture, and social dynamics/modalities can all play a role in the delivery of information. He said that he thinks an overarching interdisciplinary approach to communication is something BIFAD can study. He said they have seen successes of delivering information, particularly to the female segment, for example, new modalities that deliver small loans over handheld devices to smallholder farmers. There must be a way to connect the way banks deliver loans to the way researchers deliver messages on crop issues.

Dr. Jean Ristaino, from NC State University, made a general comment regarding the genetic engineering question posed by the student. She said that Fred Gould, a member of their department at NC State, was chair of an NAS study concerning the release of genetic engineered crops and the role of genetically engineered crop plants in global agriculture. She said that NC State also has a center on genetic engineering and society that brings in students from across disciplines. She indicated that NC State has agricultural ethicists who involve other people in a dialogue. They host meetings and movie nights for the public for discussions on genetic engineering. They hope that this develops more science literacy. She also commented that BIFAD can work on the issue of genetically engineered crops that are currently prevented from being imported to the developing world. She added that if these countries would use genetically modified crops, farmers would have to apply fewer harmful chemicals. Dr. Ristaino suggested that a balance is needed for these issues. She said that BIFAD and/or USAID can work on the dialogue because there are some success stories on the topic. She added further that it is frustrating when you see that technology is ready to be released, and there are the 'non-sense' comments about the harm.

Mr. Carol Moseley from Syngenta, Greensboro, indicated that he appreciates the comment related to the recently released NAS report associated with genetically engineered crops. He mentioned that there are web resources where individuals can learn more about genetically modified organisms. One is at GMOanswers.com, which is sponsored by Syngenta. Another is <http://factsaboutgmos.org/>.

Dr. Pamela Anderson also commented on the NAS GMO study. She said that the NAS study reported that there was no evidence that GMOs are harmful to human health. She also pointed out that the report also found no evidence that GMO crops appear to be improving productivity, which was an intended purpose. The varieties that are commercially available are focused on pest and disease resistance. These can then be considered a human benefit. She noted that there is still a need to figure out what narrative will convince and persuade the public that this is responsible thing to do. There is also a need to educate scientists and students on how to engage the public in a constructive way concerning topics such as GMO.

Dr. Osei Yeboah of A&T made a comment concerning GMOs. He said that questions concerning GMO favorability need to be clearly articulated based on commodity use. For example, “do you support using GMO varieties to grow corn for ethanol?” He thinks that if questions are specific, they would not generate as much negative response compared to more general questions.

Dr. Deaton indicated that he was thankful for the tremendous opportunity to interact and have dialogue with the science, industry, and education community. It’s only by bringing together the best of all fields that we can address the critical issues of food security and poverty diminution. He indicated that the issue of sustainability has become very critical in resolving these problems. Dr. Deaton also said that metrics were important to be able to know if we are making progress. He said that the presentation on Feed the Future and the GODAN effort gives him hope that we can go forward to help feed ourselves through science. Dr. Deaton described the conundrum that no matter how good we are as researchers in any field, the future will always be different than we thought it would be. He indicated that we must move forward with the voice of reason leavened from our knowledge base. He said we have to be open as educational institutions to absorbing input and instilling our students with passion as we look to the future. Dr. Deaton also mentioned that President Obama recognized the need to cultivate youth leadership in Africa, which is the tip of the iceberg in terms of resolving the needs of 2030. The people who will be 30 years old in 2030 are already 16 years old. He said he was thrilled by the commitment by many private sector firms, because it is truly a joint endeavor to build a sustainable world. Dr. Deaton said that many comments made will be brought into their deliberations with the Board and with USAID, to ensure that the best is done for society.

Dr. Martin said that A&T had enjoyed hosting BIFAD. He thanked all the staff and people who attended. He also appreciated BIFAD’s feedback. Dr. Martin also thanked the presenters for their thought-provoking messages, for taking the time to prepare for the meeting, and for their passion shown through their delivery. He thanked all partners as well for their engagement with BIFAD and A&T.

Dr. Deaton thanked everyone for attending and adjourned the public meeting.