NC STATE UNIVERSITY

Global Food Security

The NC Global Food Security Institute

Planning Meeting

Meeting Summary

April 2017

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Visioning a Global Food Security Institute

The NC Global Food Security Institute held a planning meeting on Thursday April 13, 2017 at North Carolina State University's Dorothy and Roy Park Alumni Center. Approximately 60 people attended from NC State, UNC Chapel Hill, Duke, other non-profit and government agencies and private industry interested in global food security.

The purpose of this one day retreat was to set the groundwork and develop a strategic plan that will shape the future direction for the NC Global Food Security Institute (GFSI). Food security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life.

The GFSI will develop knowledge and deploy next generation plant and animal science tools and technologies that are environmentally sustainable to increase farmer income and nutrition, to reduce hunger and poverty, and to sustain food security. We will train the next generation of globally engaged students, scientists and policy makers and support gender equity, policy reforms, and university/institutional capacity development for efficient, sustainable food and crop production in the world.

This document summarizes the discussion and activities of the meeting. The results of polling questions participants responded to throughout the day are also included. Note copies of the presentations are available here: https://drive.google.com/open?id=0B-2O6IFMMUwCSk9FMGxnU3BXYjA

Global Food Security Institute

Food security exists when all people have physical, social and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life. The four pillars of food security include availability, access, utilization and stability.

The Global Food Security Institute is a partnership of NC research institutions.

Our Mission: The Global Food Security Institute (GFSI) will develop knowledge and deploy next generation plant and animal science tools and technologies that are environmentally sustainable to increase farmer income and nutrition, to reduce hunger and poverty, and to sustain food security. We will train the next generation of globally engaged students, scientists and policy makers and support gender equity, policy reforms, and university/institutional capacity development for efficient, sustainable food and crop production in the world. The GFSI will build and deploy new technologies that reduce the detrimental impacts on ecosystem services of agriculture at local, regional and global scales.

Thematic Areas of Research: We conduct research and academic capacity-building in nine thematic tracks:

1. Plant and animal biology in agriculture, including coevolution of plants and animals, pests and pathogens
2. Impact of climate change on plant and animal performance
3. Food loss, waste, distribution, safety and sanitation
4. The phytobiome and microbiome
5. Evolutionary & Ecological Approaches to Reduce Infectious Disease and Improve Food Security
6. Agriculture, nutrition, and global health
7. Policy influencing technology adoption in areas such as transgenics, gender, food, nutrition and health
8. Data driven analytics, metadata and predictive modeling to improve food security

Who are we?
The GFSI brings together scientific thought leaders from six **NC State** Colleges and the Chancellors Faculty Excellence Program Clusters, expertise from **Duke University's** World Food Policy Center and the Triangle Center for Evolutionary Medicine (TRCEM), Food Security and Agriculture from **RTI International**, and Nutrition and Public Health from **UNC-CH**.

Training and Workforce Development.
We will train the next generation of globally-engaged students, scientists and policy makers and support gender equity, policy reforms, and university/institutional capacity development for efficient, sustainable food and crop production in the US and the developing world.

For Further information on becoming a founding partner, please contact:

Dr. Jean Beagle Ristaino, jean_ristaino@ncsu.edu
William Neal Reynolds Professor of Plant Pathology and Director of the Emerging Plant Disease and Global Food Security Cluster NC State University

Welcoming Remarks

Dr. Duane Larick, Senior Vice Provost, NC State University, welcomed the group. He noted he is a professor of Food, Bioprocessing and Nutritional Sciences. He has also worked to enhance interdisciplinary work on this campus. NC State is honored to be hosting this session and he considers this a unique partnership. Everything we do at NC State is associated with our strategic plan. The conversation that takes place today will touch all 5 of the strategic goals in the university's plan.

(1) Enhance student success;
(2) Invest in faculty and infrastructure;
(3) Support interdisciplinary infrastructure;
(4) Pursue organizational excellence; and
(5) Engage locally and globally.

Interdisciplinary faculty have been brought to campus to tackle complex global issues through the Chancellors Faculty Excellence Program (CFEP). Over 60 faculty have been hired in these CFERP clusters. The goal was to recruit faculty dedicated to interdisciplinary work and to engage with other institutions and industries. This new GFSI partnership can lead to ways to reduce hunger and poverty, deal with hunger, and NCSU is proud to be the catalyst for this discussion. Dr. Larick can see this group influencing global security across the entire world.

Open Data and Food Security

Jaime Adams: Senior Advisor for International Affairs, Office of the Chief Scientist, USDA, began by sharing a video with the audience: GODAN PSA: One Solution by Zero Hunger [https://www.youtube.com/watch?v=ZNKkMCsQwcI]. Over 800 million people still go to sleep hungry every night; 3 million children die every year from malnutrition. But we have enough food. One solution is to make data open and available to combat hunger, empower farmers, and improve the health of everyone. We can end world hunger by making data freely open and available – "set the data free."

A thought-provoking look at global food security from an open data perspective is needed. The three powerhouse universities in this room coupled with RTI and companies in RTP can work to solve the problem – the brainpower in this room alone should be enough to solve the challenge. Jaime has a passion for open data for agriculture. In 2012 she spent over a year in Afghanistan. She saw the critical need for open data as there was a lack of information in Afghanistan. When she came back, she formed a team to lead the G8 conference. After that conference, the US government pressed forward with G8 partners and the United Kingdom. Over 500 organizations joined together under the Global Open Data for Agriculture and Nutrition (GODAN) Initiative to make data unrestricted. GODAN: supports global efforts to make data relevant to agriculture and nutrition available, accessible, and usable for unrestricted use worldwide. There is a voluntary association of public and private entities. www.GODAN.info. GODAN is funded jointly by the US and United Kingdom. This reduces duplication, moves faster towards solutions, and documents the need for this network. The GODAN summit held last year in New York City with over 100 speakers, 800 attendees.

The world population is predicted to grow to 9 billion by 2050, global demand for food, and need for fiber is predicted to nearly double. Experts tell us that we currently produce enough food to feed everyone, but 11% of the population goes to bed hungry every night (most are women and children). Why is that? We need to figure out how to solve this problem. Open

agriculture and nutrition data is a powerful food for long-term sustainable development, improving the economic opportunities for farmers and contributing to the health of all consumers.

Jaime applauds the GFSI for tackling 9 thematic research areas. Due to incomplete data, lack of data altogether, the GFSI had to list these 9 areas that impact food security. Data is not there to tell you how to solve the issue(s). Open data will lead to a more fully informed decision making process for generating research priorities. Jaime gave examples of how the weather app on the phone is open data due to NOAA's contributions. Data is enormous. The human brain cannot process how much data is available any more.

Her major point was that we produce enough food in the world but can't feed everybody. There is no need for food insecurity if open data are used to improve access, utilization and stability of the food supply.

We need collective data. Getting the experts in the room and building a database is important. The research priorities and data generated from across all of the groups here today are important so that the appropriate policies and plumbing can be put into place. We need a comprehensive data set like data NOAA provides for our weather apps. The answer lies in existing data if it was only open to solving world hunger and food insecurity.

Critical Challenges in Global Food Security- Poll question 1

NCSU Capabilities and the vision for GFSI

Dr. Jean Ristaino discussed challenges in global food security. She gave a definition of food security that is in their handout (see page 2 of this document). Four pillars of food security: availability, access, utilization and stability. Human populations are increasing from 1 billion in 1800 to 7 billion people now and projections of world population increase to 9 billion by 2050.

Despite progress in eradicating hunger, we still have 800 million that are food insecure. There are even hunger issues in the U.S. About 29 million adults and 19 million children are food insecure. There are still food deserts in the U.S. Food insecurity varies by economic status and where people live. One in 6 children in the world are underweight or stunted in their growth due to poor nutrition.

More than 60% of people in developing countries lack basic sanitation including clean water. Global demand for agricultural products will increase. Food production has to increase while at the same time protecting ecosystems, reducing environmental impacts, and maintaining natural resources. Food security and national security are tightly linked. Global conflict impacts food security. More than 93 million people have migrated in recent years from their countries due to conflict. Human rights issues, food security, migration and displacement issues are interlinked and require the expertise of diverse groups of biological scientists, social scientists and policy makers and to solve the issues.

Climate related disasters have increased and impacted agriculture. Causes of climate related losses vary globally – from drought to flooding. Drought, salty soils, fertilizer dependence and the potential for more emerging pests and pathogens exacerbated by climate will increase. Food production must increase by 60% by 2050. NC State has nearly 200 faculty involved in international projects working with over 150 international partners in every region of the world. The goal of this visioning workshop is to start linking partners. Each of our independent universities has signed MOUs with international collaborators and are conducting research and teaching in other countries. There are opportunities to leverage our collective strength.

The Global Food Security Institute (GFSI) will develop knowledge and deploy next generation plant and animal science tools and technologies that are environmentally sustainable to increase farmer income and nutrition, to reduce hunger and poverty, and to sustain food security. We will train the next generation of globally engaged students, scientists and policy makers and support gender equity, policy reforms, and university/institutional capacity development for efficient, sustainable food and crop production in the world. The GFSI will build and deploy new technologies that reduce the detrimental impacts on ecosystem services of agriculture at local, regional and global scales.

Duke Capabilities

Dr. Sarah Zoubek shared Duke University's capabilities in this area. There are 36,000 employees at Duke. Duke is global in nature – faculty and students are global, challenges we face are global. Duke is engaged throughout the world – developing global offices with campus representatives in China, West Africa and London. Duke has a robust Global Health institute. Much of the work is on the nutrition, consumption side of things – examples include Behavioral Economics and Healthy Food Choice Research (BECR) Center; Center for Population Health Sciences; Center for Health Policy and Inequalities Research; Healthy Eating Research; Duke Diet & Fitness Center; CAH.

Other places at Duke involved in food security work include: The Nicholas School of the Environment; The Center on Globalization Governance & Competitiveness; Center for International Development; Duke Biology; work on the ocean and oceans/fisheries policy; food system environmental impacts; value chains; international development policy (Sanford School of Public Policy). Duke also has The Triangle Center for Evolutionary Medicine (TriCEM).

The Duke World Food Policy Center has been in the planning phase for the last 1.5 years and is ready to launch and get going and ready to collaborate. The center I situated on the policy side of things. The "Why" of the Center: 8 of 10 leading causes of death globally are diet-related. Starting off with the idea that there are critical world food issues and areas that need to be connected: hunger, food insecurity, obesity, food safety and defense, and environmental impacts of agriculture.

There is a projected increase in diabetes – more significant issue health-wise as malnutrition. We need to think about how obesity in the US and food insecurity issues are interact. Inability to access the right kinds of food leads to obesity. Strongest predictors of life expectancy is related to where you live and food environment is one of these factors.

By 2030, half the world's population will be in water distress. Meat consumption rates continue to increase. The global greenhouse emissions from animal agriculture exceed emissions from other agricultural sources. How and what we feed the world is unsustainable.

Examples of conflicts:

- Food industry growth vs. public health
- Green Revolution vs. the environment
- SNAP benefits and soda
- Corn versus ethanol

Duke University's World Food Policy Center will: (1) Bridge research and policy; (2) Coordinate work across policy communities to achieve outcomes in each; and (3) Think globally and locally.

Funding to date is $6 million from Blue Cross Blue Shield of NC, the Duke Endowment, and the William R. Kenan Charitable Trust pending.

The first major Initiatives of Duke's World Food Policy Center include: Operations; Student Activation; Local Food Policy Initiative – Early Childhood Development and Nutrition; and a Sustainable Seafood - Global Consortium (going from local to global)

UNC Capabilities

Dr. Peggy Bentley shared UNC Capabilities in global food security. The theme for the entire (UNC) university this year is "Food for All: Local and Global Perspectives". UNC has a global Research Institute that funds small grants, especially interdisciplinary ones. Dr. Bentley is Dean of the UNC Gillings School of Public Health – a very strong school of over 200 faculty and stellar student body. Faculty and students are working in more than 80 countries around the world. Her tenure home is the Department of Nutrition with 57 full-time faculty and 155 students

Strengths/UNC Capabilities:

- Research in the role of nutrition and physical activity in preventing and treating disease in diverse populations; global population trends in diet; role of agriculture and food.
- Barry Popkin at UNC coined the term "The Nutrition Transition"
- Alice Ammerman at UNC – works locally – "Farm Fresh Meals on the Go" – socially conscious consumers subsidize costs of food for low income consumers
- Carolina Population Center: one of several population centers funded by NIH. It is the largest one in breadth of what they do. There are 70 faculty fellows from across UNC such as Ashu Handa (public policy); Harsha Thirumurthy (health economist; HIV); Clark Gray (geography and climate, population, health and well-being over time).
- MEASURE Evaluation Project: over $200 million over 5 years to work in 280 countries – monitor and evaluate programs related to health, nutrition and food insecurity.
    - Sian Curtis was past director of MEASURE Evaluation project – also has a project on how food security interventions benefit women (Better Life Alliance Project in Zambia).
    - Valerie Flax – MEASURE EVALUATION project – most significant change stories in Malawi – integrated nutrition in value chains.
- UNC has The Water Institute – led by Jamie Bartram – A conference is held every October an d over 800 people attend from universities, international agencies, water systems managers, NGOs.
- Kenan Flagler Business School – think globally, act locally.
- Noel Greis is an expert in global statistics at Kenan Flagler.

UNC has a diverse, interdisciplinary set of faculty across schools center and campus; "local and global" mindset; large "toolbox" for addressing global food security, from telling the story through global health program interventions and policy; a record of collaboration between universities, NGOs and CROs; team science; implementation science

RTI/RTP Capabilities

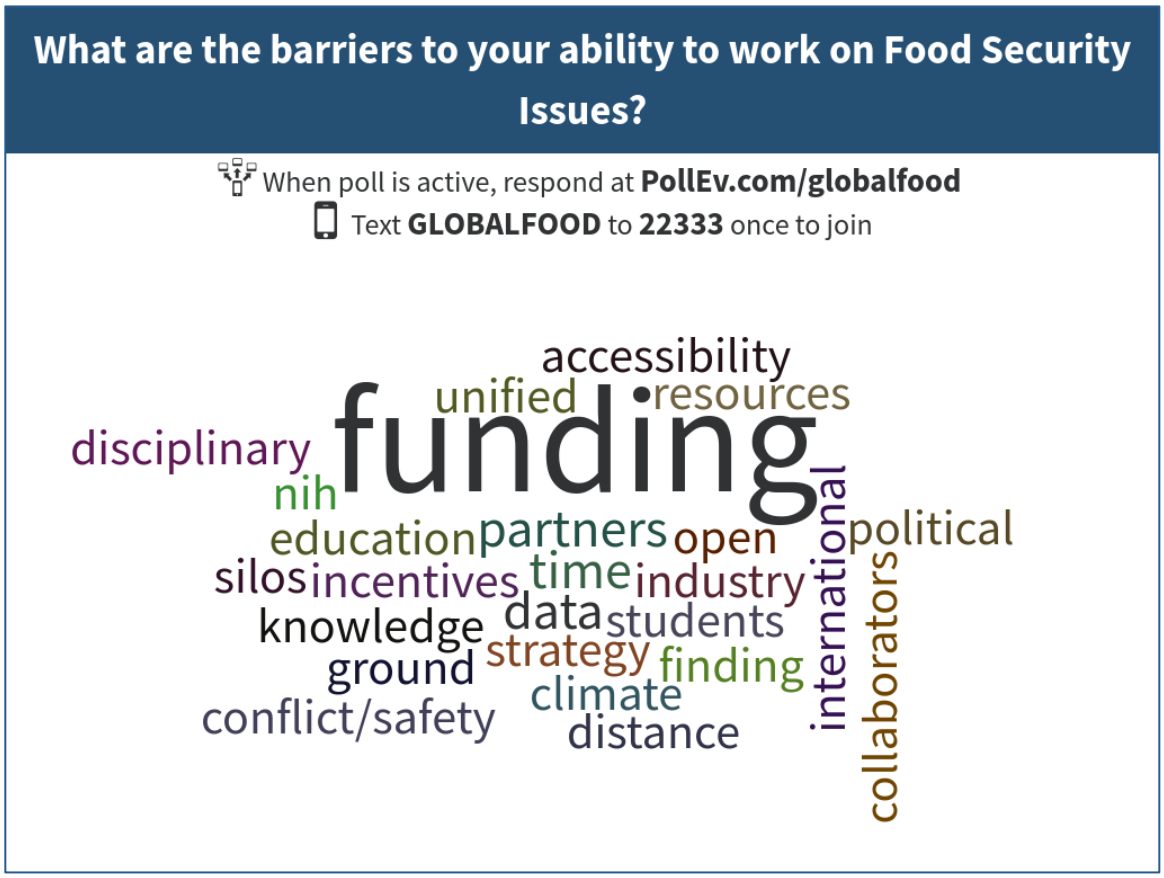
Dr. Paul Weisenfeld discussed the Research Triangle Institute (RTI) RTI and RTP Capabilities. Paul is a lawyer by training and never thought he would get involved in the food security area. He got involved in land tenant security issues in Zimbabwe and joined USAID a few years later. He saw the food insecurity crisis Zimbabwe experienced. Paul shared a video about RTI's global involvements: https://m.youtube.com/watch?feature=youtu.be&v=SSwS2s0Sies

RTI was founded in 1958 and moved the Triangle area into an innovative, technological, knowledge-based economy. Now the Research Triangle Park is the most successful research triangle in the world; found by the three universities and the governor of North Carolina. RTI

submits about $2 billion in proposals a year. There are 5000 employees and they have a 40% win rate – managing an ongoing portfolio of thousands of projects.

Four RTI research groups include groups – social, statistical and environmental group; discovery scientists and technology group; health solutions group; and international development group. The international development group works across a number of disciplines. They have 3,000 projects in 50 countries and $330 million in revenue from this group. In the agriculture space they recently increased capabilities in agriculture by purchasing another contractor and added their capabilities in agriculture and water. Within Food Security and Agriculture they work in the following areas: market systems strengthening; food safety; food and nutrition; climate-smart agriculture; agricultural innovation; obesity prevention. They are also working on reducing food loss and waste; stimulating private sector agricultural growth; supporting youth leadership in agriculture; engaging smallholder farmers and farmer groups; improving marketing linkages, competitiveness, value chains and exports. In terms of research: food choice; Information and Communication Technology (ICT) for agriculture; youth migration/acceptance of agricultural livelihoods; and prenatal aflatoxin exposure are focus areas.

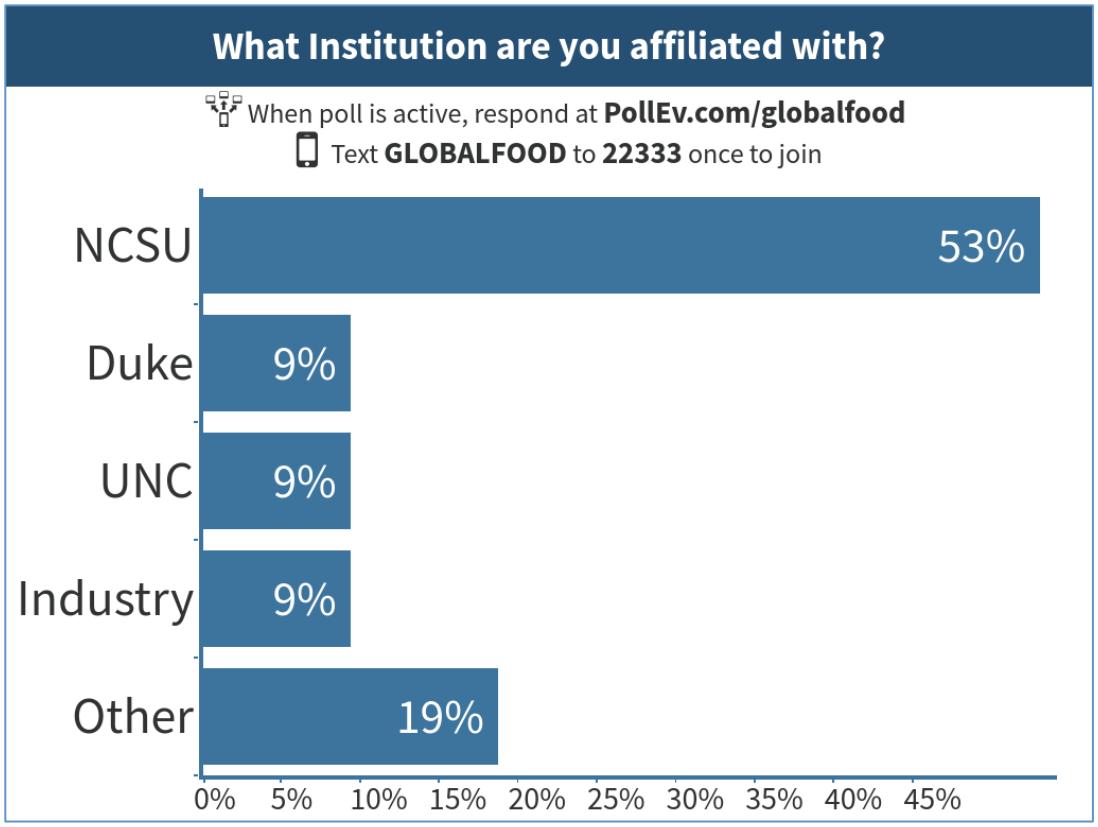
Barriers to work in Global Food Security-Poll Question 2



Participant Introductions

Each participant was asked to introduce themselves and their research to the group via a 2 minute slice presentation. Participants shared a slide describing their expertise, resources and research areas of interest. The introductory slides are available here: https://drive.google.com/open?id=0B-2O6IFMMUwCSk9FMGxnU3BXYjA

Participants also shared their institution affiliation and where they work in the world on food security.



What discipline areas across the campuses/industry would enhance our ability to develop partnerships in global food security? Poll Question 3

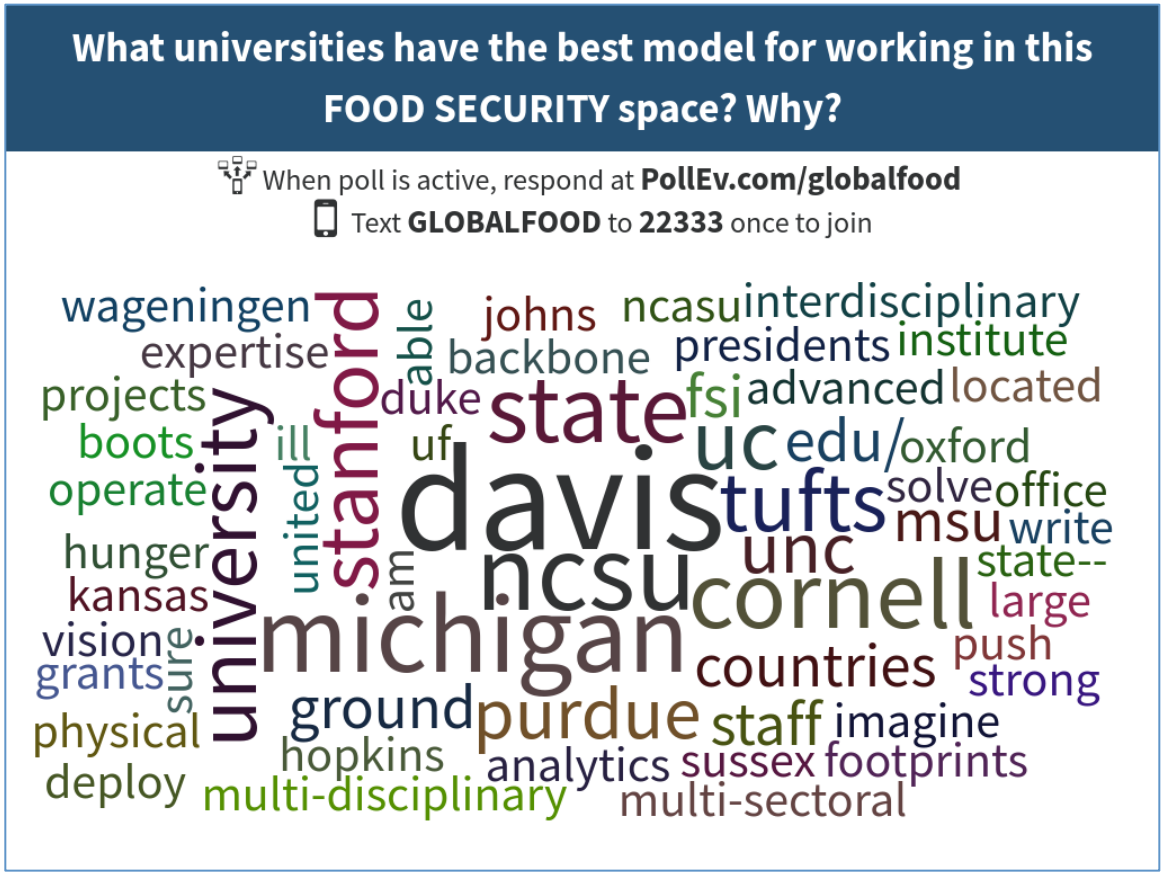
Participants were asked what discipline areas across campuses/industry would enhance our ability to develop partnerships in global food security? Responses (and number of respondents) are listed below.

Policy	7	Forestry	2
Anthropology/sociology	6	Pest Management	2
Engineering	5	Pathology	2
Environment/Environmental Engineering	4	Ag Economics	2
Global health	4	Political Science	2
Big Data	3	Abiotic stress	1
Data Science	3	Agriculture	1
Economics	3	Behavioral Economics	1
Epidemiology	3	Bioengineering	1
Health/Nutrition	3	Breeding	1
Statistics/Biostatistics	3	Climate Change	1
Business Management	2	Computational	1
Entomology	2	Conflict	1
		Crop Breeding	1

Entrepreneurship	1	International Policy/Trade/Relations	1
Food Data	1	Microbe	1
GIS	1	Modeling	1
Energy Security	1	Plant Science	1
Health Psychology	1	Human Rights	1
Humanities	1	Post Harvest	1
Implementation Science	1	Project Management	1
Infectious Disease	1	Soil Management	1
Informatics	1	Supply Chain Management	1
Information Management	1	Systems	1

What Universities Have the Best Model for Working in Food Security? Poll Question 4

Participants responded to a poll question: What universities have the best model for working in this FOOD SECURITY space? Why?



Responses (and number of respondents) are listed below.

Davis	9	University of Illinois	1
Michigan State	8	University of York	1
NCSU	7	UF	1
Cornell	5	Tufts	1
Stanford	4	Sussex	1
UNC	3	Oxford	1
Purdue	3	Kansas State	1
PUSH	2	Johns Hopkins	1
Wageningen	1	Duke	1

Comments for the reasons the other universities were successful in the food security space were:

- Advanced analytics backbone
- Have staff and office personnel and are able to write large grants and deploy projects on the ground
- Multi-disciplinary, Mulit-sectoral
- Expertise and Vision
- Strong International Connections

NC State's Plant Sciences Initiative

Dr. Steve Lommel, Associate Dean of Research, CALS, NC State University described the Plant Sciences Initiative (PSI), a $160 million investment in CALS. The building will open in August 2021. The aspiration is to become the world's foremost Plant Sciences Enterprise. There are two prongs: a new kind of building and reprogramming the way we conduct research at NC State University. The building is designed to put teams of people together temporarily to address the grand challenges and the grand opportunities in agriculture. The building will be on Centennial Campus. Funds were raised from a $85 million NC Bond; $45 from The Golden Leaf Foundation; and the remainder of funds were raised from money from 44 commodity groups across North Carolina.

It is predicted that 84% of US agricultural jobs are projected to be in Plant Sciences discipline. There will be a $200 million programmatic investment for the PSI endeavor. He envisions ongoing partnership engagement.

One NC Assets include geography. The state of North Carolina is diverse in terms of soil, climate, different commodity groups, research stations across the state and has RTP and the neighboring universities with a large concentration of plant scientists. There are a number of plant start-ups so there is an ecosystem for start-ups.

How is NC PSI different?

- Deployment of fluid, interdisciplinary, multi-partner teams on projects to address grand challenges and opportunities
- Embedded entrepreneurial network with a focus on IP and launching start-ups

- Training of a new breed of interdisciplinary farmers and scientists with global team experience

A uniquely integrated innovation pipeline will be in the PSI. The next generation of student needs to have deep knowledge and be able to communicate with a broad group of people.

The NC PSI Value Proposition: Discovery – Refinement – Application – Deliver – Implementation

A Partner-Engaged Planning Process with over 120 people engaged in this for over a year. There are four task forces:
Task Force 1: Governance and Leadership
Task Force 2: Research and Technology
Task Force 3: Advocacy and Resource Development
Task Force 4: Workforce Development and Public Engagement

These task forces will report out in the next couple of weeks – guiding document for PSI.

Three areas of science:
- Plant improvement
- Data driven science – leverage the College of Engineering, College of Sciences, partnerships in RTP
- Resilient agricultural systems – international activities and opportunities

PSI will be a world-class facility that will:
- Foster interdisciplinary research to solve global challenges
- Will create unique partnerships

Facilitating Partnerships

Dr. Alan Rebar, Vice Chancellor for Research, NC State University, spoke of the power of partnerships. The main goal of today's symposium is to facilitate partnerships. NC State has the expertise and the depth of concern for food security to be a participant and a leader with these issues. What greater grand challenge than global food security and global health? We look at this as an opportunity to work with others to have a greater impact.

Centennial Campus is symbolic of NC State's belief in partnerships and collaborations. It is one of the premier live/work/learn campuses in the U.S. We hope what happens today will broaden the University's vision and identify areas of fundable, significant areas of collaboration. We hope this can help make the Triangle the world's leader in food security and global health. Rebar believes we can pull together and become this. He was very impressed with the expertise he heard described this morning in the room. He can see the GFSI having meaningful impact. We – all of us – will do what we can to facilitate your work. The GFSI is about the faculty and their work from the ground up.

BREAKOUT GROUPS

Participants worked in groups focused on each of the 8 proposed themes. The groups addressed five questions about each of the themes:

1. Does the thematic area address a food security issue area well?
2. How do you envision the Global Food Security Institute addressing research in this thematic area? What are the opportunities for collaboration in this thematic area? What are the research objectives?
3. Could new teaching/curriculum/ academic programs be developed across triangle colleges?
4. Do you have ideas for a sustainable funding model or opportunities for funding GFSI?
5. What needs to be in place – besides money – to make GFSI a reality? What are the challenges that need to be overcome?

After the group discussed each question, the participants rotated to a different table and topic to provide peer review on the initial group's ideas. The initial groups then summarized their ideas and shared it with the entire group. The information for each theme follows below and the detailed notes from the breakout group discussions

Plant and animal biology in agriculture, including coevolution of plants and animals, pests and pathogens

Group Leader: Linda Hanley-Bowdoin (NCSU)
Group Members: Marian McCord (NCSU); Frank Louws (NCSU); Colleen Dourety (NCSU); Dahlia Nielsen (NCSU); Qingshen Wei (NCSU); Jeorg Bauer (BASF)

Discussion summary:

- Reducing abiotic and biotic stresses is critical for food security, especially in the developing world.
- Global ecosystem approaches to address stress in agriculture. Catalyst to develop these types of collaborations. Facilitate data sharing and development of data standards.
- Internships (corporate, government, NGO, international). Interdisciplinary training, professional development and policy, certificates and workshops (local and international capacity building).
- Need 5 years of institutional buy-in (all partners and researchers) to develop infrastructure and staff necessary to compete effectively for large interdisciplinary grants in food security and to develop training opportunities. Immediate funding for an Agriculture and Global Food Security seminar program.
- Need an excited, focused planning committee with incentives (?) to get this off the ground. Should have representatives from all types of partners.

Audience Q&A:
Did not agree with relieving teaching workload to participate on planning committee as NCSU is a teaching institution – people just need to "carve out the time", get their grants; not all agreed and pointed out that it depends on the department as they have different teaching loads.

Brainstorming Notes:

1. Does the thematic area address a food security issue area well?
- All pathogen-host intersection, apply to plants, livestock, & wildlife/natural systems
-Changing ecosystem changes whole balance, urbanization
-World challenge: invasive species (plants and animals), shifts in populations
-In less developed areas, where these factors (disease, etc.) are worse, yield impact is much greater
-Abiotic and biotic stress is clear limitation to food security
-Pests are changing basic bio of host resistance movement of pathogens
-Pathogens/viral diseases insects are adapting
-Invasive

2. How do you envision the Global Food Security Institute addressing research in this thematic area? What are the opportunities for collaboration in this thematic area? What are the research objectives?
-Share data on pets, geotype: where/how details, for example. Diagnostic assessments
-Share data and weather data; develop open standards for data
-Build capacity to go for larger resources infrastructure: requires holistic view - connect dots to offer bigger solutions
-Look at how other food security centers differentiate and focus on production
-Infrastructure to foster research exchange, get material, ideas
-Bring more resources that can be leveraged, start with inventory of assets
-Use framework to work for non-obvious solution: foster creativity
-Mix historians, socioeconomics, with scientists, economists, politics, policy
-Interact with human health and nutrition

-Need consortium like human health has for agriculture
-Molecular assays field applicable user-friendly on-side detail for individual users
-Selling food security as global health is easier, bring in unexpected (like textiles). For example, cotton is important source of food security because it provides income. Value added crops with socio-economic nature.
-Sustainable silvaculture - cooking wood, integrate land management with most basic energy
-Keep in mind to OPCA multiple challenges

3. Could new teaching/curriculum/academic programs be developed across triangle colleges?
-Formalized recognition for training on global security, certificate programs, framework program for undergrads, grads
-Optimized internships, industrial trainerships. Projects come from industry.
-Leverage industry interactions, help bring in students, set up the infrastructure to allow students to work overseas.
-Professional development opportunities
-Offer classes outside of NC to facilitate needs of international students
-Get support from NC legislature for student support
-Interdisciplinary curriculum in pest & disease modeling
-Internship opportunities, real world experience, industry training student need
-Opportunities for NGO, policy, editing, writing, etc, but keep faculty engaged

4. Do you have ideas for a funding model or opportunities for funding GFSI?
-Development philanthropic showcase
-Capture some of the overhead that faculty get to go into program
-Become a global learning institute, subsidize students from developing world to develop support programs
-Membership dues
-Large resources in federal / international groups exist

5. What needs to be in place - besides money - to make GFSI a reality? What are the challenges that need to be overcome?
-Need staff to build bridges so faculty don't have to do all the work
-Institute to get presence in building

Synthesis:
-data sharing standards open
-interdisciplinary programs
-professional development
-support for development of core staff
-catching missed opportunities or large multi-national funding opportunities
-internships
-complex approach

Impact of climate change on plant and animal performance

Group Leader: Craig Yencho (NCSU)
Group members: Thomas Mitchell-Olds (Duke); Donna Womack (RTI); and Maria Welsh (NC Biotech)

Discussion summary:

- Does the thematic area address a food security issue area well?
  - Yes, this is important and the list is almost too long to enumerate!
- How do you envision the Global Food Security Institute addressing research in this thematic area? What are the opportunities for collaboration in this thematic area? What are the research objectives?
  - The GFSI should be a clearinghouse that fosters partnerships, helps to ID and develop proposals, breaks down barriers and brings transdisciplinary teams together. In short it should facilitate ideation, translation and solutions for global challenges.
- Could new teaching/curriculum/ academic programs be developed across triangle colleges?
  - Yes...this is badly needed and it will lead to increased collaboration on global needs in RTP. Two way training opportunities for students and internships are key for developing and developed country scientists.
- Do you have ideas for a sustainable funding model or opportunities for funding GFSI?
  - We need to look at other successful initiatives. Perhaps a consortium of members with subscription levels? Local universities to provide core support in terms of FTE's and office space? NC State a natural lead institution.
- What needs to be in place – besides money – to make GFSI a reality? What are the challenges that need to be overcome?
  - A charismatic and experienced leader who is willing to lead the charge!

Audience Q&A:

- There was a question about climate change and if there was anything unique about North Carolina. The state has a range of climates and a range of soils. The state of North Carolina is a transition zone between the deep South and the North and this is changing – this is a good place to tackle climate change issues; also, the triangulation of RTP, the universities and the industries lend it to being a great place to differentiate us from other locations – also need to think about how the research stations can be used and not have to have a PI oversee the research that occurs at these stations. Our research stations are stretched to the limit. Jean shared that we also have the geospatial center, other centers – a whole cluster that could work with GFSI on climate change. "This is the one area that truly differentiates North Carolina."
- Peggy Bentley (UNC) said she was at a consortium where climate change was a big topic and how global health is impacted by climate change. Craig said he is really interested in working with folks in the medical sciences – broaden outside of just agriculture – need to cross-fertilize across the disciplines. He sees a big divide but sees opportunities

within this divide.

- This group envisions the consortium as going out to bring in funds to sustain the efforts – NGOs, US AID, World Bank – wherever they can go but first need to get it up and running, get it populated with great ideas.
- Gretchen Thompson (FHI 360) said that in terms of the current political climate, there are concerns but it is a national security priority and private industry is taking it up as well. Joerg Bauer (BASF) said that they do see climate change as a reality. Another participant agreed but shared that they also see change/impacts on a quality of life.

Discussion Detail and Brainstorming Notes:

1. Does the thematic area address a food security issue area well?

- Trees in the solution of sequestration
-Manipulate methane emission on rice
-Yes
-Increased urban populations due to displacement of farmers
-Increased likelihood of drought and flooding, pest pressures, soil quality, soil microbiome
-Aquaculture impacts, runoff/bio of contaminants
-Greenhouse gases effect on agriculture
-Interesting thought: plants can be bred to have a reduced impact on climate change.
-Global climate change impacts food security at tremendous levels

2. How do you envision the Global Food Security Institute addressing research in this thematic area? What are the opportunities for collaboration in this thematic area? What are the research objectives?

-What will the GFSI look like government-wise?
-Matrix approach?
-Predict now to start breeding for dry climate
-Breakdown barriers - if they exist
-Breed: big problems require big teams, transdisciplinary
-Foster partnerships, bring people together, interdisciplinary (trans) teams
-GFSI serve as a connector/catalyzer to different disciplines
-Be a clearing house for information
-Proposals: joint development, help to identify and attract funding
-Leadership development? Webinars
-Pest management, research observations!
-Quantify impacts of climate change, societal, ROI, etc.
-Soil health, forecasting of pests and diseases
-Support of plant breeding research
-Culture adoption of new ideas
-Construction

3. Could new teaching/curriculum/academic programs be developed across triangle colleges?

-Yes!
-Two-way exchanges
-Need to determine NexGen needs, big data, engineering, security, etc.
-Foster more connectivity, area universities and beyond (Kannapolis)
-Industry internship: e.g. tri-county, how will plants be affected by animal performance?

4. Do you have ideas for a funding model or opportunities for funding GFSI?

-Seed funding!
-Venture funding?
-Supplemental funding by NGOs, government, etc.

-Consortium of members' money: NCSU, Duke, UNC-CH, NCA&T, etc.
-Stakeholder mentorships

5. What needs to be in place - besides money - to make GFSI a reality? What are the challenges that need to be overcome?
-Committed people
-We need a champion! Jean... you've got us started!!!
-Can RTI lead?
-Infrastructure for applying future climate scenarios in the field
-Infrastructure for getting the people overseas

Food waste, safety, and sanitation

Group Leader: Peter Ojiambo (NCSU); Jose Cisneros (NCSU)
Group Members: Steve Powell (Synensys)

Discussion summary:

- Rapid convening multi-disciplinary teams to solve problems
- Applying new technologies to solve old problems
- US solutions as proof of concept for solutions in other countries
- Policy a key component of these problems: enhance training in policy
- Want to add "distribution" to theme title

Audience Q&A:

One suggestion: have professors come from different institutions to teach students on, share their expertise

Craig Yencho (NCSU) – he said he has to "push back" – his experience was that things that work well here don't necessarily work well in other areas; Jose agreed with him. However, there is some science that may not have to be tweaked depending on the country – sometimes the science is the same across areas and regions. Craig still disagreed with this as there are other factors – electricity, storage, etc. Linda Hanley-Bowdoin (NCSU) shared that even if it will work in another place, trust needs to be built; other countries don't want to just be told what to do – want to partner and have engagement – this will depend on the culture (ex: Africa vs. China). Linda thinks we should go to that country and work with their science to help them figure it out. Linda gave example of Ugandan scientists working with Americans to find a solution on banana disease. We need to have the mindset of working with them to help them figure out solutions, but the real solutions are coming from them.

Discussion Detail and Brainstorming Notes:

1. Does the thematic area address a food security issue area well?

-Want to add "distribution" to theme title
-Infrastructure
-Defining the problem
-Supply/demand
-Standards: are they enforced?
-Policy? Regulation? Cost of regulation
-Distribution
-Value/supply chain
-Lot of food production
-Lack of infrastructure
-Loss: supply side production
-Waste: demand side
-Safety: policy based on a process and experience
-Standards, enforced or not enforced
-Economic
-Distribution
-Sustainability

2. How do you envision the Global Food Security Institute addressing research in this thematic area? What are the opportunities for collaboration in this thematic area? What are the research objectives?

-Multi-players
-Expanding team
-Local demo
-Food security development goals
-Causal relationships
-Does waste equal security?
-We have the expertise Addressing this problems and we can add expertise not used before. Sensors for example
-Use of technology can lower cost on time once it's adapted
-Prototyping new systems
-Cut waste at consumer level
-How do you move food from it could be wasted to where it's needed
-How to link food security with development
-Development programs for communities
-Why do we have food loss, waste

3. Could new teaching/curriculum/academic programs be developed across triangle colleges?

-Mentoring tech transfer, policy/advocacy
-Build networks
-Get external involvement, translate research
-Workshops, technology transfer
-Interdisciplinary teaching, course taught by professors from different colleges
-Certifications, trained here to pick their own technology
-Get extension involved
-Network

4. Do you have ideas for a funding model or opportunities for funding GFSI?

-PPP
-Entrepreneur
-Prototypes, case-bases
-Seed finance
-How to bring companies to be part of the solution

5. What needs to be in place - besides money - to make GFSI a reality? What are the challenges that need to be overcome?

-Focus on gaps
-Avoid duplication to conflict areas
-Share data
-Differentiate focus
-Avoid internal overlap
-Avoid redundancy with other institution
-What is unique about us, the state
-Avoid overlap, great collaboration

Evolutionary & Ecological Approaches to Reduce Infectious Disease and Improve Food Security

Group Leader: Sid Thakur (NCSU) and Charles Nunn (Duke)
Group Member: Jean Ristaino (NCSU)

Discussion summary:

- Does the thematic area address a food security issue area well? Yes, but this was originally two themes that were merged
    - Evolutionary & Ecological Approaches to Reduce Infectious Disease and Improve Food Security
- How do you envision the Global Food Security Institute addressing research in this thematic area? What are the opportunities for collaboration in this thematic area? What are the research objectives?
    - Other entities around Triangle: TriCEM, Ecology & Evolution at all 3 university, strengths in One Health and Global Health, Global Food Security Center at Duke and focus on "food" at UNC, geospatial analysis teams
    - Form SWAT teams to address particular new challenges.
    - Example topics of interest:
        - Evolutionary & ecological modeling of resistance in meta-populations.
        - Modeling movement of EIDs in Trade & Travel, and effects on evolution of virulence.
        - Identify drivers of hotspots of agricultural disease emergence
- Could new teaching/curriculum/ academic programs be developed across triangle colleges?
    - Usual suspects of RAs, GFSI certificate program, grad program, etc.
    - Experiential learning for undergraduates that dovetails with needs for preliminary data
    - NCSU-Duke-UNC course, modeled along lines of One Health Course
    - Internships with industry
- Do you have ideas for a sustainable funding model or opportunities for funding GFSI?
    - Agencies: FDA, USAID, Gates
    - Initially: buy-in from multiple universities and RTI for 5 years
    - IGERT (NRT)
    - Local industry connections (assistantships, etc.)
    - Alumni donors
- What needs to be in place – besides money – to make GFSI a reality? What are the challenges that need to be overcome?
    - Challenges: streamline process for certificates, joint committees, courses (tuition, planning), international research headaches and risks.
    - Needs: creative ways to build the community of engaged scientists.

Audience Q&A:

Linda Hanley-Bowdoin (NCSU) said there is a group that is working on modeling for emerging diseases (NOTE: Chris Gilligans group at Cambridge University). Jean Ristaino notes we are already partnering with them on grants and papers. There is a lot of historical data at African institutions – challenge is getting that data transposed into a usable form

Discussion Detail and Brainstorming Notes:

1. Does the thematic area address a food security issue area well?

Two themes were merged into one:

- Evolutionary medicine and infectious disease
- Evolution of antibiotic and pesticide resistance

- Evolutionary & ecological approaches to food security
-Ecology & evolution of resistant infectious pathogens & impacts on food security
-Ecology & evolution of infectious diseases: pesticide resistance, antibiotic resistance, beneficiates, hosts/pathogens, climate change
-FDA genome tracker, lab grants

2. How do you envision the Global Food Security Institute addressing research in this thematic area? What are the opportunities for collaboration in this thematic area? What are the research objectives?

-Urbanization as an ecological driver: urban environment as different ecology
-Temporal and spatial dynamics impact on pathogen evolution
-Drivers of host jumps
-Local adaptation by humans, international needs
-Model evolution of resistance in meta-populations (communities of farms)
-Why do pathogens become resistant?
-Identify hotspots of disease emergence (for agricultural disease)
-Model movement of EIDS in trade & travel & effects on virulence
-How does culture impact pathogen spread?
-GFSI vs. Geospatial analytics
-SWAT teams EEID, food scarcity, new emerging resistance, alternate sustainment
-How doe management or diagnostics studies impact population biology?

3. Could new teaching/curriculum/academic programs be developed across triangle colleges?

-Internships with industries
-GFSI internship
-PhD Assistantships
-Partnership with the 3 universities
-Include study abroad research in GFSI curriculum
-Make Evol. and Epid. one course: NCBC
-Develop NSF Int. Lecture experience for students - IRES

4. Do you have ideas for a funding model or opportunities for funding GFSI?

-Hypothesis driven, develop IGERT, training grants: hot spots
-USAID
-Gates
-Companies
-Buy in from the 3 universities

5. What needs to be in place - besides money - to make GFSI a reality? What are the challenges that need to be overcome?

-Streamline the process for Graduate courses/programs across the 3 universities
-Top level university buy in

The phytobiome, soil, human, and animal microbiomes

Group Leader: Rodolphe Barangou (NCSU)
Group Members: Brooke Bissinger (AgBiome); Sharon Inch (Novozymes); Mathias Twizeyimana (AgBiome); Rick DeRose (Syngenta)

Discussion summary:

- Microbiomes, are a key enabling platform, and not a stand alone theme for GFSI (there are other more critical themes to focus on, and 9 are arguably too many; some could be easily combined)
- Developing a training program (classes / certificates / workshops) is a tremendous opportunity (to cover sampling, culturing, sequencing, data analytics, formulation, shelf life prediction models) and a core competency for NC State. This may also be an opportunity for funding.
- There are gaps in understanding the root causes of food insecurity in general, and locally in particular. Major gap in education, policies, community empowerment, infrastructure. Perhaps solving the world's food insecurity problem starts in RTP, with plan to scale the process globally.
- In this area, it will be necessary to build a collaborative network, with other academics (UNC & Duke), and industry (RTP) and explore within-industry opportunities under the GFSI umbrella (transcend competitive forces). Pre-competitive and product-focused areas may be of particular interest (fermentation, stability, analytics, manufacturing)

Audience Q&A:

- Craig Yencho (NCSU) said that three things that pop out for him – he sees a lot of overlap; training program is needed; likes the idea of looking at hunger here in North Carolina – he thinks this could be an interesting training ground. He thinks that we can't be all things to all people. He also likes the idea of the collaborative network – have universities, industries and NGOs to the same table.
- Gretchen Thompson (FHI 360) – to that point, there are opportunities we may be missing that there are things happening globally that could be scaled to locally. Peggy Bentley (UNC) said that we often do not know how to scale; problems will have to be contextualized.
- Rick DeRose (Syngenta) said that this has to be a solution that is not put upon someone – need to engage the person who will have to be the person to implement the solutions.
- Linda Hanley-Bowdoin (NCSU) said both local and international are very important. More than 40% of the future population growth is going to be in Africa – they are going to have the single most population increase in the next few years. Many of the crops grown in Africa are not grown in the developed world. We need to do both in parallel – there is no time to do this parallel between local and international.
- Fred Gould (NCSU) said there is that question of balance and where funding is coming from – need to think about that and need to think about our responsibilities locally.

Discussion Detail and Brainstorming Notes:

1. Does the thematic area address a food security issue area well?
- Microbiomes are an enabling platform, but they do not stand alone as a research theme for GFSI
-9 themes are too many for GFSI to tackle

2. How do you envision the Global Food Security Institute addressing research in this thematic area? What are the opportunities for collaboration in this thematic area? What are the research objectives?
-Bundle microbiome research with other relevant disciplines
-Exploit cluster hire framework
-Many opportunities (mandatory) to collaborate with local industry, academics, Kannapolis
-NCSU is not viewed as a leader in microbiome research (with a few exceptions)
-Research objectives: disease management, diagnostics, preventatives, curatives, performance, and health

3. Could new teaching/curriculum/academic programs be developed across triangle colleges?
-A dedicated certificate or set of classes in microbiome research is a great opportunity: animal health, plant health, human health, sampling, data analytics, shelf life modeling, formulation & application, soil health, post harvest, integrated pest management, genomics, discovery, bioassay development, QA/QC, microbiology and culturing, in silico, bioinformatics, statistics

4. Do you have ideas for a funding model or opportunities for funding GFSI?
-This is the major challenge
-Need incentive for industry to get involved. Needs entrepreneurial spirit
-More product driven & manufacturing driven than basic research-focus

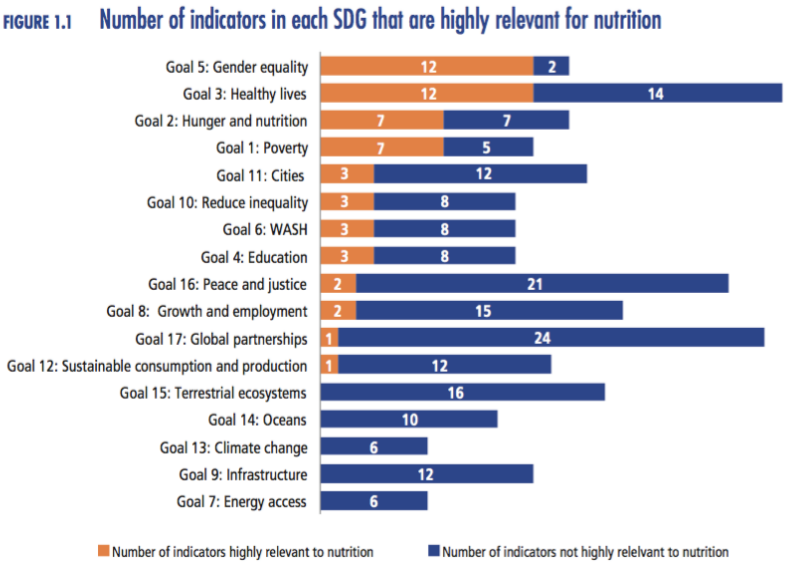
5. What needs to be in place - besides money - to make GFSI a reality? What are the challenges that need to be overcome?
-Root cause analysis of local food security. Understanding the problem (local food insecurity as an example)
-Education, policies
-Community initiatives
-Infrastructure: understanding the entire foundation

Agriculture, nutrition, and global health

Group Leader: Heather Wasser (UNC)
Group Members: Amanda Thompson (UNC); Scott Johnson (NC Biotech); Peggy Bentley (UNC); Andy Stringer (NCSU); Maggie Zhang (UNC); David Dixon (NCSU)

Discussion summary:

- Develop an overarching framework aligned with Sustainable Development Goals and leverages capacity of "The Triangle"
    - Should there be strategic/priority regions or countries that build on existing expertise and infrastructure???
- Curriculum: graduate-level "farm to fork"/"cell to society"/planetary health cross-campus course; inventory of existing course offerings across institutions
- Sustainability: bottom-up team science research grants and contracts, leveraging "The Triangle" – USAID, NIH, DOD, NSF, BMBG, Wellcome Trust, State Government, Industry (diversify sources)
    - Question confusing (clarify) → for GSFI or for increased collaboration across consortium???
    - Clear goals and metrics of success – 3 year, 5 year, 10 year
- Leadership (full-time executive director and staff), develop strategic/business plan, advisory board, political commitment → (show impact for NC; does political will exist?)



Audience Q&A:

- Frank Louws (NCSU): NC State has Extension for a local impact and UNC and Duke have public health people; we have the power not to compete but rather how to be more synergistic. There is a model; we take research-based information and take it to the farmer. There is a disconnect

between our health services and our agricultural services – need to make this connection. Craig Yencho (NCSU) said that many of the Extension services in developing companies are provided by the NGOs.

- Sarah thought Cooperative Extension should be in the GFSI. UNC also has an institute that works with every single county – public health.

Discussion Detail and Brainstorming Notes:

1. Does the thematic area address a food security issue area well?

- Alignment with SDGs & capacity of triangle & institute mission

2. How do you envision the Global Food Security Institute addressing research in this thematic area? What are the opportunities for collaboration in this thematic area? What are the research objectives?

-Use SDGs as goals/research themes: good health, hunger, poverty, gender equity
-Integrate food sec within SDGs
-Goal targets to generate questions: ending malnutrition, doubling production, enabling sustainability
-Focus on regions/country-areas that build on strategic partners (existing expertise and infrastructure)

3. Could new teaching/curriculum/academic programs be developed across triangle colleges?

-Yes, have existing examples: one health course, DVM/MPH program, existing FS courses, Farm to Fork
-Could collaborate/develop MAs/Certificate program
-Planetary health
-Lab/cell: society for food sec. (molecular to pop health)
-Create an inventory of existing examples

4. Do you have ideas for a funding model or opportunities for funding GFSI?

-Bottom up from researchers
-USAID, Gates, NIH, NSF, NOAA, DOD, Wellcome Trust
-Public-private partnerships
-Donors
-Diversity of sources
-Advocacy prioritize Ag R&D

5. What needs to be in place - besides money - to make GFSI a reality? What are the challenges that need to be overcome?

-IP, industry interactions
-Showing impact for NC
-Leadership commitment (institutional, government, and industry): does it exist yet? How to achieve it?
-Metrics for success (3 years, 5, 10): possible sunset?
-Time
-Expertise in international law, finance, tax
-Value-added product development/revenue generation

Policy influencing technology adoption in areas such as transgenics, gender, food, nutrition, and health

Group Leader: Fred Gould (NCSU); Sarah Zoubek (Duke)
Group Members: Tom Birkland (NCSU); Chantell Lapan (NCSU); Paul Wiesland (RTI)

Discussion summary:

- The area is appropriate: Policy influences all aspects of food studies; possibly include advocacy for increased funding in ag R & D (to develop the technology to begin with!) Who influences what in terms of policy?
- Research and collaboration:
  - Risk and culture
  - Public understanding of science
  - Technology adoption
- teaching/curriculum/ academic programs
  - Yes, but most are within institutions; cross-institutional programs are challenging
  - IGERT-like programs
  - Interdisciplinary: Science, behavior, policy
- Funding requires highly entrepreneurial faculty, market based strategic planning or a business plan, advocacy for increased funding, true interdisciplinarity, strong research leadership

Challenges: Overcoming disciplinary, organizational and institutional silos. Need a triangle-wide institute for matchmaking, proposal development, pilot studies. Translate research to application.

Audience Q&A:
Need to remind people that fundamental science is important.

Discussion Detail and Brainstorming Notes:

1. Does the thematic area address a food security issue area well?
-Change "impacting" in the original title to "influencing"
- The real issue is can policies mitigate risk to drive adoption
-Question is good, but should not be limited to transgenics
-Advocacy for funding
-Foreign aid policy influences food security
-Drive how calls for proposals are written - interdisciplinary
-Open data vs. proprietary data
-Yes: policy regulation addresses food & agriculture
-Variation in risk regulation, risk & culture
-Tax and econ policies that affect agriculture
-Food, conflict, and security

2. How do you envision the Global Food Security Institute addressing research in this thematic area? What are the opportunities for collaboration in this thematic area? What are the research objectives?
-Adoption of food
-Human effort vs. mechanism
-Cultural identity in work roles
-Participatory research

-Complex human & nature systems research
-Public understanding of science/science communication
-Opportunity: food & gender
-Understand food culture & food ways
-Behavior change and tech adoption

3. Could new teaching/curriculum/academic programs be developed across triangle colleges?
-Duke - behavior change
-Programs like IGERT
-RTI & center for communications science

4. Do you have ideas for a funding model or opportunities for funding GFSI?
-A strategic plan for funding: "market" based
-Need competitive market analysis. Who's providing funding for what? How do GFSI's costs compare to market?
-Promote responsive and entrepreneurial faculty researchers

5. What needs to be in place - besides money - to make GFSI a reality? What are the challenges that need to be overcome?
-Effective communication across discipline
-Siloed institutions are a challenge
-Pilot studies for technology adoption
-Need a triangle-wide institute
-Trans institute fundamental science to application

Data driven analytics, metadata, and productive modeling to improve food security

Group Leader: Raju Vatsavai (NCSU)
Group Members: Jay Swaminathan (UNC); Jaime Adams (USDA); Laura Tateosian (NCSU); Gretchen Thompson (FHI 360)

Discussion summary:

Q1. Yes, analytics is a common thread
- Better resource allocation, target right people at right time
- Big data analytics to generate new hypothesis
- However, we need to increase data sharing

Q2. GFSI addressing data driven analytics
- Bridge gap between scientists-farmers-government
- Enhance resilience of food systems (demand-supply modeling; production vs. distribution debate)

Q3. Could new academic programs be developed? Yes!
- Develop curriculum for food security data scientists (data sci + domain sci)
- Duke – policy/medical; UNC – medical/public health/biology/water, NCSU – Analytics/Agriculture
- Public, Private participation (RTI, …) – scholarships, funded student projects, internships

Q4. Sustainable funding model for funding GFSI?
- Traditional: Government, Industry, and Foundation
- Services model (bring your data – GFSI provides knowledge); Extension (existing partnerships)

Q5. What needs to be in place – besides money?
- Concrete plans (short, medium, and long-term), and willingness to adopt
- Use data to motivate goals
- Avoid expert area stove-piping

Audience Q&A:

- This problem is truly multi-disciplinary – local and global
- Fred Gould (NCSU): open data is different from the analytics – hard thing to make open. Analytics for food security – could be impacted by who has control of these analytics. Jaime Adams (USDA) thinks it would be good for the GFSI to have its own open data policy. Gretchen Thompson (FHI 360): industries and their profit motives – really have to build strong collaborations built on social capital, trust and reciprocity – need to figure out motivations and what people can get out of collaborations. Rick DeRose (Syngenta): by definition, open data also means that you have to be open as to how you use it.

Discussion Detail and Brainstorming Notes:

1. Does the thematic area address a food security issue area well?

-Analytics is a common thread
-Predictive modeling to ID right people at the right time
-Integral: necessary for evidence-based discussions
-How can data inform and connect decision-making across space? Units?
-Using data to develop hypotheses
-Reactive to proactive, explain vs. predict
- Yes: resources allocation
-Informs resources allocation/investment in solutions
-Informs policy/decision making

-Enabling global and local solution
-Informs resource allocation: targeting the right people at the right time (e.g., Northern Niger—a known fragile state, predictive modeling)
-Use big data analysis to generate hypotheses to determine the most important issues to model. Models may be for farmers/government/public etc.
-However – we need to increase data sharing

2. How do you envision the Global Food Security Institute addressing research in this thematic area? What are the opportunities for collaboration in this thematic area? What are the research objectives?
-Supply model: local capacity
-Who is the decision maker?
-Demand model: human based nutrition, geo-political movement
-Production vs. distribution debate, enhance the resilience of food security vs. demand
-How do we narrow the modeling?
-Bridge the gap between scientists-farmers-government
-Enhance resilience of food systems (demand-supply modelling; production vs. distribution debate)

3. Could new teaching/curriculum/academic programs be developed across triangle colleges?
-Data translation and visualization for experts to the layman
-Transformational analytics: data visualization and writers
-Global farming ecosystem certificate
-Food security data scientist
-Data science and demand science (agriculture)
-Gap: data literacy
-Ag-health concentration
-Develop curriculum for food security data scientists (data science + domain science)
-Global farming ecosystem certificate.
-Communication (Data visualization and scientific writing)

4. Do you have ideas for a funding model or opportunities for funding GFSI?
-Government and firms foundation
-Philanthropist / foundations
-Govt., industry, foundation, service model where farmers can register for expert services

5. What needs to be in place - besides money - to make GFSI a reality? What are the challenges that need to be overcome?

-Human behavior evolution
-Quantitative goal with a sunset date on Institute
-Used data to drive definition of end-goal and ROI
-What is our end goal? What datasets do we have?
-Concrete, short, medium, long-term goals and their impact
-Units of analysis, National Global Programmers
-Avoid expert area stove piping
-Inductive vs. deductive resolve
-Concrete plans (Short, medium, and long-term)
-Willingness to strategically focus on priority issues demonstrated to have highest impact & discontinue others
-Need to integrate contextual knowledge (conflicts? politics? climate?)
-Clearly defined quantitative goal(s). E.g., (decrease people going to be hungry by 2% after 5 yrs). Use data to motivate these, though the model needs to be informed by human behavior. A sunset date on institute
-Avoid expert area stove-piping

Closing Comments

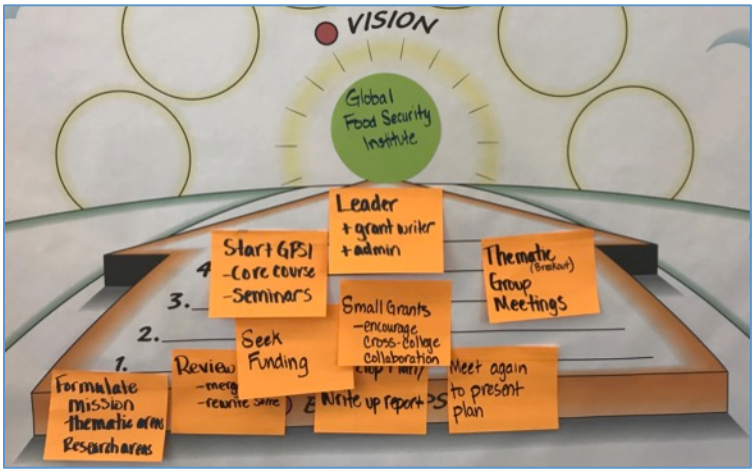
Chancellor Randy Woodson (NC State University) thanked everyone for their commitment to be here. One of the many things that drew him to NC State is the region and the possibility of outstanding collaborations with Duke, UNC and RTI. He hopes that whatever comes out of this, we break out of the silos. We have a tremendous opportunity here. He is chairing a commission for the Association of Public Land-Grant Universities that is about to release a report. There are over 110 million people in a small region in east Africa that are very food insecure. The goal of the report was to focus on the transition of the administration – but the commission is not sure who to deliver the report to given the vacant offices in Washington, DC. Hope to provide information for many universities for how to overcome disciplinary barriers that get in the way of true collaborations that can address global issues such as food security. Report will be out in early to mid-May. Bottom line: the whole reason for the APLU Commission is to promote what is happening here today – how to collaborate to address both local and international issues. He is proud of the leadership Jean Ristaino has provided. GFSI is on his radar screen. He said it is about access, food loss, nutrition; some of the tension is between those who are focused on the global issue of providing food and calories and those concerned about local issues in our own backyard. All of it is true and all of it is relevant. He thinks what we have talked about will be seen and reflected in the APLU report. He is a firm believer in harnessing our intellectual capacity and technology to address these issues. He believes we have the ability to address all areas of food security with NCSU, UNC, Duke and RTI.

Dr. Kelly Brownell, Dean of the Sanford School of Public Policy (Duke University) shared he was very impressed with the discussions. One thing that came up time and time again was the amount of intellectual capital we have in this area. He also sees a lot of collaboration. He is inspired by the discussion today about the GFSI and thinks it would be terrific thing for NC State and the Triangle. Duke is developing a World Food Policy Institute – it is a daunting enterprise. This will only work if they can collaborate and generate novel solutions. They are going to create a Food Policy Innovation lab to bring together people who normally would not speak to one another. Global front: starting up an endeavor – hopefully with Google – to create a network with those working on food policy. The hope is to connect people all around the world to connect, share resources and information. This would be a digital network where you could search the world, post questions, share ideas, withdraw and use the ideas. The other project is local: want to address particular issues. Would like to have collaborative teams across the area to work on this issue, such as agricultural students from NC State, public health students from UNC, engineering students from NC State. Hope to create a big data enterprise within the context of the Center itself. In the context of their Center, they are using evidence-based scientific inquiry to create policy-based decisions – notion of strategic science. Look forward to collaborating, co-teaching.

NEXT STEPS

Jean Ristaino (NC State University) concluded the meeting by discussing next steps.

- Reviewing the themes and merging some of them, formulating the mission and research areas.
- Write a document that will be sent out to each group leader who will review it with their team for feedback
- Jean will finalize a document and then present it to the chancellors of the three universities
- Will be seeking funding
- Start a small grants program, encourage cross-college cross-university collaboration and team projects
- Start several GFSI core courses in each thematic area and fund graduate assistantships
- Hold thematic area group break-out meetings
- Leadership is needed; grant writing leadership is needed; administrative assistance is needed



And in conclusion, participants were asked how each person in the room would contribute to GFSI:

- Pursue project-based funding opportunities
- Share with colleagues
- Help connect researchers to opportunities
- Research
- Teach
- Write Proposals/ develop collaborative proposals
- International partners
- Participate in research groups,
- Help write grants
- Work on the conceptual framework
- Internships

GFSI Planning Meeting Attendees

Name (Last, First)	Institution/Afiliation	Title
Adams, Jaime	USDA	Senior Science Advisor
Barrangou, Rodolphe	NC State	Associate Professor
Bauer, Joerg	BASF	
Bentley, Peggy	UNC	Distinguished Professor
Birkland, Tom	NC State	
Bissinger, Brooke	AgBiome	Director of Entomology
Boston, Becky	NC State	Assistant Director CALS
Brandenburg, Rick	NC State	Professor
Cisneros, Jose	NC State	Director, CALS Global Initiatives
De Los Reyes, Francis	NC State	Professor
DeRose, Rick	Syngenta	Global Expert, Technology Acquisition
Dixon, David	NC State	International Programs Coordinator
Doherty, Colleen	NC State	Assistant Professor
Gibson, Jim	RTI	COO-RTI
Gould, Fred	NC State	WNR Professor
Hanley-Bowdoin, Linda	NC State	WNR Professor
Inch, Sharon	Novozymes	Research Scientist
Ingham, Dave	AgBiome	Pre-Product Manager
Johnson, Scott	NCBio Center	VP, Agricultural Biotechnology
Kuzma, Jennifer	NC State	Co-Director GES Center
LaPan, Chantell	NC State	Office of International Affairs, NCSU
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