NORMAN E. BORLAUG INTERNATIONAL AGRICULTURAL SCIENCE AND TECHNOLOGY FELLOWSHIP PROGRAM (BORLAUG FELLOWSHIP PROGRAM)

FISCAL YEAR 2017 NOTICE OF FUNDING OPPORTUNITY for ASIA AND LATIN AMERICA*:* WTO and SPS

Application Deadline: JUNE 16, 2017 @ 11:59 PM EDT

Email: BorlaugFellowships@fas.usda.gov; sarah.librea@fas.usdsa.gov

Website: http://www.fas.usda.gov/programs/borlaug-fellowship-program

Catalog of Federal Domestic Assistance Number (CFDA) – 10.777

USDA Funding Opportunity Number:

1. USDA-FAS-10777-0700-10.-17-0017, India, WTO-SPS
2. USDA-FAS-10777-0700-10.-17-0020, Thailand 1, WTO-SPS
3. USDA-FAS-10777-0700-10.-17-0021, Thailand 2, WTO-SPS
4. USDA-FAS-10777-0700-10.-17-0022, Vietnam, WTO-SPS
5. USDA-FAS-10777-0700-10.-17-0018, Mongolia 1, WTO-SPS
6. USDA-FAS-10777-0700-10.-17-0019, Mongolia 2, WTO-SPS
7. USDA-FAS-10777-0700-10.-17-0029, Colombia, WTO-SPS

This announcement is also being distributed through USDA's EzFedGrants system under the same funding numbers.

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U.S. DEPARTMENT OF AGRICULTURE
FOREIGN AGRICULTURAL SERVICE
OFFICE OF CAPACITY BUILDING AND DEVELOPMENT
NORMAN E. BORLAUG INTERNATIONAL AGRICULTURAL SCIENCE AND TECHNOLOGY FELLOWSHIP PROGRAM

ISSUED BY: USDA Foreign Agricultural Service, Office of Capacity Building and Development

CATALOG OF FEDERAL DOMESTIC ASSISTANCE (CDFA) NUMBER: 10.777.

CDFA TITLE: Norman E. Borlaug International Agricultural Science and Technology Fellowship

NOTICE OF FUNDING OPPORTUNITY TITLE: Borlaug Fellowship Program 2017, Asia and Latin America, WTO and SPS

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AUTHORIZING AND APPROPRIATION AUTHORITIES: The legislative authority for the Borlaug Fellowship Program is provided in 7 USC 3319j, Pub. L. 95-113, title XIV, §1473g, as added Pub. L. 110-234, title VII, §7139, May 22, 2008, 122 Stat. 1231, and Pub. L. 110-246, §4(a), Title VII, §7139, June 18, 2008, 122 Stat. 1664, 1992. Authority also comes from the National Agricultural Research, Extension, and Teaching Policy Act of 1977 enacted as Title XIV of the Food and Agriculture Act of 1977, 7 U.S.C. 3319(a), 7 U.S.C. 3318(b).

PROGRAM TYPE: New

AWARD TYPE: Cost Reimbursable Agreement for U.S. Universities

PROGRAM OVERVIEW, OBJECTIVES, AND PRIORITIES

The United States Department of Agriculture's (USDA) Foreign Agricultural Service (FAS) announces the availability of funding through cost reimbursable agreements for the Norman E. Borlaug International Agricultural Science and Technology Fellowship Program (Borlaug Fellowship Program). These Fellows have been competitively selected based on research priorities, academic and professional

accomplishments, commitment to Borlaug Fellowship Program goals, and leadership qualities. The Fellow's proposal and research plan appears at the end of this notice. USDA recommends that the program begin in the fall of 2017; however, priority should be given to a time that is appropriate for the Fellow's proposed research topic. The program's duration should be 12 weeks unless otherwise indicated.

Each Fellow has a specific research topic. Here is a summary of the applicants and a brief description of their research topics:

1. Fellow #1, (female); India; Study of detection techniques for plant viruses
2. Fellow #2, (female); Thailand 1; How to analyze and conduct risk assessments with a focus of on the impact of different levels of cadmium in food and soil
3. Fellow #3, (female); Thailand 2; How to analyze and conduct risk assessments with a focus on the Monte Carlo simulation
4. Fellow #4, (female); Mongolia 1; Capacity building in SPS and food safety standards
5. Fellow#5, (female); Mongolia 2; Improving the quality of ruminants, especially lamb, through proper nutrition and health
6. Fellow #6, (female); Vietnam; Increasing cow production through diets
7. Fellow #7, (male); Colombia; Development of a soil and plant based study to reduce cadmium accumulation

Section VII provides each Fellow's proposal with background information and research plan.

This notice identifies the Borlaug Fellowship Program deadline, legislative authority, eligibility and proposal requirements, funding restrictions, cost share requirements, allowable and unallowable costs, reporting requirements, program purpose and priorities, focus areas and recommended topics, application and submission information, application review, selection and notification process, agency program contact information, and mailing address.

FEDERAL AWARD INFORMATION

AVAILABLE FUNDING: Up to $40,000 for each award

PROJECTED NUMBER OF AWARDS: up to 7

PERIOD OF PERFORMANCE: 2 years
An extension to the period of performance may be permitted in certain circumstances. The awardee must request an extension at least 90 days prior to the end of the period of performance, including a justification to explain why the statement of work cannot be completed during the original period of performance.

PROJECTED PERIOD OF PERFORMANCE START DATES: between July 1, 2017 and January 1, 2018

PROJECTED PERIOD OF PERFORMANCE END DATES: between June 30, 2019 and December 31, 2019

FUNDING INSTRUMENT: Cost Reimbursable Agreement

DEADLINE: Applications must be received by June 16, 2017 by 11:59 p.m. Eastern Daylight Time. Applications received after this deadline will not be considered for funding.

ELIGIBILITY CRITERIA

ELIGIBLE APPLICANTS: Public and state controlled institutions of higher education.

FAS will accept proposals from U.S. state cooperative institutions or other colleges and universities and minority serving institutions (MSIs). Proposals from smaller academic institutions, MSIs (in particular American Indian, Alaska Native, Pacific Islander, Hispanic, Asian American, and African American institutions) are especially encouraged to apply.

A proposal from a consortium of organizations must be submitted as a single proposal with one U.S. institution serving as the lead and all other organizations as team members, when applicable. An individual mentor must be identified for each Borlaug Fellow. A single mentor may not host two fellows simultaneously. The Principal Investigator (PI) and mentor must hold a position at an eligible U.S. institution.

FAS reviews proposed project costs to make certain those costs are reasonable and allowable per applicable federal regulations. This program is subject to the provisions of 2 CFR Part 200, grant, cooperative, joint venture, and cost-reimbursable agreement recipients/cooperators (including, universities, non-profits, States, Cities/Counties, Tribes, for-profits, and foreign organizations) are subject to Title 2 of the Code of Federal Regulations and other legal requirements, including, but not limited to:

1. 2 CFR Part 25, Universal Identifier and Central Contractor Registration
2. 2 CFR Part 170, Reporting Subaward and Executive Compensation Information
3. 2 CFR Part 175, Award Term for Trafficking in Persons
4. 2 CFR Part 180 and Part 417, OMB Guidelines to Agencies on Government wide Debarment and Suspension (Nonprocurement)
5. 2 CFR Part 200, Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards, as adopted by USDA through 2 CFR part 400.

University indirect costs for cost reimbursable agreements are limited to 10% of direct costs in accordance with 7 USC 3319a. A cost share or cost match is not required. Management and Administration (M&A) Costs are not allowable. In addition to the above mentioned, all recipients are subject to the Federal Award's general terms and conditions, project narrative, and budget narrative, as well as the applicable authorization used to issue the Federal Award.

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Section I: FUNDING OPPORTUNITY DESCRIPTION

A. PROGRAM DESCRIPTION

The Norman E. Borlaug International Agricultural Science and Technology Fellowship Program promotes food security and economic growth by increasing scientific knowledge and collaborative research to improve agricultural productivity. This program targets promising, early- to mid-career, English-speaking scientists and policymakers from developing or middle-income countries. Fellows spend 8-12 weeks in the United States and work one-on-one with U.S. scientists in their field. Mentors coordinate the Fellows' training, and they visit the Fellows' countries for 5-10 days within 6-12 months after completion of the training in the U.S. to continue collaborative efforts.

During the program, the Fellows learn new research techniques, gain exposure to the latest scientific developments in various fields of agriculture, access fully-equipped laboratories and libraries, and learn about unique public-private partnerships that help fund agricultural research and science. Equally important, this program provides international scientists and policymakers with opportunities to establish long-term contacts with U.S. scientists and to apply newly gained knowledge from U.S. institutions to their country's research and development programs.

B. PROGRAM RESPONSIBILITIES OF HOST INSTITUTIONS

Assignment of a Principal Investigator (Training Coordinator)
The host institution will designate a contact person as the Principal Investigator (PI) responsible for coordinating all administrative and programmatic arrangements.

Assignment of a Mentor
A key component of the program is matching the Fellow with a mentor. The host institution will select an appropriate mentor for one-on-one work with the Fellow for the duration of the program.

Mentor Roles

- The mentor will establish a professional relationship, providing guidance and training in the Fellow's research and studies.
- The mentor will work with the Fellow before arrival to discuss appropriate work plan, site visits, and other arrangements. A work plan should be agreed upon and finalized no later than 2 weeks after the program start date.
- The mentor will provide draft of work plan through the PI to USDA/FAS for consultation and approval approximately 2 weeks before the commencement of the program.
- The mentor agrees to commit a significant amount of time each week for one-on-one work with the Fellow during the program.
- The mentor will continue communicating with the Fellow beyond the end of the program in the U.S. through the mentor visit.
- Mentor will submit quarterly progress reports that indicate all program activities conducted (form SF-PPR).
- The mentor may assign other faculty members to assist with Fellow's training and research activities.
- Mentor may not be assigned to multiple Fellows during the same time frame.

Mentor Follow-up Visit

- The mentor visit is an essential and unique part of the Borlaug Fellowship Program. The reciprocal visit is required, not optional.
- The mentor will work with the Fellow to plan a follow-up visit to the Fellow's home country. The trip should occur within 6 months to 1 year after the program ends.
- The PI should provide USDA/FAS with an agenda for mentor's travel, including goals and objectives.
- The PI **must** consult with USDA/FAS **prior** to finalizing plans or purchasing plane tickets for the reciprocal visit. Mentor's travel information must be provided for emergency contact purposes and country clearance (if required by the FAS Overseas Office).
- The mentor will provide a **trip report** highlighting the trip's activities and results through the PI to USDA/FAS within 30 days after the visit.
- The mentor should plan to meet with the USDA/FAS Attaché or staff from the U.S. Embassy while they are traveling, if feasible. USDA/FAS can assist with coordination prior to the trip.

Visa

- USDA/FAS will provide a DS-2019 for the Fellow to request and obtain a J-1 Visa. USDA/FAS will provide instructions to the Fellow regarding the application process, the amount of lead-time needed, and any paperwork required. The visa start and end date will be coordinated with the host institution who will be responsible for purchasing round trip plane tickets for the fellow to come to the U.S. for his or her program.

Travel and Transportation

- The host institution must comply with the Federal Travel Regulations (41 CFR 300 *et seq.)*.
- The host institution will provide round trip, economy class, international airfare from the Fellow's home to the university.
- The host institution is responsible for arranging and purchasing all domestic travel related to the Fellow's training program.
- The host institution will provide housing for the Fellow for the duration of the training program, taking into account gender and cultural norms.
- The host institution will pay lodging fees directly. The host institution will not require the Fellow to pay for his or her lodging expenses, whether through reimbursement or advance payment.
- Lodging will include a private bedroom, private or shared bathroom, access to a laundry room, and access to a kitchen with pots, pans, and utensils.
- Basic necessities, such as sheets, towels, and cleaning supplies (if not already provided), will be provided for Fellow's use. The Fellow should not have to pay for these items.
- Lodging will be within walking distance to the campus/training location or easily accessible by public transportation.
- If public transportation is required to access campus/training location, the host institution will provide the Fellow with a bus pass or proper allowance for transportation expenses.
- When planning lodging options, the host institution should check with the Fellow and account for any special dietary restrictions or preferences.

Meals and Incidentals (M&IE)

- The host institution will provide each Fellow with meal and living allowances for the duration of stay.
- Daily M&IE allowance shall be calculated based on current GSA per diem rates.
- The host institution can determine the frequency of per diem allotments, but the Fellow **must** receive per diem within the first week of the Fellowship. The PI must inform the Fellow and USDA/FAS immediately if this cannot be accommodated.

Emergency Health Insurance

- The host institution will purchase emergency health insurance for the Fellow for the duration of stay, as required for all J1 Visa holders (22 CFR 62.14).
- The Fellow will not be required to purchase his or her health insurance and then be reimbursed.
- The host institution will educate the Fellow as to what is covered under health insurance policy, especially highlighting that **pre-existing medical conditions are not covered.**
- The host institution will alert USDA/FAS staff if any health/medical conditions arise during the Fellowship.

Communication

- The host institution will initiate contact with the Fellow as soon as possible.
- The host institution will develop the training program in consultation with USDA/FAS and the Fellow.
- The host institution will keep USDA/FAS informed regarding any logistical or program planning.
- The host institution will notify USDA/FAS immediately upon Fellow's physical arrival and departure from the U.S.
- The host institution will provide USDA/FAS with the Fellow's temporary U.S. address and phone number, and emergency contact numbers for the PI, mentor, or other appropriate institution personnel. This information is **required** so that Fellow can be reached in the event of an emergency.

Fellowship Program

- The host institution will provide educational materials and supplies to each Fellow necessary for their full participation in the fellowship.
- The host institution will pay for all fees related to the Fellow's training program, such as (but not limited to) technology fees, administrative fees, laboratory fees, etc.
- The host institution will arrange relevant field visits to a local farm, processing plant, private industry, or other related industry as applicable to the Fellow's training program.
- The host institution will ensure the Fellow submits an interim and final report (2-3 pages each) to USDA/FAS before the Fellow leaves the United States. USDA/FAS will provide a report template.

Orientation

- The PI/Training Coordinator will communicate directly with the Fellow at least 4-8 weeks **before** his or her arrival in the U.S. to ensure that all pertinent information is provided, including:
  - Name and contact information of PI/Training Coordinator
  - Name and contact information of mentor

  - Institution information, weather information, and clothing needs
  - Housing and M&IE allowance
  - Program plan and anticipated site visits
  - Professional development expectations
  - Reminder to bring any necessary prescription medications
  - Explain what is and is not covered under emergency health insurance policy (e.g. no pre-existing conditions, no dental, etc.)
- Institution will provide an orientation upon the Fellow's arrival to acquaint them with campus and community resources:
  - Explain and demonstrate local bus/transportation options
  - Explain cultural and legal expectations
  - USDA will provide a welcome and orientation packet for mentors

Progress Reports

- The Principal Investigator or Mentor will submit **semi-annual** progress reports. The Principal Investigator or Mentor will use Performance Progress Report (SF-PPR) to submit quarterly progress reports.
- The Principal Investigator or Mentor will submit a final report to USDA/FAS within 30 days after the Mentor visit. USDA/FAS will provide additional guidance and a template for the final report.
- Reports should include the following:
  - Summary of activities, accomplishments, and any problems encountered or overcome
  - Photographs, when possible
  - Completed program evaluations and action plan
- An invoice cannot be paid if a progress report is past due, and will not be paid until the required report has been received.

Financial Reporting

- Financial reports will follow the Uniform Administrative Requirements for Grants and Agreements, 2 CFR Part 200.
- Invoices will use the Request for Advance or Reimbursement (SF-270).
- Invoices will be submitted electronically to SF-270InvoicesMailbox@fas.usda.gov and copied to the USDA/FAS program manager and USD/FAS program assistant.
- A summary of expenses that aligns expense totals to the agreement's budget line items must be included.
- A detailed breakdown of expenses must be included with SF-270. Payment will not be processed without supporting documentation.
- A final invoice must be submitted within 90 days of the end of the period of performance for the agreement.
- Costs must be reported in accordance with the regulations that govern the agreement, and must follow the applicable Federal cost principles 2 CFR 200. The institution cannot be reimbursed for costs that are contrary to the specific terms of the agreement or are outside its scope.
- A Federal Financial Report (SF-425) must be submitted quarterly and within 90 days of the end of the period of performance for the agreement.

- An invoice cannot be paid if a financial report is past due, and it will not be paid until the required report has been received.

SECTION II: APPLICATION AND SUBMISSION INFORMATION

A. ADDRESS TO REQUEST APPLICATION PACKAGE

This announcement contains all instructions and links to all forms required to complete the application. All applications must be submitted as PDF or Word documents. No mailed or facsimile submissions will be accepted. Email address is BorlaugProposals@fas.usda.gov.

B. CONTENT AND FORM OF APPLICATION SUBMISSION

Institutions may submit proposals to host more than one Borlaug Fellow. Institutions interested in hosting one or more Fellows should submit a proposal following the guidelines below:

- Complete SF-424 Application for Federal Assistance for a single Borlaug Fellow. USDA/FAS cannot accept applications for multiple fellows in a single application.
- Indicate the name of the institution applying to host the Fellows.
- Indicate the country, research interest, and reference number.
- Identify a Primary Investigator.
- Identify a Mentor. A Mentor may not be assigned to multiple Fellows who are in the U.S. at the same time.
- Provide a tentative research plan based on the Fellow's research proposal and action plan, including topics covered, field visits, and other activities.
- Include a narrative description of the proposed fellowship, how it will be administered, and the role of the university faculty and support staff.
- Provide a summary of relevant institutional capabilities for hosting international scientists and policymakers in the proposed field.
- Briefly describe the research expertise and international experience of the mentor in the Fellow's field of interest.
- Provide a one to two page curriculum vitae for the mentor and other collaborating researchers involved in the proposed program.
- Identify the expected skills or knowledge to be acquired by the Fellow at the end of the program
- Provide a program budget using Standard Form -424A- Budget Information Non Construction Programs, including a detailed budget worksheet (see page 12).
- Provide a budget narrative. All line items should be described in sufficient detail to enable FAS to determine that the costs are reasonable and allowable for the project in accordance with federal regulations.
- If attendance at the World Food Prize in Des Moines, Iowa during October 2017 is feasible, then the Fellowship may be extended one additional week, not to exceed 13 weeks, to ensure the Fellow receives up to 12 weeks of training.
    - If attending the World Food Prize, the budget should include time and funding for the Fellow and Mentor to attend. An adjustment to the Fellow's M&IE must be made for the time spent in Iowa.
- Complete AD-3030, Representations Regarding Felony Conviction and Tax Delinquent Status for Corporate Applicants.

- Complete AD-3031, Assurance Regarding Felony Conviction or Tax Delinquent Status for Corporate Applicants
- Complete the Host University Administrative Checklist on university administrative policies
- **If not submitting applications through the ezFedGrants portal at https://grants.fms.usda.gov, Submit all application materials as attachments to a single email.**
  - The primary document submitted in response to this REI with all information requested should be titled *Statement of Work.*
  - Include all application information that is not a specific form in a single PDF document.

Successful applicants will be required to submit all relevant national certifications and compliance documents prior to awards being issued.

C. UNIQUE ENTITY IDENTIFIER AND SYSTEM FOR AWARD MANAGEMENT (SAM)

All applicants are required to:

1. Be registered in SAM before submitting its application;
2. Provide a valid DUNS number in its application; and
3. Continue to maintain an active SAM registration with current information at all times during which it has an active Federal award or an application or plan under consideration by a Federal awarding agency.

FAS may not make a Federal award to an applicant until the applicant has complied with all applicable DUNS and SAM requirements and, if an applicant has not fully complied with the requirements by the time FAS is ready to make a Federal award, the Federal awarding agency may determine that the applicant is not qualified to receive a Federal award and use that determination as a basis for making a Federal award to another applicant.

FAS is using ezFedGrants, which is an electronic grants management system. Applicant(s) with electronic access are to submit their applications electronically through: https://grants.fmmi.usda.gov. As stated above before you can apply, you must have a DUNS number, be registered in SAM, and have access to the ezFedGrants website.

Applicants are encouraged to register early. The registration process can take approximately four weeks to be completed. Therefore, registration should be done in sufficient time to ensure it does not impact your ability to meet required submission deadlines.

DUNS number. Instructions for obtaining a DUNS number can be found at the following website: http://www.dnb.com/duns-number.html. The DUNS number must be included in the data entry field labeled "Organizational DUNS" on the Standard Forms (SF)-424 forms submitted as part of this application.

System for Award Management. In addition to having a DUNS number, applicants applying electronically through ezFedGrants must register with SAM. Step-by-step instructions for registering

with SAM can be found here: www.sam.gov. Failure to register with SAM will result in your application being rejected during the submissions process.

D. ezFedGrants System Access and Electronic Signature

Level 2 eAuthentication. The next step in the registration process is to obtain a Level 2 eAuthentication account that will allow access to the ezFedGrants system. Instructions for getting a Level 2 eAuthentication account can be obtained by emailing GrantorHelpdesk@fas.usda.gov.

Requesting a role in ezFedGrants: After obtaining eAuthentication, users will need a role in the system. Descriptions of the roles available and instructions on how to request a role can be obtained by emailing GrantorHelpdesk@fas.usda.gov.

Electronic Signature. Applications submitted through ezFedGrants constitute a submission as electronically signed applications. When you submit the application through ezFedGrants, the name of your Signatory Official on file will be inserted into the signature line of the application. If you experience difficulties accessing information or have any questions please email the Helpdesk at GrantorHelpdesk@fas.usda.gov.

FAS may not make a Federal award to an applicant until the applicant has complied with all applicable DUNS and SAM requirements and, if an applicant has not fully complied with the requirements by the time the FAS is ready to make a Federal award, FAS may determine that the applicant is not qualified to receive a Federal award and use that determination as a basis for making a Federal award to another applicant.

E. SUBMISSION DEADLINES AND TIMES

Submit all application materials in a single email. Include all application information that is not a specific form in a single PDF document. The following forms are required: SF-424, SF-424A, AD-3030, and AD-3031. The primary document submitted in response to this NOFO with all information requested should be titled *Statement of Work.*

Funding opportunities will be distributed through ezFedGrants and advertised via the USDA/NIFA listserv. All proposals must be submitted through the ezFedGrants portal at https://grants.fms.usda.gov or to the email address below with all required forms. Proposals not submitted by the stated deadline will not be accepted.

Borlaug Fellowship Program Proposal Email: BorlaugProposals@fas.usda.gov and Sarah.Librea@fas.udsa.gov

F. FUNDING RESTRICTIONS

Allowable Costs:

To help in this review and to expedite the award process, budgets must include a narrative detailing all line items. The categories listed below are examples of some of the more common items found in project budgets. All items should be described in sufficient detail that would enable FAS to determine that the costs are reasonable and allowable for the project per federal regulations.

1. **Salaries and Fringe Benefits:**
Requested funds may be allocated toward salaries, fringe benefits, or the combination thereof. No more than 20% of the requested funds may be allocated toward salaries, consultant fees, fringe benefits, or the combination thereof. Only individuals that hold positions at eligible U.S. institutions should be listed in this category.

2. Travel:
For domestic travel, provide the purpose of the travel and information used in calculating the estimated cost, such as the destination, number of travelers, and estimated cost per trip. There are several restrictions associated with traveling on federal funds. In most cases, airfare must be purchased in economy class from a U.S. carrier. Travelers must also adhere to federally mandated domestic per diem guidelines. Additional information may be found in the circulars listed in the "Legislative Authority" section of this announcement.

3. Supplies:
All personal property excluding equipment, intangible property, and debt instruments as defined in this section.

4. Other Direct Costs:
Other Direct Costs are those anticipated charges not included in other budget categories, including materials and supplies, lab fees, publication costs, reasonable consultant fees, computer services, sub-awards (the level of detail required for the sub-award budget is the same as the recipient organization), equipment rental, facility rental, conferences and meetings, speaker fees, honorariums.

5. Indirect Costs:
Indirect Costs may not exceed 10% of direct costs.

6. Tax Withholding:
Borlaug Fellows (as trainees, *not* students) are considered EXEMPT INDIVIDUALS under the IRS Substantial Presence Test for tax purposes. The exemption falls under one or both of the following categories: either the Foreign Government-Related Individuals standard or the Closer Connection Exception. Tax treaties might also exist between the U.S. and the Fellow's home country. The only requirement is to complete IRS Form 8843 (Sections 1 and 2). No taxes should be withheld from Borlaug Fellows since they are exempt.

Unallowable Costs:
General purpose equipment (no particular scientific, technical, or programmatic purpose) and scientific equipment exceeding $5,000 or more; entertainment; capital improvements; thank you gifts, and other expenses not directly related to the project are not allowed.

G. OTHER SUBMISSSION REQUIREMENTS
All applications must be submitted electronically as indicated above.

HOST UNIVERSITY ADMINISTRATIVE CHECKLIST

Please complete the following checklist concerning the university's policies on providing per diem funds to exchange visitors. This information is for USDA internal use only and does not determine your eligibility to serve as a host institution.

Host University Policies	YES	NO
Will the mentor listed in the proposal be present for the majority of the fellowship?		
Will the mentor be able to spend time meeting with fellow individually each week?		
Will the university be able to provide per diem within the first week of the Fellow's arrival?		
Will the university be able to provide fully furnished lodging with kitchen facilities?		
Does the university withhold federal tax on the participants' per diem and housing?* If so, you must list this expense as a separate line item on the budget.		

*Note that Borlaug Fellows (as trainees, *not* students) are considered EXEMPT INDIVIDUALS under the IRS Substantial Presence Test for tax purposes. The exemption falls under one or both of the following categories: either the Foreign Government-Related Individuals standard or the Closer Connection Exception. The only requirement is to complete IRS Form 8843 (Sections 1 and 2). No taxes should be withheld from Borlaug Fellows since they are exempt.

Budget Worksheet

Host Institution:

Estimated Dates:

NOFO#/Country/Fellow#

SF-424 Category	Line Items	Rate	Days	Subtotal
	Fellow's Logistical Expenses			
TRAVEL/Housing	1. Lodging			
TRAVEL	2. Meals and Incidentals			
OTHER	3. Federal Tax			
TRAVEL	4. Medical Insurance			
TRAVEL	6. Local Transportation			
TRAVEL	7. Airfare - International			
TRAVEL	8. Airfare - Domestic (If Applicable)			
			Subtotal	
	Fellow's Professional Development			
TRAVEL	1. Field Tours			
SUPPLIES	2. Educational Materials and IT Expenses			
SUPPLIES	3. Shipping Materials			
			Subtotal	
	Host Institution Fees			
PERSONNEL	1. Training Coordinator (Salary)			
FRINGE BENEFITS	1.b. Training Coordinator (Fringe Benefits)			
PERSONNEL	2. Mentor Fee			
FRINGE BENEFITS	2.b. Mentor (Fringe Benefits)			
SUPPLIES	3. Laboratory Expenses			
			Subtotal	
	World Food Prize Symposium (Oct. 2017; If Applicable)			
TRAVEL	1. Domestic Transportation			
TRAVEL	2. Lodging			
OTHER	3. Conference Fee			
			Subtotal	
	Mentor Follow up Activity (5-10 Days)			
TRAVEL	1. Mentor Airfare – International			
TRAVEL	2. Mentor Domestic In-Country Travel (If Applicable)			
TRAVEL	3. Lodging			
TRAVEL	4. Meals & Incidentals			
SUPPLIES	5. Supplies for Trainings/Workshops			
			Subtotal	
			Total Program Costs	
INDIRECT			**Indirect Costs/Overhead (10%)**	
			Total Request	

Section III: Application Review Information

All proposals are carefully reviewed by USDA/FAS Program Officers and other FAS staff against the criteria listed below, including others who are experts in a particular field, as appropriate.

A. REVIEW CRITERIA

- **Technical Expertise and Experience (40 points):** Mentor must have appropriate technical background to provide the desired, advanced training. If necessary, other appropriate collaborating scientists should be identified to meet any of the objectives which the mentor cannot address. Mentor's experience and knowledge of relevant agricultural conditions within the Fellow's country or a similar location will be considered as appropriate. The trainer's experience with international training and adult-education will also be considered.

- **Overall Program (35 points):** The overall program plan and design should be relevant to the Fellow's objectives background. The program plan should be thorough, and it should help achieve the desired post-program deliverables and the Fellow's research goals and objectives. Relevant agricultural practices within the region of the university will be considered as appropriate. Relevant university resources should be identified. Additional resources/organizations should be identified as appropriate. Site visits and meetings should be meaningful to the content of the program, if included.

- **Budget (25 points):** The proposed budget should be appropriate for the length of the program. The budget should include appropriate cost savings where available. Salary and fringe benefits expenses should not be excessive.

B. REVIEW AND SELECTION PROCESS

Other factors may also be taken into consideration such as regional diversity and MSI status in the review process. After review by appropriate offices, it is expected that all applicants will be notified within 2 months after the closing date for applications.

Section IV: Award Administration Information

A. AWARD NOTICES

Applicants should expect to be contacted by program staff for clarification and additional discussion on any budget related issues before final determination of successful applicants. Any notification by the program office regarding the selection of an institution is not an authorization to begin performance. No pre-award costs can be charged. The notice of award signed by the Deputy Administrator of USDA/FAS/OCBD is the authorizing document. This document will be sent by electronic mail to the university. Both parties must sign this document before the agreement is in force. Unsuccessful applicants will be notified of the status of their application by email.

B. ADMINISTRATIVE AND NATIONAL POLICY REQUIREMENTS

Certifications regarding debarment Suspension, Drug Free Workplace, Felony Conviction and Tax Delinquent Status, and other national administrative assurances and policies are required. The

cooperator must adhere to administrative requirements, cost principles, and audit requirements as contained in 2 CFR Part 200, Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards.

All successful applicants for all cost reimbursable agreements are required to comply with Standard Administrative Terms and Conditions, which are available online at:
https://www.fas.usda.gov/grants/general_terms_and_conditions/default.asp
The applicable Standard Administrative Terms and Conditions will be for the last year specified at that URL, unless the application is to continue an award first awarded in an earlier year. In that event, the terms and conditions that apply will be those in effect for the year in which the award was originally made.

Before accepting the award the ezFedGrants GMO should carefully read the award package for instructions on administering the grant award and the terms and conditions associated with responsibilities under Federal Awards. Recipients must accept all conditions in this NOFO as well as any Special Terms and Conditions in the Notice of Award to receive an award under this program.

C. REPORTING REQUIREMENTS:
Primary Investigators are required to submit mid-term and final Fellow's performance reports on the U.S. portion of the Borlaug Fellowship. A final mentor's visit report including a final evaluation should be submitted no later than 30 days after the completion of the mentor visit.

- Financial reports will use SF-425.
- Progress Reports will use SF-PPR.
- Invoices will use SF-270.

Progress Reports
- The Principal Investigator or Mentor will submit **semi-annual** progress reports. The Principal Investigator or Mentor will use Performance Progress Report (SF-PPR) to submit quarterly progress reports.
- The Principal Investigator or Mentor will submit a final report to USDA/FAS within 30 days after the Mentor visit. USDA/FAS will provide additional guidance and a template for the final report.
- Reports should include the following:
  - Summary of activities, accomplishments, and any problems encountered or overcome
  - Photographs, when possible
  - Completed program evaluations and action plan
- **An invoice/claim cannot be paid if a progress report is past due, and will not be paid until the required report has been received.**

Close Out Reporting Requirements. Within 90 days after the end of the period of performance, or after an amendment has been issued to close out a grant, whichever comes first, recipients must submit a final FFR and final progress report detailing all accomplishments and a qualitative summary of the impact of those accomplishments throughout the period of performance.

After these reports have been reviewed and approved by *Program Division*, a close-out notice will be completed to close out the grant. The notice will indicate the period of performance as closed, list any remaining funds that will be de-obligated, and address the requirement of maintaining the grant records for three years from the date of the final FFR.

The recipient is responsible for returning any funds that have been drawn down but remain as unliquidated on recipient financial records.

Section V: Agency Contact

Applicants can direct questions or request help before the deadline for submission of the application for these funding opportunities via the contact information below:

- Borlaug Fellowship Proposals General Email: BorlaugProposals@fas.usda.gov
- Borlaug Asia/Latin America: Sarah Librea, (202) 720-2018 or Sarah.Librea@fas.usda.gov
- Borlaug Asia/Latin America: Tanya Hinnant, (202) 720-3382 or Tanya.Hinnant@fas.usda.gov

Section VI: Other Information

The USDA Borlaug Fellowship Program began in 2004. More than 750 Fellows from 64 countries have been trained to date. Additional program information is available at http://www.fas.usda.gov/programs/borlaug-fellowship-program.

Related Requests for Expressions of interest will be distributed by region and topic including: Asia, Eastern Europe, Latin America, North Africa, East/ Sub-Saharan Africa. This will be posted on the NIFA listserv.

Section VII: Borlaug Fellow Proposal and Research Plan

Fellow Reference Number	Country	Gender	Fellowship Length (weeks)	Research Focus
1. NOFO: USDA-FAS-10777-0700-10.-17-0017, India, WTO-SPS	India	Female	12	Detection techniques for plant viruses
2. NOFO: USDA-FAS-10777-0700-10.-17-0020, Thailand 1, WTO-SPS	Thailand 1	Female	12	How to analyze and conduct risk assessments with a focus of on the impact of different levels of cadmium in food and soil
3. NOFO: USDA-FAS-10777-0700-10.-17-0021, Thailand 2, WTO-SPS	Thailand 2	Female	12	How to analyze and conduct risk assessments with a focus on the Monte Carlo simulation
4. NOFO: USDA-FAS-10777-0700-10.-17-0018, Mongolia 1, WTO-SPS	Mongolia 1	Female	12	Capacity building in SPS and food safety standards
5. NOFO: USDA-FAS-10777-0700-10.-17-0019, Mongolia 2, WTO-SPS	Mongolia 2	Female	12	Improving the quality of ruminants, especially lamb, through proper nutrition and health
6. NOFO: USDA-FAS-10777-0700-10.-17-0022 Vietnam, WTO-SPS	Vietnam	Female	12	Increasing cow production through diets

7. NOFO: USDA-FAS-10777-0700-10.-17-0029, Colombia, WTO-SPS	Colombia	Male	12	Development of a soil and plant based study to reduce cadmium accumulation

Appendix 1: Detailed Borlaug Fellow Proposal and Research Plan

Fellow 1 – India; SPS

1.The goal of my research proposal is to develop an on the spot detection technique for plant viruses which is fast, reproducible, robust and practicable for growers, nurserymen, researchers, regulators, extension agents irrespective of their skill, can be easily employed for monitoring plant viruses in breeding programes, climate change impact studies, pre and post entry quarantine studies to reduce post harvest trade losses due to phytosanitary issues.

2.Objectives of the proposed project are i. To develop expertise in Recombinase Polymersae Amplification Assays (RPA) and Lateral flow assays for diagnostics of plant viruses' ii.To develop RPA and lateral flow based diagnostics for Plantago asiatica mosaic virus (PlAMV)

3.Background
India has exported 22,947.23 MT of floriculture products including cut flowers and branches, plants for planting, seeds, suckers, tubers and other flower products to the world for the worth of Rs. 460.75 crores in 2014-15(APEDA) with United States being the top most country importing our floriculture products (APEDA). Globalization and free trade agreements, trans-boundary travel is creating more opportunities for disease spread. Viruses comprise almost half (47%) of the reported plant emerging infectious diseases (EIDs). 71% of the virus emergence is as a result of introductions associated with trade in plants and plant products and movement of people and 16% because of changes in vector populations in response to climate change (Anderson et al., 2004). Timely, reliable and robust detection and identification of plant viruses is necessary for disease management, decision making, monitoring pathogens evolution and emergence due to the changes in climate, safeguarding our plant resources to maintain bio security.

The detection and identification of viruses currently rely on a large range of techniques, both traditional and modern including Electron microscopy, PCR and its variants, ELISA, microarrays and next generation sequencing (Boonham et al., 2014; Mumford et al., 2016). ELISA technique revolutionised virus diagnosis but when it comes to multiplexing ELISA lacks flexibility and is time consuming. Following ELISA, PCR based diagnostics of plant viruses came in 1990s followed by QPCRs ie realtime PCR. But PCR techniques needed more skill and is a costly affair, thus ELISA continues to rule the routine diagnostics.

The major challenge of the day is moving diagnostics away from centralised reference laboratories into the field or to the point of decision making, maintaining similar performance and quality as of laboratory based methods. Isothermal amplifications which donot require complex thermal cycling, which can be performed using much simpler, less power demanding equipment are promising. RPA (Piepenburg et al., 2006) is an approach used for isothermal amplification. In RPA a recombinase is used which forms a complex with primers to initiate amplification by incubation at a low reaction temperature (37 - 42◦C in typically <30 min).

The most grower friendly diagnostic tool for plant viruses available today is Lateral Flow Devices (LFDs) or dip sticks, where a porous nitrocellulose membrane on which virus specific antibodies

are immobilized on a band and is bound to a plastic strip which work on the same principle as a pregnancy detection kit. LFDs are simple fast one step assays with long shelf life. The combination of RPA along with lateral flow assay has been found successful in case of human pathogens and this strategy can be applied for the detection of plant viruses as well.
PlAMV is a significant pathogen of Lilium, the fourth major cutflower in the world. PlAMV is an emerging virus in US whose incidence in Lilium is recorded only in 2015 and the symptoms are characterized by severe leaf necrosis. PlAMV is described from Lilium in Netherlands (2010), UK (2012), Taiwan (2013), USA, Italy (2015) and in South America, Korea and India (2016). It is suspected to be introduced from Asian countries through planting materials or bulbs but the status of this virus in Asian countries is unclear. The virus has a wide host range from Nandina (woody plant), Primrose (Dicot) to Lilium (Monocot). Thus efficient diagnostic method for PlAMV is the need of the hour for an accurate certification scheme for virus free lily bulbs at production end as well as at the receiving end.

4. I hope to accomplish i) expertise in Development of Recombinase Polymerase Amplification Assays and Lateral flow Assays; ii) On the spot RPA-LFD assay for PlAMV
I'm a Plant Pathologist with specialization in Plant virology working in project on "Investigations on viral and phytoplasmal diseases of major flower crops in India"; where development of readily available on the spot diagnostics for viruses like dipsticks in for various stakeholders in floriculture industry like growers, nursery men, regulatory officials, policy makers, plant breeders is an integral part. My doctoral research is in Plant virology in genomics of Alphaflexiviridae to which the Plantago asiatica mosaic virus, belongs. The technical knowledge in developing lateral flow assay for detection of PlAMV can be replicated in India for the detection of major viruses affecting floricultural crops for which quick diagnostics is needed.

Floral and Nursery Plants Research Unit, USDA is the best of its kind in floriculture research in the world. Working with a mentor like Dr. John Hammond, Research Plant Pathologist, Floral and Nursery Plants Research Unit, USDA who has more than thirty years of experience in ornamental virus diseases itself will be a great opportunity for beginner like me in ornamental plant virology. Dr. Hammond Conducts research on virus diseases of ornamental crops, including identification and characterization of newly occurring viruses, resistance to virus infection and replication in transgenic plants, and virus detection and strain differentiation by serology and nucleic acid hybridization. His research interest and the current goal of Floral and Nursery Plants Research Unit to develop new methods for the detection of plant pathogens using serological- and nucleic acid based techniques is in congruence with my goal.

5.Borlaug fellowship support researchers and policy makers in agricultural sciences to get exposure to state of the art laboratories and advances in USDA, one of the best and the knowledge acquired can be replicated in India for the development of our agriculture sector which is the backbone of the economy.

Action Plan

Time Schedule
Week 1 Laboratory orientations and staff introductions; Compare double antibody sandwich (DAS)

Enzyme-linked immunosorbent assay (ELISA) and antigen-coated plate (ACP) ELISA to review detection sensitivity and appropriate antibody dilutions for different detection methods.
Information on the range of antibody dilutions for specific and sensitive detection of PlAMV

Week2 Evaluate PlAMV antiserum on Western blots of dilutions of purified PlAMV, healthy plant extracts, and PlAMV-infected plant extracts to examine sensitivity and specificity (absence of reactivity to proteins from healthy plants) with different antiserum dilutions.
Knowledge of antibody reactivity, specificity, and sensitivity in a membrane-based assay.

Week3 Evaluate effects of different extraction buffers on sensitivity of detection using existing commercial lateral flow assays for a) generic potyviruses; b) Pepper mild mottle virus; c) Potato virus X/Potato virus Y; d) Tobacco etch virus, and e) Ralstonia solanacearum to observe differential effects on assay success and sensitivity. Evaluate tissue:buffer ratios of optimum buffer for each assay to examine effects on assay sensitivity.
The factors affecting antigen presentation to antibody for successful detection will be known.

Week 4 Visit Agdia, Inc. laboratories (Elkhart, Indiana) to learn methods of lateral flow assay preparation, and prepare initial batch of PlAMV lateral flow assays.
First production batch of Lateral flow assays

Week 5 Evaluate initial PlAMV lateral flow assays with different sample extraction buffers, varying sample tissue: buffer ratios, and dilution of infected extract with healthy extracts to determine sensitivity.
Design and order primers and probe for PlAMV by RPA assay
Knowledge of appropriate sample extraction buffers, tissue dilution ratio, and presence or absence of interference from healthy plant components will be known.
Knowledge of criteria for RPA primer and probe design

Week 6 Depending upon evaluation of initial batch of lateral flow assays, prepare second set of lateral flow assays by same methods as used for first test batch – or learn and apply techniques for absorbance of host-specific antibody prior to use of the absorbed antibody to prepare a fresh batch of lateral flow assays. Second production run of lateral flow assays

Week 7 Evaluate second production batch of lateral flow assays for equivalence to first production run (assuming no problems with background reactivity in first batch) – OR, prepare new production batch using antibody preparation absorbed to remove host-specific antibody. Test against plant samples infected with other related and unrelated viruses to evaluate specificity.
Evaluate PlAMV-specific RPA primers by PCR and RT-PCR
Knowledge of performance of second production batch
Knowledge of efficacy and specificity of designed RPA primers

Week 8 Apply second production batch to test detection of PlAMV in extracts of soil in which PlAMV-infected plants have been grown, and in root, stem, and leaf extracts of different species infected with PlAMV, compared to DAS-ELISA.
Evaluate production of shorter probe/reverse primer product in RPA assay by electrophoretic

analysis Knowledge of performance of lateral flow assays in an atypical assay, and of the distribution of the virus within different hosts to establish most appropriate tissue sampling strategy.
Knowledge of functionality of cleavage of probe during RPA assay

Week 9 Test tissues of various hosts known to be problematic with some lateral flow assay strips (e.g.: species with significantly pigmented tissues, such as begonia; and species with high levels of polyphenolics, latex, oligo-saccharides, etc.).
Initial testing of full RPA assay including lateral flow device Knowledge of performance of assay with potentially challenging samples
Knowledge of full functionality of RPA assay

Week 10 Standardization of RPA techniques for the diagnostics of PlAMV
Standardized protocol for RPA for PlAMV will be available

Week 11 Review methods, repeat any tests lacking clear results and fine tuning
Lateral flow assay for PlAMV and RPA for PlAMV

Week 12 Prepare summary report of experiments and conclusions; Manuscript preparation and communication. Assurance of ability to establish similar lateral flow assays independently.

Fellow 2 – Thailand 1, SPS

1. The goal of my research is to assess dietary cadmium exposure and the impact of different possible Maximum Levels (MLs) .

2. In order to define this research area, the specific objectives were outlined below;
(2.1) to combine results of the distribution of concentrations of cadmium in food from existing studies by using systematic review and meta-analysis model.
(2.2) to assess the impact of difference possible MLs on cadmium intake.
(2.3) to assess the impact of difference possible MLs on the distribution of cadmium level in each food group.

3. Cadmium and cadmium compounds are widely used in the steel industry, plastics and batteries. Releasing to the air, soil and water cause cadmium contamination in foodstuffs. The application of phosphate fertilizers and atmospheric deposition are significant sources of cadmium input to soils and water. The level of contamination increases in environment, cadmium content result increase in foodstuffs. It is evident that cadmium is a normal constituent of wide groups of foodstuffs, shellfish, crustaceans, and fungi are natural accumulators of cadmium. Therefore regular consumption of these items can result in increased exposure. Cadmium is exactly know that it cause carcinogen. The Joint Food and Agriculture Organization of the United Nations (FAO)/WHO Expert Committee on Food Additives (JECFA) recently considered new information at its sixth session in 2010 and established a Provisional Tolerable Monthly Intake (PTMI) for cadmium at 25 ug/kg body weight/month. In order to perform the exposure assessment, required information about total cadmium intake by the Thai consumer need to calculate from the distribution of cadmium levels in each food group and the total dietary data. The national consumption data can obtain from National Bureau of Agricultural Commodity and Food Standards (ACFS) conducted in 2014-2015. However, concentration level of each food group need to survey to match between consumption and concentration for each foodstuffs.
While embarking on a new survey consumes time and expensive, a review of existing studies, systematic review, and a statistical analysis, meta-analysis may be used to determine the distribution levels of cadmium which quicker and cheaper.

4. The toxic effects of oral cadmium exposure have been well studied in animal and human. It toxic on the kidney, the skeletal system and the respiratory system and is classified as a human carcinogen Group 1. Therefore the government has to protect humans from excessive cadmium exposure. Thai Food and Drug Administration (Thai FDA) follow Codex's guideline maximum level for cadmium, although we never conduct exposure assessment to measure how much Thai consumers intake cadmium from diet. As recommended in the guidelines for food safety control, countries should be based on scientific advice following risk assessment and people are exposed to cadmium upon consumption of cadmium containing foodstuffs. This because Thai FDA have not enough concentration data of cadmium in foodstuffs (primarily raw data). In order to set appropriate MLs of cadmium in Thai Food , this study will conduct as following;
(4.1) Combine the distribution of cadmium levels in each foodstuff group using systematic review and meta-analysis.
(4.2) Assess the impact of difference MLs on cadmium concentration.
(4.3) Assess the impact of difference MLs on cadmium intake.

5. The Borlaug Fellowship programme on risk assessment will promote scientific competence for food safety and food security decision making especially for preparing food regulations and standards.

Action Plan

In order to achieve the research goal and objective, the activities have planned as following:

Week 1: University Introduction.
Week 2- 3: Understanding systematic reviews and meta-analysis.
Week 4-6: Aggregate studies on cadmium levels in foodstuffs in Thailand.
Week 7-9: Set up criteria and Extraction of relevant data and select a statically model.
Week 10-11: Interpret and Summarize information.
Week 12: Report Writing.

Fellow 3 – Thailand 2, SPS

1. Goal
The goal of my research is to evaluate the cancer risk of inorganic arsenic exposure to rice consumption by the Thai population using probabilistic risk assessment approach.

2. Specific objectives
2.1 To compile available update data on the inorganic arsenic contents in rice cultivated in Thailand.
2.2 To assess exposure to inorganic arsenic from rice consumption of Thai population using updated national consumption data and probabilistic risk assessment approach.
2.3 To evaluate the cancer risk of the inorganic arsenic from rice consumption of Thai population.

3. Background information
Approximately two-thirds of the world's population consume rice (Oryza sativa L.) as a major staple food. Rice is the most important economic crop in Thailand and Thailand is the world's second largest exporter of rice in 2015. Thai rice is recognized as one of the best quality and have a great demand worldwide. However, rice can intrinsically contains higher levels of inorganic arsenic than other terrestrial plants i.e. rice grain tend to absorb inorganic arsenic more readily than other food crops. Studies have shown that rice is a major source of inorganic arsenic where rice is predominantly consumed.

Arsenic is a widely-occurring food contaminant resulted from both natural occurrences and human activities. Volcanic eruptions and other natural processes are sources of arsenic in the environment. Human activities including disposal of industrial waste chemicals, smelting of arsenic bearing minerals, burning of fossil fuels, and the application of arsenic compounds in numerous products also cause arsenic contamination. Arsenic compounds are used in many industries including glass, electrical devices and pesticides. Acute and chronic toxicity of arsenic relate to the respiratory, cardiovascular, nervous, and hematopoietic systems. Inorganic arsenic compounds are more toxic than organic compounds. Inorganic arsenic compounds are identified as human carcinogens, with evidence for an increased cancer risk of the urinary bladder, lung, and skin.

Thailand Food and Drug Administration has established the maximum limit of inorganic arsenic in food of 2 mg/kg which is a very high level compare to other international standards. In 2016, the Codex Alimentarius Commission recommends that polished rice and brown rice should be allowed to contain no more than 0.2 and 0.35 mg/kg of inorganic arsenic, respectively in order to protect consumers from excessive exposure to inorganic arsenic. Additionally, the United States Food and Drug Administration proposed a very low maximum limit of 0.1 mg/kg for inorganic arsenic in infant rice cereals in April, 2016. These low maximum limits of inorganic arsenic in rice proposed by the international organizations could be one of the trade barriers for Thailand in rice exporting. Probabilistic risk assessment (PRA) is an approach to determine the extent of chemical substance exposure which incorporate uncertainty and/or variability information. For chemicals in foods, the content of chemical in food and the amount of particular food consumption are mainly considered. The estimated exposure is usually presented as the average and high (90th, 95th and 97.5th

percentile) intake. Food consumption data are prerequisite for exposure assessment of chemicals. Limited information on probabilistic risk assessment of inorganic arsenic from rice consumption in Thailand has been published. Evaluation of inorganic arsenic intake from rice consumption is critical for assessing potential health risks. To promote the quality and safety of Thai rice as well as to protect consumers, exposure assessment of inorganic arsenic has to be conducted. Therefore, probabilistic risk assessment of inorganic arsenic from rice consumption needs to be studied by compiling the available update data on the inorganic arsenic contents in rice and the update data on rice consumption from the Thailand national food consumption survey (2013–2015). The outcomes of the proposed study would be benefit for being aware of exposure to inorganic arsenic from rice consumption and determining the maximum level of inorganic arsenic in rice for safe consumption.

4. I hope I can profoundly learn and practice probabilistic risk assessment approach in order to develop skill and complete my proposed study. During the fellowship, I will be able to complete inputting and analyzing the data on exposure to inorganic arsenic from rice consumption in Thai population. The studied subjects may be classified into different aged group, gender or geological area to identify the high risk groups. The results from the probabilistic risk assessment will be further evaluated to determine the cancer risk.

I have basic knowledge in conducting probabilistic risk assessment and have applied a commercial software namely @RISK (Palisade cooperation) in the previous research studies. However, I do not have a good knowledge on Monte Carlo simulation and need to learn how to incorporate uncertainty, variability and bioavailability information into probabilistic risk assessment. My research team at the Institute of Nutrition, Mahidol University has received a number of grants related to food safety and risk assessment from Thai FDA and the Ministry of Agriculture and Cooperatives. Therefore, if I have an opportunity to work closely with an expert in probabilistic risk assessment approach, I will be able to accomplish the proposed study and apply to other risk assessment studies in the future which will benefit my country.

5. Thailand is an agricultural country and one of the world largest food producers. Nowadays, food safety is one of the most concern in the world trade. To meet the imported countries' requirements, not only the food quality but also the safety of the agricultural produce has to be considered. Comprehensive and profound knowledge in risk assessment is a useful approach to support regulatory decision makings in order to protect consumer, ensure national food security and compete in the world trade.

Action Plan

1st week
Action step: University and laboratory orientations and staff introductions
Needed resource: University and laboratory facilities
Outcome: Knowing the University and laboratory facilities/staff/rules/limitations

2nd week
Action step: Learning and practicing on probabilistic risk assessment approach

(Basic and intermediate level)
Needed resource:
- Computer

- Probabilistic risk assessment software
- Internet access
Outcome: Having knowledge and skill in using probabilistic risk assessment approach

3rd–4th week
Action step: Learning and practicing on probabilistic risk assessment approach
(Advance level) e.g. incorporating uncertainty, variability and bioavailability information
Needed resource:
- Computer
- Probabilistic risk assessment software
- Internet access
Outcome: Having profound knowledge and skill in using probabilistic risk assessment approach

5th week
Action step: Studying how to characterize the cancer risk from dietary exposure to inorganic arsenic
Needed resource:
- Computer
- Internet access
Outcome: Having deep knowledge and understanding in cancer risk characterization

6th week
Action step: Learning how to determine inorganic arsenic and arsenic speciation in foods
Needed resource:
- Atomic Absorption Spectrophotometric coupled with Hydride Generator
- Liquid Chromatography coupled with Mass Spectrometer
- Other suitable instruments
Outcome: Having knowledge and skill in determining inorganic arsenic and arsenic speciation in foods

7th week
Action step:
- Compiling available update data on inorganic arsenic in Thai rice
- Preparing the available national rice consumption data
Needed resource:
- Computer
- Probabilistic risk assessment software
- Internet access
Outcome: Having a set of data on inorganic arsenic contents in Thai rice and rice consumption by Thai population

8th–9th week
Action step: Exposure assessment of inorganic arsenic from rice consumption of Thai population using probabilistic risk assessment approach
Needed resource:
- Computer
- Probabilistic risk assessment software
- Internet access
Outcome: Result on exposure to inorganic arsenic from rice consumption of Thai population

10th week
Action step: Characterization of cancer risk of exposure to inorganic arsenic from rice consumption
Needed resource:
- Computer
- Probabilistic risk assessment software
- Internet access
Outcome: Result on cancer risk of exposure to inorganic arsenic from rice consumption of Thai population

11th–12th week
Action step: Summarizing the results, discussing and writing the report
Needed resource:
- Computer
- Internet access
- Statistical program e.g. SPSS, minitab, etc.
Outcome: Report on probabilistic risk assessment of inorganic arsenic from rice consumption of Thai population.

Fellow 4 – Mongolia, SPS

1. The goal of my research is how to develop Food Safety training programs for a higher level of technical competence in testing and calibration of equipment, and training on DNA traceability in Mongolia for the first time in the country by thus protecting the public health and improve both domestic and export markets through improved food safety standards.

2. Specific research objective(s) that will achieve your goal.

1. Conduct a desktop study on DNA is the best biometric to identify/trace the product
2. Develop a scope the full meat and animal originated products - chain birth to final product as an example of Mongolian meat processing chain.
3. Training program development on a) Precision – Potential to trace meat back to the animal/farm of origin b) assurance and trace products as distinct from associated labels c) Verify accuracy of labeling
4. Develop a guideline for food processors and retailers on protection of public health.
5. Develop a public awareness and communication tools to help and assurance of food safety and compliance with the standards are the primary roles of the food producers and processors.
6. Initiate and to set up a professional center which will provide a technical assistance on food processing issues to entrepreneurs and food companies by drawing on Cornell experts, links with the FDA and USDA.

3. Background: Food control system of Mongolia has two major objectives such as ensuring the safety of food supplies as well promoting food safety in fair trade. But the existing system require strengthening and periodic reorganization to adapt to changing priorities and advances in knowledge and technology. The approach that assurance of food safety throughout food chain system was adapted just recently after approval of new Food Safety law in 2012. However the previous food control system was focused only to end of the process and ready to eat products. The understanding of traceability was introduced with approval this new law. Consumers and, food retailers were required increasingly to manage the food chain to ensure high standards that can be proven by inspection and audit. In order to prevent any food falsification, especially trace animals and animal products along the food chain become very important as the country is aiming to increase export of meat products, however it's one of major tendency of current economic development in Mongolia.

4. Before 2008, Food control system of Mongolia was under different government agencies such as ministries of agriculture, health, and commerce and trade etc. It was requiring very effective interministerial coordination and harmonization of food standards. By creating one unified agency such as the Government Agency of Specialized Inspection (GASI)which is responsible for the whole system it's become more effective and economical than divided responsibility or fragmentation through separate functions of responsibility. Now this agency plays main role in inspection and enforcement of Food laws.

I have worked on a number of projects on lab capacity building, training, food safety, and nutrition and hygiene communication in this process. Also, I worked as a national consultant for FAO and WHO projects on how to establish and strengthen Central and local (aimag) food control

laboratories of General Agency for Specialized Inspection.
The National Reference Laboratory for Food Safety of the GASI, which I am working as a scientific advisor, has following primary services according to clause 15.2 Article 15 of Food Safety Law of Mongolia on surveillance, assessment and testing on raw materials for food, product safety and create and manage an integrated database of results of tests made at state owned accredited, local and private laboratories.
However developing traceability system in the country for food in general and especially for livestock animals is requiring a new initiative which should start development of the training programs.
As general practice of International food control system, I am looking to receive following impacts after the development and implementation of the traceability approach in food control system of Mongolia based on my future work on this research proposal:
(1) assurance system origin and ownership of animals and meat; (2) prevention falsification and misbranding 3) surveillance, control food borne and animal diseases; (4) for compliance with requirements of international partners in trade; (5) for compliance with country-of-origin labeling requirements; and in last minimize product recalls and make risk management protocols more effective.

5. By thus I am applying for the Borlaug Fellowship program to learn from leading universities of the USA, especially from the Cornell University, College of Agriculture and Life Sciences, with ambition that to create similar institution such as The Northeast Center for Food Entrepreneurship (NECFE) or Food Safety Excellence Center towards end of the year followed by this proposed program. Safe food supplies and proper nutrition are important to any country as its part of protection of public health policy. Because I am sure Borlaug Fellowship is helping and contributing safe food production and sustainable development in Mongolia.

Action Plan
1. University and lab orientation 1 week
2. Conduct a desktop study on DNA is the best biometric to identify/trace the products -1week
3. Develop a scope the full meat and animal originated products - chain birth to final product as an example of Mongolian meat processing chain. 2 weeks
4. Training program development on a) Precision – Potential to trace meat back to the animal/farm of origin b) assurance and trace products as distinct from associated labels c) Verify accuracy of labeling-. 2 weeks
5. Develop a guideline for food processors and retailers on protection of public health and ensuring safe and quality food are ensured throughout the food chain.. 2 weeks
6. Develop a public awareness and communication tools to help and assurance of food safety and compliance with the standards are the primary roles of the food producers and processors.. 2 weeks
7. Initiate and to set up a professional center which will provide a technical assistance on food processing issues to entrepreneurs and food companies by drawing on Cornell experts, links with the FDA and USD+2 weeks

Fellow 5 – Mongolia, SPS

1. The goal of my research is to determine and evaluate some bioactive compounds in lamb samples from different geographical areas of Mongolia.

2. Objectives
a. Endogenous bioactive peptides (carnosine, anserine, creatine)
b. Conjugated linoleic acid
c. residues of chloramphenicol

3. Mongolia has a nomadic lifestyle since before the time of Genghis Khan (12th century) and nowadays about 30 percent of the population are nomads and semi-nomads who are raising livestock. Moreover, nomads living a life mostly unchanged for centuries and main diet involves around meat and milk products. Current livestock numbers are around 50 million head. livestock is the main livelihood and source of wealth in Mongolia and the country's economy substantially depends on the production and development of this sector. Animals raised commercially in Mongolia include sheep, goat, cattle, horses, camels. We export meat products to China, Russia and Middle East and their demand are increasing promptly. On the other hand, overgrazing by millions of sheep and goats is the primary cause of degraded land in the Mongolian Steppe, one of the largest remaining grassland ecosystems in the world. Thus, to find approaches to increase revenue from the animal husbandry and improve herders' life with no ecological losses is crucial. One way is, to evaluate nutritional and functional value of meat products and promote to increase the price. Mongolia has ecological clean pasture and pasture based livestock. Literature reviews indicate that pasture raised animals' meat have more balanced nutritional ingredients and bioactive compounds compared to those farm animals. Moreover, meat tastes are quite different in diverse areas depending on species, plant compositions of pasture and climate.
a. A bioactive component of a diet as any food or part of a food that provides medical or health benefits, including prevention and treatment of a disease. Carnosine, anserine, creatine, taurine, ubiquinone, betaine, and carnitine are some of the common endogenous bioactive compounds available in meat For example, carnosine is a naturally occurring histidyl dipeptide (N-β-alanyl-lhistidine) with several biological functions. It has been credited with a potent buffering antioxidant properties, and antiaging properties. In addition, carnosine possesses defence mechanisms against glycation and oxidation, which are related to diabetes, kidney diseases, and some forms of cancers. Concentration of these bioactive peptides may depend on processing technology. animal species and feed composition.
b. A key function of ALA (C18:3 n-3) is as substrate for the synthesis of longer-chain omega 3 fatty acid which play an important role in the regulation of inflammatory immune reactions and blood pressure, brain development, cognitive function, etc. There are several research paper including Mongolian researchers' stating that grass fed or wild animals has two to four times more omega-3 fatty acids than meat from grain- fed animals.
c. Chloramphenicol (CAP) is an antibiotic not authorized for use in food-producing animals in the European Union (EU). However, being produced by soil bacteria, it may occur in plants. Minimum required performance limit of 0.3 µg-1 was assigned by the European Commission. In recent years findings of CAP residues in food products such as poultry, honey and sheep casings has had impact on international trade. Berendsen et al. (2010) showed the presence of CAP in various

herbs (Thalictrum, Artemisia, Thermopsis species) collected in 2006 from Mongolia, but also herbs bought in the Netherlands (Parusahaan Jamu herbs) or the USA (Artemisia frigida). In general, levels were in the range of 0.3–50 µg/kg, but three Mongolian samples contained substantially higher levels of 160, 175 and 450 µg/kg.

4. During my fellowship I will practice and learn the latest methods on extracting, isolating, method developing and analyzing bioactive compounds mentioned above. Hope I able to analyze many samples as possible. Moreover, I will practice to run modern analytic instruments such as gas chromatography (GC), high performance liquid chromatography (HPLC) and tandem mass spectrometry. This fellow will be a primary important part of my ongoing research and will continue after returning home institution. HPLC-Ms/Ms and GC instruments already installed at our lab but due to some missing expensive parts and reagents we are still not using properly. Also we are lacking good specialists that run these instruments, so after the fellowship I will run them confidently . Working with a mentor in the U.S give me advantage in many ways, such as taking professional advice , update my knowledge on latest food production and food safety and to generate confident and certified research data, professional publication, further partnership ets.

5. 1. Bioactive peptides and essential fatty acids composition of Mongolian meat from some area will be confirmed. The correlation between concentration bioactive compounds and taste of meat could be established. Research results will be fundamental material to promote local meat brands' qualities and attract consumers. Unfortunately, we are exporting meat products with very low prices compared to their qualities. Also we assume that these studies will reveal an importance of the meat processing on quality and taste of meat.
2 Residues of chloramphenicol (CAP), found in plant, soil samples from Mongolia, one of the issues impacting the meat trade to abroad. The distribution of CAP residues across the country can be mapped using research data on meat and plant samples from different areas. According to the map, low or heavy contaminated zones, plant or animal species will be detected and allow export meat from specific zones or take actions to neutralize during a withdrawal period heavy contaminated animals. On the other hand, the health of local people consuming contaminated food for a long period is concerned. Hence the research should be continued

Action Plan

Week 1
Orientation

Week 2
Extracting and isolating samples for GC
Method development of conjugated linoleic acid

Week3
analysis for meat samples to detect and quantify conjugated linoleic acid

Week 4
Extracting and Preparing samples for HPLC-MS/MS for residues of antibiotics

Method development
Week 5
Analysis for meat samples to detect and quantify of CAD in meat samples

Week 6
Extracting and Preparing samples for HPLC-MS/MS for meat bioactive peptides
Method development

Week 7
Analysis for meat samples to detect and quantify of meat bioactive peptides

Week 8
Determine antioxidant capacity of meat and isolated meat peptides using colorimetric method

Week9
Repeat analysis with interesting results or repeat necessary samples

Week 10
Repeat analysis with interesting results or repeat necessary samples

Week 11
Data analysis

Week 12
Summarizing and writing report

Fellow #6, Vietnam, SPS

Research Plan

The goal of this research is finding out the relationship between the quality of beef cattle carcass and the forage crops and grasses.

The beef cattle in Vietnam are valuable. Although pork, fowls and aqua-products are still the main protein sources of Vietnamese the consumption of beef are increasing. The beef cattle play an important role in Vietnam due to its high protein content and its specific flavor and taste. Beef also plays quite important role in the Vietnamese culinary. Beef exists in traditional pho, Hue beef noodle or in foreign dishes such as beefsteak or ragout. Up to the 2014, the consumption of beef is of 6 percentages of Vietnamese daily diet. However, the demand on beef quantity and beef quality are increasing. Now in the menus of the premium restaurants to the small restaurants, beef is on the most premium dishes. It may due to the import of beef from foreign countries such as Australia, European countries shifts the customer choice to the better flavor and taste, tenderer texture of beef.

The beef cattle industry in Vietnam is based on the two main sources of beef cattle. The first one is the domesticated cattle, named Yellow or Laisind breeds, which may be fed and sold by farmer or may be fed by the feedlotters before being sold to the market. The domesticated beef cattle is approximately five million cattle. The second source is the imported feeder cattle. The feedlotters import the beef cattle from many countries to Vietnam. The number of beef cattle imported to Vietnam in the 2015 reaches approximately 400000 beef cattle. The domesticate beef cattle insufficiently supply to the domestic demand. The feeding methods applied for domesticated beef cattle are recently ineffective to reach the production and quality of beef carcass. The increasing import in beef cattle carcass and beef cattle to Vietnam has change the customer choice and inhibit the domestic beef cattle husbandry.

The quantity and the quality of the feedstuffs for beef cattle in Vietnam are the challenge for beef cattle industry. In Vietnam, the feeding stuffs are from forage crops and grasses such as dried stuffs or silage from corn, cassava leaves, rice straw, sugar cane... Recently, some grasses such as Pennisetum purpureum, Centro cavalcade, Bracciaria ruziziensis…are now increasing in planting areas for feeding source. However the limits in big farm and large lands for grasses growth inhibit the development of beef cattle industry. In addition, the quality of beef depends on the beef cattle and therefore depending on the cattle's diets and feeding. The quality of domestic beef cattle should be increased throughout the changes in feed stocks and feeding methods.

In this research, the carcass characteristics, chemical composition, texture and sensory attributes of beef from cattle that fed with vary forage crops or grasses. The forage crops or grasses should be various in growth conditions and species. The nutritional value of these feed stocks will be analysis including the nutritional value of the forage crops or grasses, the composition of the fed diets. The wholesale rib cut of beef cattle will be collected at each carcass and then be fabricated into steak. The carcass characteristics, chemical composition, texture of the beef carcass will be analyzed. The USDA yield grade, USDA quality grade are determined. The near Infrared spectrometer are supposed to use for basic composition analysis of the beef steaks while the

cooking loss and the texture analysis instrument will be used for determine the texture of beef steak. The composition of fatty acids in steak will be determine using gas chromatography method. pH and color of steak will be analysis using pH meter and colorimeter. The sensory attributes of beef steak will be evaluated. The customer acceptance and the descriptive sensory analysis will be the means to evaluate the sensory attributes of beef steak. the 9-point hedonic scale will be applied for customer acceptance test for determination of the overall acceptability average.

During this fellow program I hope to find out the relationships among the nutritional value of the forage crops or grasses and the production and the quality of beef carcass. The effects of grass feed stocks and forage crop feed sstock to the texture and sensory attributes of steaks should be clarified. Thus the results can bring the new approach for Vietnam farmer and feedlotters to increase the production, the quality of the beef cattle and thus they increase their incomes.The advises and instruction form the mentor will be the excellent knowledge supporting source for me to solve the above problem. Under the supporting of The Borlaug Fellowship, the study will be implemented effectively.

Action Plan

Week 1: To discuss to the mentor, works with lab staffs, lab equipments. Preparing for sample Collection

Week 2: To collect samples
Needs of the connection and cooperation of the stockers or farmers , the commercial feedlots that follow the various subjected feed diets, diet compositions
Connection and cooperation of the slaughter houses
Needs consumable collecting and storage devices, cooler
Should collect the right samples with suitable amount

Week 3: To prepare sample - and make steaks
Needs consumable devices and cooler for making steak.
Vacuum packaging machine, packages, refrigerator and storage chambers

Week 4: To prepare sample - and make steaks to analyze the beef carcass quality
Needs consumable devices and cooler for making steak
Vacuum packaging machine, packages, refrigerator and storage chambers

Week 5: To analyze the beef carcass quality
Needs chemicals, analytical standard chemicals, Near Infrared Spectrometer , pH meter, texture analysis instrument, gas chromatograph inserted with flame and ionization detector and column

Week 6: To analyze physical and chemical properties of the beef steak

Week 7: To analyze physical and chemical properties of the beef steak and evaluate the results

Week 8: To prepare for the sensory test
Needs of oven and cooker, kitchen wares

Week 9: To analyze the customer acceptance
Needs of help in penalist invitation, at least 180 people
Needs of oven and cooker, kitchen wares and bland foods

Week 10: Descriptive sensory test
Needs of help in penalist invitation, at least 20 people
Needs of oven and cooker, kitchen wares and bland foods

Week 11: Analyze the sensory data
Needs of Compusense software

Week 12: To interpret the data, make conclusion and evaluate the study

Fellow #7, Colombia, SPS

Research Plan

1. Fellow #2 (Male); Colombia; brief proposal description – The proposed research topic is related with the developing a Soil and Plant based study to reduce Cadmium (Cd) accumulation by cacao and its relations with different genotypes, as a strategy to support the Cacao Breeding Program in Colombia, identifying low accumulators on germplasm accessions and developing amendment technologies to reduce its bioavailability. The goal of my research is to develop a soil and plant based study to reduce Cadmium (Cd) accumulation by cacao and its relations with different genotypes.

2. The specific research objective are (1) supports the Cacao Breeding Program in CORPOICA – Colombia. It is related to identification of low Cd accumulator cacao accessions of the Germplasm Bank and (2) develop soil organic and inorganic amendment technology to reduce bioavailability of soil Cd to cacao.

3. Export of cocoa beans is an important value chain commodity for Colombia and the government has been working in the growing of this crop in the country. Soils under cacao tend to have high levels of Cd. Elevated levels of cadmium (Cd) in cacao beans reduce their quality and marketability and have negative impact on export earnings and the life quality of the small scale farmers. CORPOICA has been working in different strategies in order to face this important problem. Identifications of cacao genotypes capable of reduced accumulation of Cd and coupled with development of soil amendment technology reduce bioavailability of soil CD in order to producing high quality cocoa beans with less Cd contamination and will improve marketability of cocoa beans in international trade. Related with the genetic approach, since 2012, CORPOICA has developed an integral Cacao Breeding Program. This program works in three research lines: 1- Parental Selection and Identify the Core Cacao Collection focused on Productivity, Disease Resistance, Quality, and Cadmium Uptake and Accumulation, 2- Recombination Cacao Plan, and 3- Characterization of different regional cocoa genotypes in different environments. According with first research line, we are working in some activities related with the developing of a phenotypic platform located at Palmira Research Station, to assess and characterize the uptake, transport and accumulation of Cadmium with the aim of identify materials (new clones or rootstocks) and to develop soil amendment technology to reduce bioavailability of soil Cd. For this purpose, we want to standardized the future Cacao platform and explore the adaptability of the techniques developed for crops type like corn or lettuce (short term cycle crop). Different cacao genotypes will be tested to increased levels of soil Cd and its response to the various soil amendments (e.g. Limestone, gypsum Biochar, organic).

Action Plan

Week 1 – Get familiar with the University and laboratory facilities. Meeting with the mentors and staff introduction at the Tropical Research and Educational Center (TREC). Review the working plan.
Week 2 to 3 – Literature review about different methodologies for nutrient and Cd determinations on tissue plant and determination of total and bio-available Cd using different chemical extraction methods on soils. Working in techniques for plant and soil samples preparation

Week 4 – Implement 2 or 3 extraction methods of determination of total and bio-available Cd on Soils
Week 5 – Implement methodologies for nutrient content and Cd determinations on plants in laboratory
Week of 4 or 5. Dr. Baligar will visit TREC and hold group discussions with us on the proposed research plan and future research activities for CORPOICA.
Week 6 - Recognition of techniques of conducting experiments under controlled conditions (greenhouses) at Tropical Research and Educational Center (TREC)
Week 7 to 10 – Implement and conduct the experiment under facilities of TREC with the crops type and laboratory analysis. During this period, I and Dr. Li will be visiting USDA-ARS Beltsville Agricultural Research Center, Beltsville MD for 4 days in Dr. Baligar's research facilities to learn experimental techniques to assess the plant response to abiotic stresses.
Week 11 – 12 Data analysis, draft report and prepare detail proposal with U.S mentors for the following up activities after back to Colombia