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*:* CSA and GRA

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.-17-0024, Bangladesh, CSA-GRA
2. USDA-FAS-10777-0700-10.-17-0043, Cambodia, CSA-GRA
3. USDA-FAS-10777-0700-10.-17-0026, Sri Lanka, CSA-GRA
4. USDA-FAS-10777-0700-10.-17-0031, PHILIPPINES 1, CSA-GRA
5. USDA-FAS-10777-0700-10.-17-0032, PHILIPPINES 2, CSA-GRA
6. USDA-FAS-10777-0700-10.-17-0033, PERU, CSA-GRA

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

Table of Contents

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, CSA and GRA

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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); Bangladesh; CSA: Study beneficial soil microbes to produce drought-tolerant crops and high-throughput sequencing and associated techniques of metagenomics
2. Fellow #2, (male); Cambodia; CSA: Identifying the gene-trait in rice related to salinity tolerance
3. Fellow #3, (female); Sri Lanka; CSA: Focusing on climate change and stress physiology of wild rice
4. Fellow #4, (female); Philippines 1; GRA: Researching wetting-dry rice production system to sustain rice yield and reduce methane emissions through improved water and nutrient management
5. Fellow #5, (male); Philippines 2; CSA: Evaluate the effects of the CSA practices and factors to scale
6. Fellow #6, (female); Peru; GRA: Learn tools and guidelines to establish new regulations use of fertilizers; build an MRB system for reporting GHG emissions and fertilizer use

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 6

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 semi-annual 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 semi-annual 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 semi-annual 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.
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- 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 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 semi-annual 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.-17-0024, Bangladesh, CSA-GRA	Bangladesh	Female	12	CSA: Beneficial soil microbes to produce drought-tolerant crops
2. NOFO: USDA-FAS-10777-0700-10.-17-0043, Cambodia, CSA-GRA	Cambodia	Male	12	CSA: Gene-trait in rice related to salinity tolerance
3. NOFO: USDA-FAS-10777-0700-10.-17-0026, Sri Lanka, CSA-GRA	Sri Lanka	Female	12	CSA: using on climate change and stress physiology of wild rice
4. NOFO USDA-FAS-10777-0700-10.-17-0031, PHILIPPINES 1, CSA-GRA	Philippines 1	Female	12	GRA: Wetting-dry rice production system to sustain rice yield and reduce methane emissions through improved water and nutrient management
5. NOFO: USDA-FAS-10777-0700-10.-17-0032, PHILIPPINES 2, CSA-GRA	Philippines 2	Male	12	CSA: Evaluate effects of the CSA practices and factors to scale it

6. NOFO: USDA-FAS-10777-0700-10.-17-0033, PERU, CSA-GRA	Peru	Female	12	GRA: Learn tools and guidelines to establish new regulations use of fertilizers; build an MRB system for reporting GHG emissions and fertilizer use

Appendix 1: Detailed Borlaug Fellow Proposal and Research Plan

Fellow 1 – Bangladesh; Climate Smart Agriculture

1. The main goal of my research is to contribute in sustainable agricultural production and enhance resilience against biotic and abiotic stressors by maintaining beneficial soil microbes.

2. In order to achieve such research goal, the specific research objective will be- to develop faster identification and screening technique of beneficiary soil microbes (BSM) community using high throughput sequencing from the samples of various vulnerable agro ecological zones.

3. Due to the curse of global warming and extensive uses of synthetic agro-chemicals for maximizing the production, ecological biodiversity is going to be endangered condition day by day. Therefore, sustainable agricultural production is a current concern across the globe. As a consequence, the utilization of beneficial soil microbes for agricultural production is worldwide acceptable strategy due to their numerous bio-control, bio-protection and bio-fertilizer effects on plants. It is established that beneficial soil microbes can successfully combat with different plant stress factors like heat, drought, salinity, pathogen and diseases etc. Thus quick identification and screening technique of this microbial community and effective utilization and management of these soil metagenome is very urgent for sustainable ecofriendly production. Soil is probably the most challenging of all natural environments for microbiologists, because of the microbial community size and the diversity of species present on it. Considering the complexity of soil metagenome high-throughput and sensitive screening method is required which will help to faster screening of the beneficial soil microbes from different ecological diverse samples. I have my research experience with some beneficial plant endophytes (mycorrhiza and Piriformospora sp.) and their uses as bio-control and bio-fertilizing effects on plants to alleviate biotic and abiotic stresses. During my previous research (both doctoral and post-doctoral), I observed the bio-control effects of Arbuscular Mycorrhizal Fungi (AFM) association on plant diseases and their impact on to reduce the heat stress in cyclamen plants, which was also a first report of remediating high temperature stress by using AMF. I received in-depth knowledge in utilizing BSM to alleviate biotic and abiotic plant stresses. In order to develop commercially usable biofertilizer/ bioregulator from BSM for our locality, it is important to identify and isolate the some of them for large scale reproduction. Unfortunately, such extensive studies were never conducted before. Recent development of techniques in metagenomics by high-throughput sequencing offers enormous opportunity for identification and screening of BSM directly from natural soil samples. Hence, the study has been proposed. An attempt will be taken to take soil samples from Bangladesh for analysis in the USA. If such arrangement is not possible, research will be conducted by using soil/environmental samples taken from USA to address a similar problem existing there as training. Such hands-on training should enable me to work independently for further research in Bangladesh with minimum supervision.

4. During my first phase of Borlaug fellowship period in the USA, I would like to learn the technique of high-throughput sequencing and other associated techniques of metagenomics from my Mentor and his/her research lab. During my post-doctoral study at the Liebniz Institute of Vegetable and Ornamental Crops (IGZ)- Germany, I learned different molecular techniques including RNA and

DNA extraction, cDNA synthesis, rtPCR which built my confidence to be a quick learner of any plant and-or microbial molecular studies. A fellow-up research in Bangladesh, being in touch with my same US supervisor for 2 years should certainly bring some productive output for simultaneous improvement in my personal research skills, scientific knowledge as a whole and paving way to promote eco-friendly sustainable agriculture in the country.

5. Bangladesh has different agro-ecologically constraint area like, High Barind tract regions in northwestern part that suffers from recurrent drought conditions, coastal zones in the south that suffer from high salinity problem and north-eastern haor region that suffer from prolonged water log conditions. Those environmental constraints pose a great impact to our food security. Farmers also spent a good amount of money for application of chemical pesticides to protect their harvest from diseases and insect-pests and causing health and environmental threats all over the country. In these said contexts, utilization of appropriate BSM can help farmers by boosting production and at the same time saving costs of production while taking the best care of environment. My research may contribute in enhancing crop production and sustaining food security by identification of BSM in our local soils for further isolation and utilization for management of plant stressors.

Action Plan

Time Schedule
W.# 01- University and laboratory orientations and staff introductions
W.# 02- Literature review and hands-on training on overall procedure
W.# 03- Collection soil samples, preparation for transport and storage for future analysis
W.# 04- Preparation of soil samples for laboratory analysis, extraction of soil DNA, purification, quantification
W.# 05- High-throughput sequencing
W.# 06- Analysis of community gene contents and genetic/functional diversity
W.# 07- Microarray development and data analysis, meta data assimilation
W.# 08- Functional metagenomics, diversity distribution and mechanisms
W.# 09- Reserve time for repetition of any/part of analysis
W.# 10- Writing report and journal article
W.# 11- Presentation and feedback
W.# 12- Preparation of proposal for further collaborative research in Bangladesh

Fellow 2 – Cambodia; Climate Smart Agriculture

1. The goal of my research is to Improve rice variety which tolerance to salinity using Cambodian germplasm resource.

2. This study aim to identify the level of salt tolerant accessions and wild rice collected from coastal area.

3. Rice is one of the most important crops which serve as major calorie sources in human diet. Domestication of cultivated rice, Oryza sativa L., started about 10,000 years ago from its wild ancestor, O. rufipogon Griff (Oka 1988). Domestication caused many morphological changes between wild and cultivated rice plants on plant shape, panicle structure, pericarp color, seed shattering, seed dormancy. This process of selection causes a genetic bottleneck and leads a reduction in genetic variation (Ishii et al. 2013, Xu et al. 2012, Doebley 1989). Since wild rice accessions still have wider genetic variation than cultivars, they may keep many useful genes which can be used for rice improvement (Tanksley et al. 2007). In fact, there is considerable evidence that genes from wild rice and local varieties can improve the yield of cultivated rice and the resistance to biotic/abiotic stresses (Brar and Khush 1997).

Cambodia has a wealth of local rice varieties that have adjusted to different ecosystems. The natural selection pressures such as drought, submergence, salinity, flooding, nutrient stresses and biotic stresses have contributed significantly to the evolution of various rice varietal types for different environments (Javier 1997). So far, a total of 2,557 accessions of local varieties were collected and being conserved under medium term conservation in a gene bank of Cambodian Agricultural Research and Development Institute (CARDI). The germplasm collection also consists of wild relative species including O. rufipogon, O. nivara, O. nivara x O.rufipogon, O. ridleyi, and O. sativa f. spontanea (Vaughan 1990, Sahai et al. 1992a, 1992b, Lu 1996, 1997, Javier et al. 1999). These genetic resources were collected under various ecosystems in Cambodia. However, information on genetic resources of Cambodian wild and cultivated rice are less documented.
In Cambodian coastal areas, seawater is brought inland during high tides or salt rises from the shallow saline groundwater during the dry season from January to June. In most coastal areas, salinity is high in both soil and water during the dry season. It then decreases over time after the monsoon rains have started from June to December. But the salt comes back during the dry season when most of the fields are left barren. Only when freshwater resources are available, can salt-tolerant, short-maturing crops be grown in these areas. For wet-season rice, the main problems are encountered at the beginning of the season during crop establishment in the months of June to July when soil salinity is still high. Because rice is highly sensitive to salt stress in its early growth stage, this poses a major problem to rice farmers because transplanted seedlings may all die or seed not germinate (broadcasting method) and establishing a sufficient crop stand becomes very difficult. Accordingly, salt tolerance rice variety is an urgent need for coastal farmers.

In this study, a set of accessions including wild (collected from coastal area) and local cultivated rice from Cambodian germplasm will be used for phenotype and genotype analysis.
In order to understand the degree of genetic variation among wild and cultivated rice at molecular level, a survey using SSR markers will be carried out in this study. Firstly, a total of 12 SSR markers across the 12 rice chromosomes will be used to examine the genetic variation among wild rice,

genetic distance, and the identical genotypes at individual level. In addition, an allelic survey at salt tolerance related loci will be carried out using molecular markers.
Secondly, a phenotype survey of salt tolerance performances of these materials will be carried out using salt hydroponic. Based on standard evaluation system (SES) of IRRI (Gregorio et al. 1997), wild rice accessions and local cultivars will be screened and classified according to their level of salt tolerance. Finally, the salt tolerance varieties or accessions will be used as material for salt tolerance breeding program in Cambodia.

4. During the fellowship, I hope to accomplish as following:
- Classify the level of salt tolerance of the germplasm material.
- Analyze the genetic variation among germplasm material using molecular markers.
My research background is focus on genetic diversity and plant breeding using conventional and MAS methods. The main objective of our research scheme is to explore the stress adaptation traits (drought and salinity) that have evolved in germplasm and their precise introgression into elite varieties.

United State is known as the world's leading nation for innovation and technology. So far, plant breeding program in this country was advanced, and has reputation in the world. I strongly hope that working with a mentor in U.S. will improve my research skill in plant breeding and develop myself to become a professional plant breeder. Under the strong support from him/her the development of a salt tolerance variety will be possible in the future.

5. Cambodia agricultural by far is relying heavily on natural resource-based; erosion of natural resource by climate change and human activities could make this country fact to food crisis. Thus, enhancing agricultural productivity by Research and Development (new varieties) and knowledge extension is urgently need. I believe that a Borlaug fellowship will contribute to the two aspects which are the principle and basic of economic development from agricultural sector.

Action Plan

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

Week 1:
Activities: - Discuss research plan with a mentor
- Prepare seed materials for sowing
Material: Petri dish, seedling tray, marker, label.
Expected Outcome: the research proposal will be justified and all the materials will be allocated into petri dish

Week 2:
Activities: - Design and order primer
- DNA extraction from young leaf
- Attend training/class related to molecular breeding and breeding for abiotic stress tolerant.
Material: - SSR marker, Indel marker and genes specific markers
- DNA extraction buffer, homogenizer, centrifuge, 2 ml and 1.5 ml tube, incubator.

Expected outcome: Twelve SSR markers and gene specific marker will be obtained. 50% of plant materials will be DNA extracted.

Week 3
Activities: - Prepare Sodium solution for salt tolerant screening
- Transplant seedling into hydroponic
- Test polymorphic of primers and survey genetic variation among germplasm material using SSR markers
Material: - Sodium solution, and sodium meter
- Solution tank
- PCR machine and Polyacrylamide/Agarose Electrophoresis tank
Expected outcome: Planting materials will be transplanted into the solution tank. Polymorphic data from one to two SSR markers can be obtained.

Week 4
Activities: - Evaluate salt tolerance level of germplasm materials based on standard evaluation system (SES) of IRRI.
- Survey genetic variation using SSR and gene specific markers
- Attend training course or class related to breeding for drought and salinity tolerance.
Material: - SSR and gene specific markers
- PCR and Electrophoresis
Expected outcome: Several accessions and varieties will be identified based on the level of salt tolerance.

Week 5 to Week 10
Activities: - continue screening the salt tolerance level of the materials in sodium solution.
- continue genotyping the materials using molecular markers.
Material: - SSR and gene specific markers
- PCR and Electrophoresis
Expected outcome: Both phenotype and genotype data will be completely obtained.

Week 11 to week 12
Activities: Data analysis, report writing and present the result.
Expected outcome: An information of salt tolerance accessions will be documented and use as a basic information for future rice breeding program in Cambodia.

Fellow 3 – Sri Lanka; CSA

1. The goal of my study is to explore the adaptability of wild rice (Oryza nivara and Oryza rufipogon) populations to climatic changes and their utilization in varietal improvement.

2. The above goal will be achieved by
i. Determining the degree and distribution of genetic diversity of O. nivara and O. rufipogon populations in Sri Lanka.
ii. Determining the nutritional value of O. nivara and O. rufipogon populations from different localities
iii. Exploring drought, submerge and salinity tolerance of O. nivara and O. rufipogon
iv. Characterizing brown plant hopper (BPH) resistance in relation to antixenosis and antibiosis ability of O. nivara and O. rufipogon wild accessions and Study the inheritance of resistance in O. nivara and O. rufipogon wild accessions based on BPH bioassay/s
v. Testing compatibility of selected wild rice populations with selected improved varieties.

3. Rice is the staple food for about 50% of the world's population and more than half of the crop is produced and consumed in Asia. As the most prominent crop in Sri Lanka, rice plays a vital role in the food security and like any other crop, suffers various constraints to its production and productivity including biotic and abiotic stresses.

Climate change is estimated to drastically affect crop productions and paddy cultivation has no exception. Hence, there is an urgent need to redirect the rice-breeding program, which can stand well to climatic changes. Wild species of Oryza are an important reservoir of useful genes and can be exploited both to broaden the existing narrow genetic base and enrich the existing varieties with desired agronomically important traits. These wild species of rice have many important traits such as cytoplasmic male sterility, disease resistance, pest resistance and tolerance towards a variety of abiotic stresses (drought, salt and cold). Their nutritional status is still largely unknown. In Sri Lanka, five wild species of Oryza, are known. O. nivara and O. rufipogon, with AA genome are widespread and easy to hybridize than the others. Comprehensive understanding of ecogenetic diversification and eco-geographic variation in terms of nutrient composition, pests, disease resistance and drought, salinity like abiotic resistance of wild rice (Oryza nivara and Oryza rufipogon) will be focused in this study enabling their proper use in rice improvement. The present study includes a detailed field survey of the population distribution of O. nivara and O. rufipogon natural habitats throughout the country to understand the population genetic structure and ecogenetic diversification at DNA level. Further, characterization of BPH resistance, drought and salinity resistance of O. nivara and O. rufipogon populations will be focused. Additionally, it is well known that climate change exacerbate grain protein and micronutrients concentrations and hence, understanding nutritional composition of theses wild rice populations will have potential utilization in quality improvement of rice.

4. I). Learn modern techniques and current methodologies those are not still available in Sri Lanka, but applicable in cutting-edge research.
II). Nearly 20 years of my research experience, working with eminent scientists in standard laboratories in China, India, Australia and Netherlands would be a great advantage to achieve the proposed goals of my proposal. My hand skills on stress plant physiology, molecular biology and

biochemistry during my PhD study in China Agricultural University would be supportive to achieve some of the goals of this study (molecular basis of drought, submerge, salinity tolerance and BPH resistance) (Zou Jun-Jie, et al. 2015. The PLANT Cell) and Zou, J.J, et. al. 2010. J of Plant Physiology, 154. Further, my research experience on population genetics, gene flow and evolutionary biology by working with well-qualified scientists from Fudan University, Shanghai, China and Institute of Botany, China Academy of Sciences, Beijing, China would be a additional advantage to achieve proposed goals in my proposal (He Zhuoxian 2014. PLOS ONE. 9(12) and Disna Ratnasekera, 2014. WBM. 14).
III). Learn new techniques, statistical packages and novel skills will be helpful to achieve the research goals.

• Enhanced agricultural productivity- Understanding genetic basis of wild rice species through this research training will be useful to improve rice to enhance rice productivity in Sri Lanka. Research is essential to understand plant mechanisms, which can be manipulated into enhance productivity of an economically important traits such as yield, biotic and abiotic stresses tolerance.
• Economic development - Sri Lanka, as developing country is more vulnerable to the predicted climate changes, as the majority of the population are highly depend on agriculture for their livelihood. Although my country is self-sufficient with rice production, risk of facing climate change for stable production and improving quality aspects of rice are still challenging. In this context, improving the productivity, qualitatively and quantitatively of rice has become immense importance to feed nearly half of the world's population and is immediate priority in Sri Lankan government. Therefore, this project has direct impact on economic development by broadening rice genetic gene pool and stabilizing rice productivity under changing climate.
• Food security - Rice is the staple food and hunger leads into civil unrest challenging food security not only in Sri Lanka but also globally. By incorporation of biotic and abiotic resistant genes to cultivated rice would secure the stable food production of the country.

Action Plan

Week 1: University and laboratory orientation and induction programs
Week 2: Preparation and arrangement of samples (leaf, seed) for genetic analysis
Week 3: DNA extraction from the leaf, seed samples to determine genetic diversity, salinity, BPH and drought tolerance to achieve 1,2, 4,5 goals.
Week 4: Learning and analysis of aleurone layer of seed samples to determine nutritional status of the populations (goal 3)
Week 5: Analysis of genetic diversity using appropriate SSR markers
Week 6: Screening of BPH resistance using all available bph markers
Week 7: Screening of salinity and drought resistance using appropriate markers
Week 8: Learning techniques for data scoring
Week 9: Learning techniques for data scoring
Week 10: Learning statistical tools for data analysis
Week 11: Learning statistical tools for data analysis
Week 12: summarizing the results by exploring overall adaptability of two wild relatives of rice by means of its genetic diversity, BPH, salinity and drought resistance, nutritional status (for quality improvement of rice).

Fellow 4 – Philippines 1; Climate Smart Agriculture

1. The goal of my research is to evaluate the effects of Climate Smart Agriculture (CSA) practices and factors affecting adoption to support achievement of widespread adoption of CSA.

2. Specifically, it aims to:
Describe the adopters and non-adopters of CSA practices using their socio-economic characteristics; Identify the factors influencing the adoption of CSA practices;
Determine the ex-post effects of CSA practices on yield, selected input costs, and environmental benefits; and Provide a robust estimation of the effects of CSA practices on yield and selected inputs costs using rigorous counterfactual framework.

3. Given the impacts of climate change, CSA has received significant attention in the past years. However, like most new technologies, CSA practices remain at low levels of adoption because of the lack of evidences on the effectiveness of these approaches.

Evaluation of the potential economic as well as environmental outcomes resulting from such investments through the adoption of CSA practices (i.e., productivity enhancing and/or risk coping and/or resource conserving practices) are necessary for donors, policy makers, development agents, and researchers. It is important to validate the effectiveness of these approaches to aid decision makers in planning for investment in the dissemination of effective CSA practices. Selection bias is a major constraint in assessing impacts. This bias occurs when pre-existing conditions affect outcomes in a way that is not truly attributable to the intervention. For example, farmers with larger farm area achieve higher rates of return than farmers with smaller farm area even if they adopt similar technologies due to economies of scale. My research will provide a more accurate assessment of the effects of CSA practices, which have important implications for widespread adoption of these practices. A rigorous counterfactual framework (e.g., PSM, DID, RCT) will be used to accurately evaluate effects of CSA practices on key outcomes (e.g., income). Moreover, my research will explore extended CBA to account for environmental costs and benefits of adopting CSA practices.

4. My current work is on climate-risk vulnerability and ex-ante CSA prioritization. This research proposal can link my research interest on impact evaluation and my current work. My colleagues at CIAT have strong expertise on CSA but an additional mentor, who is an expert on impact evaluation, is needed in order to complete my proposed research. Aside from new learnings and networks, I hope to accomplish a research design that can be successfully implemented in my country after my fellowship.

5. In the Philippines, the Department of Agriculture (DA) through its Adaptation and Mitigation Initiative in Agriculture (AMIA) is supporting local communities to plan and implement strategies in managing climate risks. In 2016, AMIA launch integrated field-level action for establishing climatesmart agriculture (CSA) communities. AMIA envisions to achieve outcomes at scale by promoting the proven CRA practices, from its initial pilot sites to wider agricultural landscapes across the country. Thus, evidences on the effectiveness of CSA practices could help realize this vision. Moreover, my research outputs would contribute to CIAT's commitment to helping the Philippine

government in its prioritization and investment planning for CRA practices.

Action Plan

Week 1 - Orientation
Week 2 - Desk study (literature review)
Week 3 - Framework development
Week 4 - Consultation
Week 5-6 - Methodological design (detailed evaluation plan, summarizing sample, location, data collection plan, and key indicators)
Week 7 - Consultation
Week 8-9 - Secondary data collection
Week 9-10 - Report writing
Week 12 - Survey questionnaire development

Fellow 5 – Philippines 2; Global Research Alliance

1. The goal of my research is to determine the greenhouse gas emissions (GHG) of an aerobic rice production system using available and easy to use tools or methods for GHG measurements in order to recommend appropriate nutrient and water management to achieve yield potential while no harming the environment.

2. The specific objectives are:
2.1. Quantify the cumulative seasonal contribution of GHG emissions to the global warming potentials under aerobice rice production system;
2.2. Determine the level of trends of GHG emissions after several days of fertilizer application and irrigation;
2.3. Have better understanding on the dynamics of GHG emission under aerobic soil condition;
2. 4. Recommend appropriate timing and depth of irrigation, and rate of fertilizer to achieve optimum yield.

3. Rice remains the most important food crop among Filipinos. It is popularly grown under continuous flooding the field which requires substantial amount of water from land preparation to crop growth period. However, due to competition from domestic and industrial water use, several water management technologies have been developed to cope up with water scarcity. Among others, aerobic rice culture has been widely promoted and disseminated in a water scarce environment in the Philippines.

The aerobic rice culture involves growing of rice under well-drained, non-puddled and nonsaturated soil conditions. It is characterized by an input-responsive production system which has a potential yield of 4-6 ton ha-1 under well managed production system. Unlike in irrigated lowland rice culture, the aerobic rice reduces methane emission due to the non-flooded condition in growing rice plant. However, there may be a trade-off relationships between methane and nitrous oxide under aerobic rice culture as soil aeration increases the formation of nitrate and emissions of nitrous oxide. Hence there is a need to identify combinations of water (e.g. timing of irrigation), and fertilizer use, or even residue with the lowest global warming potential from combined methane and nitrous oxide emissions to achieve yield potential while no harming the environment.

4. Since 2007, I have been involved in various water management related studies such as optimizing water productivity in irrigated lowland rice systems by evaluating and designing appropriate water management technique for direct-seeded or transplanted rice. One of the output of these research, was the development of a rice technology bulletin entitled ““Controlled Irrigation: Saving water while having good yield” - a reference guide to managing irrigation water for farmers and extension workers. Since then, I have been actively Involved in the large scale technology adoption of AWD in the national irrigation system through provision of technical assistance, conduct of appreciation seminars and on-site-briefings to farmers.
When I took my graduate studies, I was invited by the International Rice Research Institute, as an affiliate research scholar, to work on the effects of AWD and seedling age of rice in increasing grain yields and water productivity of an irrigated lowland rice. I conducted one season field

experiment coupled with crop modelling to simulate scenario analysis of increasing threshold level for irrigation using AWD at different groundwater table depth.

In 2012, I was invited by IRRI to attend a short training course on GHG measurements in Germany. Since then, I was part of the team to work on the assessment of GHG mitigation potential of water saving technologies in irrigated rice fields in Central Luzon Philippines, funded by CCAF through IRRI. I have been supervising the measurements of GHG at the farmers' fields using closed chamber method, as well as in charge of the data analysis. Concurrently, I am also one of the researchers who are involved in a collaborative work with the Japanese government on the development of mitigation option for GHG emissions from agricultural lands in Asia. This project aims to reduce methane emission by at least 35% through water and crop management techniques. Following an established protocol, we established six season field experiments at PhilRice.

While most of my undertakings involved cost-reducing and improving grain yields through water and nutrient management, and recently working on GHG measurements but using manual closed chamber method, I would like to work on the GHG mitigation potentials, if there are any, of some agricultural management practices recommended in the Philippines using easy tools or methods available in the United States, that I can eventually apply in my field work. Specifically, I would like to quantify the GHG emissions of an aerobic rice production system in order to recommend appropriate management technique (e.g. timing of irrigation and fertilizer application) to reduce GHG emissions. The three-month fellowship under Borlaug GRA, if given the chance, will be an opportunity for me to learn method/tools for GHG measurements, enhance better understanding on GHG emissions, and an avenue to establish networks with US mentors for future collaborations.

5. Given the important role of rice production in the Philippines, strategies to adapt climate change are needed to ensure farmers can continue producing rice, while generating sufficient income and ensuring household and national food security are achieved. However, increasing rice production should also complement management practices that cares for the environment for sustainability. One of the recommended agricultural practices in growing rice in the country is shifting away from the conventional practice of continuous flooding the field, to being partly or even completely aerobic field condition especially in a water-scarce environment. Although, this could reduce irrigation water use and decrease methane emission, release of nitrous oxide from the soil and decline in soil organic matter are perceived to be the trade-off results. Hence there is a need to quantify/determine the GHG emissions of aerobic rice culture in order to recommend appropriate timing and depth of irrigation water, as well as recommend optimum fertilizer rate to achieve yield potential while no harming the environment. The Borlaug fellowship is an avenue to exchange ideas, and foster knowledge by highly trained US mentor to have a better understanding on the dynamics of GHG emissions; as well as, an opportunity to learn available and easy to use tools and methods in GHG measurements, and create linkages/networks for future collaborations.

Action Plan

Week 1: University and laboratory orientation, meeting with the mentor, staff introductions.

Preparation of protocol
Preparation of logistics to be used
-If possible, field plot to be used will be coordinated earlier so that seeding will be done immediately at the first week of the fellowship.

Week 2: Establishment of field/pot experiment
Soil collection and analysis
-Lay-outing, seeding, field labeling, first flush irrigation etc.
If possible, variety to be used will be early maturing variety in order to maximize data gathering

Week 3-10: Data gathering (i.e. gas sampling, agronomic data)
Gas analysis using gas chromatograph
Consultation with mentor (as per needed)

Week 11: Data analysis, consultation with the mentor

Week 12: Writing of report, presentation

Fellow 6 – Peru; Global Research Alliance

Proposal

Specific research objectives

Is it possible to design a monitoring scheme for the use of synthetic fertilizers? What are the main advantages for the State and producers?

How to involve the private sector in this scheme?

What are the proposals to be implemented in order to reduce the GHG emissions from agriculture related to management of agricultural soils?

Is it possible to build emission factors from Management of agricultural soils?

Background information

In accordance with the United Nations Framework Climate Change Convention (UNFCCC), Peruvian government as a Non Annex I country member, is committed to elaborate and submit a Biennial Update Report (BUR) on national Green House Gas (GHG) inventories.

The BUR report is submitted by the Ministry of Environment to the UNFCCC and requires sectorial GHG assessment in order to prepare the national report. In order to do so, Ministry of Agriculture is required to provide each year its' Annual Report of GHG (AR GHG) to the Ministry of Environment.

The 2014 AR GHG estimates a total emission of 26,233.20 Gg CO2 e. coming from agriculture sector at national scale. From this amount, agriculture soils represent the 51.38% (with 13,479.04 GgCO2 eq.) and Enteric Fermentation contributes with the 35.52% (with 9,316.90 Gg CO2 eq).

Other categories such as Manure Management, Rice Cultivation, Crop Residues and Savannah Burning represent only the 13.1%

Agricultural soils includes direct and indirect emissions of N2O from forage crops, fertilizers application (urea, calcium ammonium nitrate, ammonium sulphate) and other additions of N in the soil.

The present proposal is based on the second biggest emitter of GHG category: N2O direct emission by the use of synthetic fertilizers and aims to design a national "tracking" system for synthetic fertilizers with the view to strengthen agriculture assessment of GHG emissions and to guide future decisions towards a low carbon emission for agriculture sector.

During the experience obtained by preparing this AR GHG for 2014, even though the valuable data provided from the Statistics Department from the Ministry of Agriculture in Peru; there are some gaps and limitation that were identified:

-the last AR GHG includes some assumptions due to the lack of some data available that may lead in to a possible bias

-synthetic fertilizers are accounted from the amount of fertilizers imported, this fact may not necessary be accurate enough because not all the load received in that year is totally used in the field

The main problem, Synthetic fertilizers are not reported by a national entity, there are not official reports of the amount of synthetic fertilizers received and used in the field. Therefore, there is a need to

identify innovative and complementary methods to report an estimate in better way synthetic fertilizers for this annual assessment.

12 Week Plan
Week 1: University and laboratory orientations and staff introductions
Week 2 and 3: Identify relevant experiences applied in USA for the control of use of synthetic fertilizers (including threshold or national standards for N2 levels) towards low carbon agriculture or good agriculture practices.
Week 4 and 5: Identify methods to improve the emission factors estimations used in the Biennial Reports as Annex I country member of the UNFCCC
Week 5 and 6: Design a pilot initiative at a subnational level
Week 6, 7 and 8: Implement the field pilot research
Week 9 and 10:
Data analysis Week 11 and 12: Writing reports and proposal to Biennial Reports