

ANNEX III

APPLICATION FORM INCLUDING THE TRAINING COURSE PROPOSAL

Section 1 - Background On the Training Proposal

Project Title

Building technical expertise in DNA Barcoding for the identification of agricultural pests and invasive alien plant species in Nigeria

Preamble

One of the predicaments faced in Nigeria in management of invasive alien species (IAS), agricultural pests (AP) and developing conservation programmes is poor knowledge of concerned species especially their identification. About ten species are currently recorded as IAS in Nigeria. It is very likely that more IAS are yet to be discovered as a result of inadequate identification methods. Same is applicable to the country's list of AP and threatened species which is overdue for an update. Correct identification is crucial in enforcement of regulations and rapid response to the incidence of IAS and AP.

DNA barcoding technique is known for accurate species identification and it uses only small tissue samples from any part of the organism to generate reproducible results.

Target 9 of Nigeria's NBSAP is aligned with Aichi target 9 of identifying and prioritizing IAS for effective control and eradication. The proposed training will impact on this target by ensuring accurate species identification in prioritizing and updating the existing baseline database for appropriate control and eradication measures.

Building capacity in DNA techniques will also impact on achieving target 14 on capacity building for key actors which is aligned with Aichi target 19 of improving and transferring science base knowledge and technologies, and the COP decision XI/2 of welcoming capacity-building workshops and training modules for implementation of the Strategic Plan for Biodiversity 2011–2020.

Project Outline

The training is expected to take place within 7 days targeting not more than 12 trainees drawn from relevant Institutions involved in regulation, control and monitoring of invasive plant species and agricultural pests spread across the six geopolitical zones of Nigeria. The expected number of facilitators, instructors and support staff would be about ten in number. About 45% of the training module would be dedicated to field and laboratory experience, 25% for computer analysis on bioinformatics, 20% for presentations and 10% for discussions on relevant policy issues. Methods that would be employed are lectures, interactive sections, live demonstration in collection techniques and hands-on experience on collection and preservation of DNA compliant specimens by trainees. Laboratory hands-on experience on tissue sampling, tissue lysing, DNA extraction, PCR and reading of Gel-electrophoresis demonstrated by instructors and hands-on by trainees will employ an adapted methodology from GTI training course (2016). Selected trainees are expected to come along with fresh specimens (preserved in DNA friendly reagent) of concerned species as it relates to their field of analysis, and specimens from herbaria of involved institutions will also be sought for analysis. About 50 specimens (25 specimens each for agricultural pest and invasive alien plants species) are expected to be analysed. Pre-workshop activities would involve gathering of data on existing molecular laboratories in Nigeria and level of DNA work that can be done in each laboratory (together with contact details of coordinators). If possible, cost of analysis in those laboratory would also be included. Proposed fall out of the training are extracts and amplified DNA samples of invasive plant species and some agricultural pests in Nigeria to be sent to a commercial sequencing facility for

sequencing and map out of human resources and facilities in Nigeria where certain level of molecular studies can be done.

Post-Project Follow-up Activities

- Seminars in various relevant institutions e.g Agricultural Quarantine Service, Ministry of Environment, Forest Research Institute etc to highlight prospects of DNA barcodes in species identification by the new trainers and facilitators.
- Meetings with Heads of Department of collaborating Institutions (University of Ibadan, Ahmadu Bello University, etc) on inclusion of DNA Barcodes for species identification as a topic in systematic biology curriculum
- Meetings with GTI and CBD national authorities for them to propose inclusion of DNA base diagnostic approach in policy formulation involving invasive and pest species especially in cases of forensic issues.
- Develop a standard operating procedures for collection of DNA compliant samples to be disseminated to all repository in institutions (e.g herbaria, museums, insect collections centres and universities equipped with repository facilities)
- Continuous basic level of training e.g sample collections and preservation for DNA studies etc. (As may be required by the CBD Focal Point) for staff involved in Invasive and Alien species programme in Nigeria
- To pursue possible research collaboration with Biodiversity Institute of Ontario and in contributing to BOLD database.
- Form a proposal writing group comprising of the facilitators and the new trainers for funding for future activities especially in upgrading an existing facility to perform routine DNA base diagnostics

Section 2 - Logic Model

Project Objectives

1. To improve the capacity on documentation system of agricultural pests and invasive alien plant species in Nigeria by improving on the existing national database.
2. To expose participants to DNA barcoding techniques as a diagnostic tool in detection of invasive plant species, agricultural pests and other plant species of importance in Nigeria.
3. To train participants on proper method of sample collection and preservation of specimens for DNA analysis and documentation for traceability purpose
4. To contribute 50 records of DNA barcodes of agricultural pests and invasive species found in Nigeria to the Barcode of Life Data System
5. To lay ground work for research linkages and possible collaboration opportunities with institutions or organizations where DNA barcoding facilities can be provided nationally or internationally.

Expected Project Outcomes

1. Creation of functional national network of expertise on DNA barcoding for biodiversity issues in Nigeria meeting the NBSAP target 14 of capacity building of key biodiversity actors.
2. Updated documentation of agricultural pests and invasive plant species lists to a database deployed at major points of entering to Nigeria to improve efficient monitoring and interception meeting NBSAP target 9.

3. Identification and documentation of challenges/limitations of existing facilities (e.g NIPRD Laboratory) towards upgrading and designation as a national centre for DNA barcoding analysis/research to help biodiversity studies
4. Inclusion of barcodes of invasive alien plants and agricultural pests of Nigeria into the BOLD database
5. Creation of a network of institutions in Nigeria involved in molecular analyses for collaborations on DNA barcoding of Nigeria's biodiversity.

Performance Indicators

1. Two minutes of meetings (pre and post workshop), photographs from training activities, attendance list, presentation slides, training evaluation report by participants and certificates of participation issued.
2. Creation of 2 BOLD projects (one for agricultural pests and one for Plants) in collaboration with BIO.
3. Two minutes of meetings with government officials to lobby for improved budget allocation and the hosting institution, one report to map out the equipment needs for upgrading the existing facility to perform routine DNA barcoding research
4. At least five seminars presented by participants in their various institutions after the training including seminar report and photographs
5. One Facebook page and whatsapp group created to disseminate information and subsequently monitor activities of the new trainers.

Section 3 - List of Applicants and Facilitators

Lead Applicant

Name	Jemilat Aliyu Ibrahim, Ph.D
Institution	National Institute for Pharmaceutical Research and Development
Address	Plot 7 & 8, Idu Industrial Layout, Abuja. Nigeria
Work phone	2347036512604
Email	sadiqoyene@yahoo.com , sadiqoyene@gmail.com
Country	Nigeria

Co-Applicants

Name	Institution	Email
Prof. Abiodun Emmanuel Ayodele	Department of Botany, University of Ibadan, Ibadan, Oyo State, Nigeria	bayodele@yahoo.com, ae.ayodele@ui.edu.ng, bayodele62@gmail.com

Team Members

Name	Institution	Primary Role
Prof. Iliya Shehu Ndams	Department of Zoology, Ahmadu Bello University, Zaria. Kaduna State, Nigeria	Training Instructor
Prof. Oluyemisi F. Kunle	National Institute for Pharmaceutical Research and Development	Training Instructor
Dr Bitrus Yakubu	Applied Molecular Division, National Veterinary Research Institute, Vom, Plateau State	Training Instructor
Mr. Shehu Ndama	Forestry Department, Federal Ministry of Environment, Abuja	Training Instructor

Ms. Aisha Abubakar	National Institute for Pharmaceutical Research and Development	Support staff
Mr. Akeem Adeyanju	National Institute for Pharmaceutical Research and Development	Support staff
Dr. Henry O. Egharevba	National Institute for Pharmaceutical Research and Development	Event Coordinator
Mrs. Omolola T. Fatokun	National Institute for Pharmaceutical Research and Development	Event Coordinator
Prof. Abiodun Emmanuel Ayodele	Department of Botany, University of Ibadan, Ibadan, Oyo State, Nigeria	Training Instructor
Dr. Jemilat A. Ibrahim	National Institute for Pharmaceutical Research and Development	Training Instructor

Training instructors

Name	Area of Expertise	Instruction Topic
Dr. Jemilat Aliyu Ibrahim	Plant Taxonomy, CBD trained participant on DNA Barcode for identification of species	sample collection, front-end processing, laboratory analysis
Prof. Abiodun E. Ayodele	Plant Taxonomy and Environmental Botany	sample collection, front end processing
Prof. Iliya Shehu Ndams	Insect Ecology, molecular Ecology of Parasites, population genetics, nuerogenetics, biostatistics, megadata formatics,	Laboratory Analysis, Bioinformatics
Prof. Oluyemisi F. Kunle	Pharmacognosy, Intellectual Property Rights	Intellectual property Right, material transfer agreement.
Mr. Shehu Ndama	Forestry Department, Federal Ministry of Environment, Abuja	Implementing NBSAP for Nigeria: Its Challenges and prospects; Peculiar ABS issues in Nigeria
Dr. Bitrus Yakubu	PCR Technology, diagnosis of animal diseases, Recombinant DNA technology	DNA Extraction animal and plant specimen, PCR, e-gel

Section 4 - Background Information on Facilitators and Participants

Background of Applicants and Instructors

The lead applicant, Jemilat Ibrahim has a Ph.D in Plant Taxonomy with about 45 publications. She took part in the 2015 GTI training course on DNA barcoding for species identification. She is currently the curator of her Institute's herbarium and participated actively in the review processes of NBSAP for Nigeria. She was trained by ABS Capacity Development Initiative as a member of the team in charge of ABS Implementation. She was the Institute seminar coordinator for about 10 years and participated in organizing several conferences and scientific programmes.

Prof A. E Ayodele is a Plant Taxonomist with over 60 publications. He was the curator of University of Ibadan Botanical Garden for about 10 years and the Herbarium for 21 years. He lectures plant systematics and has expertise in biodiversity conservation and Environmental Impact Assessment.

Iliya Indams has a Ph.D in Zoology with over 45 publications. He has attended several trainings in field of molecular biology and Bioinformatics. He currently lectures bioinformatics and molecular biology in his institution.

Bitrus Yakubu has a Ph.D in Biochemistry. He is experienced in diagnosis of animal diseases, PCR methodology and recombinant DNA technology. He has several publications in use of DNA in detection and identification of disease pathogens and insects. Yemisi Kunle is a professor of Pharmacognosy and consultant on Intellectual Property Rights for Indigenous Knowledge in Nigeria with about 50 publications.

Partners and Stakeholders

1. National Institute for Pharmaceutical Research and Development: provide support in terms of venue, laboratory facility, herbarium, human resource
2. Federal Ministry of Environment: to provide human resource: NFP, Mr. Shehu Ndaman, Deputy Director/Head Conservation Division Federal Ministry of Environment Plot 393/394, Augustus Aikhomu Way Utako District, P.M.B. 468, Garki Abuja Nigeria. +234 8032183322; E-Mail: shehunda@yahoo.com
3. Department of Botany, University of Ibadan, Ibadan, Oyo state, Nigeria: human resource (Instructors), herbarium facility
4. Applied Molecular Division, National Veterinary Research Institute, Vom, Plateau State: Human resource
5. Department of Zoology, Ahmadu Bello University (ABU), Zaria, Kaduna state Nigeria: Human resource

Trainees

Target audience: Researchers/officers who have at least a master's degree in the field of biology, zoology, botany, forestry, agriculture, who are involved in invasive alien species monitoring and quarantine, protection and management of biodiversity/resources and pest management in a government own agencies, higher institutions, research institutions and NGOs.

Postgraduate students (Ph.D) may be considered; preferably his/her field of research falls within the above mention areas and he/she is affiliated with an agency or institution where the acquired training will be useful.

Means of communication before training: call for nomination will be through fliers and posters sent to relevant institutions, messages sent to relevant professional whatsapp group and group email addresses.

Means of communication after training: email addresses, whatsapp group that will be formed after the training for participants, phone calls where necessary.

Trainee Selection Criteria

1. Selected trainees should have minimum qualification of an M. Sc degree in relevant field of science e.g systematic biology, taxonomy, zoology, molecular biology, agriculture, environmental science, forestry, etc.
2. Researchers or officers involved in research, training and management of conservation programmes, pest management and control, monitoring and management of invasive alien species and any other relevant field related to the theme of the training.
3. Selected trainees should be officers that work in organisations, institutions or agencies spread across the six geo-political zones of Nigeria.

4. Trainee selection will be evenly distributed among male and female gender, and possibly, with about 50% of the total slots reserved for the female gender to fulfil the UN policy on gender equality and women empowerment.

Expected Number of Trainees

Expected number of trainees is estimated to be about 12 in number selected from the six geo-political zones of the country. Trainees will have a balanced gender representation.

Section 5 - Training Venue and Logistics

Hosting Institution

Hosting Institution's core mandate is research and development of phytomedicines, pharmaceuticals & biological products. Among the Institute's activities are collection, identification, cultivation and storage of seeds/plants of interest. The institute carries out molecular diagnoses, recombinant DNA technologies & gene amplification using PCR technology.

Funding is mainly from the country's annual budget. Capital budgets from 2014 to 2017 are \$1,203,635, \$138,505, \$134,959 and \$409,028 respectively. Recent externally funded projects are: World Bank StepB Project on development of anti-diabetic phytomedicines, NIH Grant for anti-tuberculosis molecules from medicinal plants, American Cancer Society grant on development of oral morphine solution & ANDi grant on Co-formulation of NIPRSAN phytomedicine.

About fifteen Institute's staff spread across five departments/unit will be involved in the training; match funding in-kind are staff salaries, laboratory, ICT & herbarium facilities.

Training Venue

The training venues are located within the premises of the hosting Institution. The proposed venue for pre-training presentations and discussion is the 40 seat capacity conference hall equipped with multimedia projector and all other gadgets required for a seminar. The Herbarium equipped with microscopes, imaging equipment, a desktop computer, plant presses and all other collection tools required for specimen management is located in the Department of Medicinal Plant Research and Traditional Medicine and houses about 4,000 plant specimens and well-trained staff for front-end processing. It can accommodate 12 trainees for all front-end activities except imaging which will be demonstrated by the Instructor. Proposed venue for laboratory analysis is the Molecular Laboratory located in the Department of Microbiology and Biotechnology. It is equipped with a centrifuge, incubator, PCR machines, Gel- electrophoresis and a solar powered refrigerator for sample storage etc. Hand-on is proposed to be in 3 batches for the 12 trainees as the lab can take about 4 trainees at a time.

Venue for bioinformatics is the ICT Unit of the institute's library equipped with over ten desktop computers. Relevant software (e.g Codon Code Aligner, MEGA) will be installed prior to the training activities. Data from previous studies will be sought for bioinformatics training. Introduction to Barcode of Life Data Systems (BOLD) for sequenced data and metadata storage and analysis will be provided.

Training Activities

Day 1: Presentation: Overview of DNA barcoding: introductions, application of DNA Barcoding in taxonomy, health, food safety, biodiversity conservation; pest management, habitat monitoring. Instructor: Jemilat Ibrahim

Collection, interactive: collection and preservation of DNA compliant specimens; arraying, imaging, sampling, voucher specimen, and data tracking. Instructors: Abiodun Ayodele, Jemilat Ibrahim

Day 2: Hands-on: Laboratory: GLPs, tissue sub-sampling, lysis. Instructors: Bitrus Yakubu, Jemilat Ibrahim

Day 3: Hands-on: Laboratory: DNA extraction. Instructor: Bitrus Yakubu,

Day 4: Hands-on: Laboratory: PCR amplification and e-gel electrophoresis. Instructors: Iliya S. Ndams, Bitrus Yakubu

Day 5: Lectures: Introduction to DNA sequencing methods; good quality sequence; Introduction to BOLD. Instructor: Jemilat Ibrahim,

Day 6: Bioinformatics: Assembling DNA sequences; use of online data repository. Instructors: Iliya S. Ndams, Jemilat Ibrahim

Day 7: Discussions – policy related issues: Implementing NBSAP for Nigeria: its challenges and prospects; ABS issues peculiar to Nigeria; Intellectual property right regarding indigenous knowledge: NIPRD example; Material transfer agreement: current practices in Nigeria, implementing NBSAP: challenges and prospects. Instructors: Yemisi Kunle; Shehu Ndama

Project Logistics

Communication: Fliers, letters will be sent to relevant institution calling for nomination. Selected trainees will be notified through emails and letters. During the training sections, communication will be by announcements, emails, text and whatsapp messages. Emails, whatsapp and text messages will be used for Post training communication.

Transportation: provision of return flight tickets and local transport for some invited trainees and resource persons from distant parts of the country. Bus fare will be reimbursed to trainees that travel by road. A bus will be provided to aid logistics and to transport trainees from their hotel to the training venue and back every day.

Accommodation: Trainees and facilitators are proposed to be accommodated in the same hotel of close proximity to the venue to easy logistics.

Meals and catering: Catering services at the venue is proposed. Tea break and lunch at the training venue, and dinner at the hotel will be provided for every trainees and resource persons.

Venue and laboratory are in-kind contributions of the hosting institution. However, appropriate fees charge for maintenance of the facilities throughout the period of training and also in making the venue suitable for the proposed training will be paid.

Detailed financial and training reports proposed to be submitted within the time stipulated by CBD and Focal Point. While post-activities commence immediately after the training.