



**INTERNATIONAL  
FOUNDATION FOR  
SCIENCE**

# The COMSTECH/IFS Programme

Strengthening research capacity in the  
developing countries of OIC

Report for 2015

## **The International Foundation for Science (IFS)**

The International Foundation for Science was conceived and initiated in the 1960's by individuals within the scientific community deliberating on science and world affairs. It was given life through the efforts of many pre-eminent scientists and philosophers, national and multinational academic institutions, and especially the Royal Swedish Academy of Sciences. Over its history IFS has evolved to address the needs of the time, around a consistent model of a small secretariat supported by a large number of internationally recognised scientific advisors and a strong partnership focus where the organisation works with a large number of regional and national organisation to support training and workshops (that are thematic as well as scientific methodology and communications oriented) to bring bigger impact. Thematically, IFS has been focusing on research that provides an important input for sustainable management of biological and water resources. As the global development paradigm has progressed, IFS has evolved from a biological sciences focus to biological and water resources and to including social sciences along with natural science perspectives as it has responded to the Millennium Development Goals and now to the emerging Sustainable Development Goals outlook. Scientific support services have included: Mentoring introduced by IFS advisors to grantees, equipment purchasing support for those in the most challenging environments, travel grants and other facilities, increasing the scientific support from established colleagues as well as increased networking of young researchers to interact and learn from peers elsewhere. From its earliest origin till today IFS aspired to and is widely acknowledged to have achieved a personal and sympathetic style of dealing with applicants and grantees that is attractive and effective in building confidence and capability of early-career scientists from countries with the least developed scientific infrastructure.

The earliest instrument of support and the mainstay today is the research grant to an individual, affording opportunity as well as recognition to grantees. As IFS developed, the number of grants increased, and second and third grant opportunities provided early continuity of funds, affording establishment of a research career-base. Later IFS introduce prize awards to recognise and celebrate scientific excellence and to generate role models especially amongst girls and women scientists, and then the combination of granting and capability building support that appears most effective in nurturing those with greatest potential and least opportunity. Today, IFS continue to build capability and also embrace the potential of social networking and mentoring to enhance collaboration. The aspirations of early-career scientist, and of IFS, today go beyond building scientific capability to focus also on the important body of research that grantees produce and to help them to put it into use.

## **The Standing Committee on Scientific and Technological Cooperation (COMSTECH)**

The Standing Committee on Scientific and Technological Cooperation (COMSTECH) was established by the Islamic Summit in 1981, and it is composed of all the member states of the Organization of the Islamic Conference (OIC).

COMSTECH aims to assess human and material resources, to build indigenous capabilities in the fields of science and technology, to promote the cooperation and coordination of its member states in scientific and technological areas. It also aims to create an effective institutional structure for planning the research, development and monitoring of scientific and technological activities at Ummah level.





## **How COMSTECH and IFS work together**

The IFS review process (well tested since IFS was established in 1972) involves reviews and comments on each application by a number of international experts, chosen from the IFS network of more than one thousand IFS Scientific Advisers. After the review process, the successful project proposals from OIC countries are sent to the COMSTECH Secretariat. COMSTECH verifies the scientific quality and relevance of the projects, and selects projects for support under this programme, giving consideration to a suitable geographic and disciplinary distribution.

The grants can be used for field and laboratory equipment (including computers), supplies, temporary labour, literature, and a realistic amount of local travel. A grant can be used during a period from one to three years, and may be renewed twice with the same maximum amount (renewal grants are also awarded in competition). A very successful scientist could be supported for a period of up to nine years, with a maximum amount of USD 36,000. The collaborative activities of the partnership also include non-grant activities. Scientific workshops and support to purchase scientific equipment can be considered, and grantees are encouraged to apply for travel grants to attend international meetings or training courses to underpin their research grant.

## **COMSTECH-IFS Research Grants Program**

The Organization of the Islamic Conference Standing Committee for Scientific and Technological Cooperation (COMSTECH), in collaboration with International Foundation for Science (IFS) supports research projects of importance to meeting the development needs of the OIC member states. US\$ 2,922,034 million, so far, have been spent to support 276 research projects from 34 OIC member states.

**Table 1: Country distribution of COMSTECH/IFS grants to date (1998-2015)**

country_en	1998W	1999S	1999W	2000S	2000W	2001S	2001W	2002S	2002W	2003S	2003W	2004S	2004W	2005S	2005W	2006S	2006W	2007S	2007W	2008S	2008W	2009S	2009W	2010S	2010W	2011S	2011W	2012S	2012W	2013S	2013W	2014S	2014W	2015S	2015W	Total					
Afghanistan																																				1	1				
Algeria											1																										1	1			
Bangladesh					1	1					1															1	1	1	1	2	1	1					17	17			
Benin		1		1						1				1	1	1	1	1	1	1	1	1	1				1	1	1	1	2	1				14	14				
Burkina Faso	1	1		1							1				1	1		1	1						1	1											13	13			
Cameroon	2			1						1			1		2					1								1										15	15		
Cote d'Ivoire															2	1	1	1								1	1			1	1							11	11		
Djibouti																																						1	1		
Egypt		1			1	1					1	1					1								1	1									1	2		11	11		
Gabon												1											1															2	2		
Gambia					1						1																											2	2		
Ghana																																						1	1		
Indonesia	2	1				1	2				1				2								1	1	1			1	1	1								15	15		
Iran			1									1	1	1		1	1			1	1		2	1			1	1	1	1								15	15		
Jordan									1				1						1	1																		4	4		
Lebanon									1								1																						2	2	
Malaysia			3		1				1							1							1	1			1	1	2										13	13	
Mali	1										1	1							1	1																1	1		8	8	
Mauritania	1																																						1	1	
Morocco	2	2		1														1	1		1					1										1	1		11	11	
Mozambique							1		1	1																											1	1		5	5
Niger											1	1	1																									1	7	7	
Nigeria	2	1	1	1		1			1				1		2					1						1	1			1	1	1	1	1	1	2			18	18	
Pakistan			2		1				1	1			1		2			1		1	1	2	1	2	2		1	2	3	1	1	1	1	1	1	1	1	5	29	29	
Senegal	1			1							1				1				1	1			1	1													1	1		10	10
Sierra Leone					2																																		2	2	
Somalia																																							1	1	
South Africa			1																																				1	1	
Sudan		1				1	1		1				1																									1	8	8	
Suriname																																							1	1	
Togo						1	2								1		1				1	1																	9	9	
Tunisia	2			1											1					1	1					1	1											2	1	11	11
Uganda	2									1			1		1	1							1	1	1			1		1	1	1	1	1	1	1			14	14	
West Bank and Gaza																																							2	2	
<b>Total</b>	<b>16</b>	<b>8</b>	<b>8</b>	<b>7</b>	<b>7</b>	<b>6</b>	<b>7</b>	<b>4</b>	<b>6</b>	<b>7</b>	<b>5</b>	<b>7</b>	<b>7</b>	<b>6</b>	<b>13</b>	<b>9</b>	<b>6</b>	<b>8</b>	<b>10</b>	<b>9</b>	<b>8</b>	<b>10</b>	<b>10</b>	<b>8</b>	<b>9</b>	<b>9</b>	<b>14</b>	<b>17</b>	<b>18</b>	<b>17</b>	<b>17</b>	<b>17</b>	<b>17</b>	<b>17</b>	<b>276</b>	<b>276</b>					

## **Activities in 2015**

### **Grants**

As in previous years, the main activity undertaken under the partnership in 2015 was to award competitive research grants.

In 2015, after verifying the scientific quality and relevance of the successful projects and giving consideration to a suitable geographic and disciplinary distribution, COMSTECH selected 17 projects for support under this programme. The total amount of funding for these grants was USD 199 100 of which COMSTECH contributed USD 99,550. The grantees are distributed geographically through 12 OIC countries and six of the grantees are women scientists. Country distribution is shown in Table 1 for the 2015. A full list of the new COMSTEC/IFS grantees for 2015 with names, institutions and project titles and a list with abstracts is shown in Appendix 1.

Both COMSTECH and IFS will provide, over and above the grant funds, support and advice to the grantees. Supporting services include: participation in relevant workshops, integration into regional research networks and the establishment of contacts with international scientific peers.

## Appendix 1: COMSTECH/IFS Grantees 2015 and abstracts

### Bangladesh

Nr. A/32628-0  
(A/5788-1)                      **SAROWAR, Mohammad Nasif** Gender: Male

**Institution Address:** Dept of Fisheries Biology and Genetics  
Faculty of Fisheries  
Bangladesh Agricultural University (BAU)  
Mymensingh 2202  
Bangladesh

**Budget approved:** 12000

**Budget Co-funded:** 6000

**Project Title:** Towards understanding mycotic diseases in aquaculture in Bangladesh: Molecular approach to characterisation of the causal agents

**Project Summary:** Fisheries and aquaculture industry is becoming increasingly important and continues to grow annually worldwide as well as in Bangladesh. However, outbreak of diseases, including mycotic diseases such as saprolegniosis and Epizootic Ulcerative Syndrome (EUS), frequently result in enormous economic losses and threaten both production targets and even the long term viability of the industry as well as natural ecosystems. In addition to recurrent pandemics of mycosis in wild fish, large-scale mortalities (20-50%) have repeatedly been recorded in fish farms in India and Bangladesh. However, little is known about the disease biology and host-pathogen interaction despite its economic and social impact. Controlling mycosis has been a big challenge due to the lack of early detection and prevention methods. In this situation, taking into account the economic impact of mycotic diseases in aquaculture, understanding the host-pathogen interaction is crucial for sustainable prevention and control measures of the disease. Despite its economic importance, little has been done in relation to mycotic disease identification and prevention in Bangladesh, hence the diversity of the pathogen is unknown at species level, one of the biggest impediments towards sustainable prevention and control of the disease. The overall objective of the research project is to identify prevalent oomycetes at species level that are frequently causing mycotic diseases in fishes in aquaculture through molecular disease management. The long term objective of the project is to understand the host-pathogen interactions of mycotic disease and formulate sustainable prevention and control measures. After completion of the project we expect to have highly relevant data that will help towards developing novel ways to control mycotic diseases, which is essential for fish farms in Bangladesh as well as in South East Asia.

## Benin

Nr. D/32734-0                      **GOUSSANOU, A Cedric** Gender: Male  
(A/5835-1)

**Institution Address:**      Laboratoire d'Ecologie Appliquée (LEA)  
   Faculté des Sciences Agronomiques (FSA)  
   Université d'Abomey-Calavi (UAC)  
   01 BP 526  
   COTONOU  
   Benin  
   OBS: Un de deux locaux de LEA. L'autre est situé à ISBA au Champ de foire.

/Ili 2010-08-16

**Budget approved:** 10500

**Budget Co-funded:** 5150

**Project Title:** Estimation and monitoring of litterfall carbon fluxes in Lama forest reserve

**Project Summary:** Litterfall is an important component of the nutrient and carbon cycle in forest ecosystems. Understanding litterfall dynamics of forests is useful to ascertain the process of carbon sequestration and nutrient cycles. Literature emphasized global changes effect on litterfall inputs in forest floor and the high variability of litterfall quantity and quality. Advances in aboveground carbon have been made but for the case of Benin, attempt to estimate the variability of litterfall carbon fluxes at local scale is rare despite the importance of this carbon pool. The purposes of the present project is to estimate and monitoring during two years litterfall carbon and environmental factors that affect it. Litterfall will be collected from litter traps set up in the forest across vegetation type. Monthly average of litterfall will be determined and litterfall component which contribute the most to carbon storage will be determined. Moreover we expected to identify how far climatic factors influence litterfall production and litterfall carbon. In add, the turnover rate of litterfall will be evaluated in order to know how biochemistry process occur. A prediction model of litterfall carbon fluxes will be elaborated in order to monitor variation in litterfall and his consequence on forest floor productivity. Our results will permit to improve inventories of forest carbon stock and provide data for REDD+ project implementation.

## Burkina Faso

Nr. C/32679-0                      **ZOUGRANA, Sylvain** Gender: Male  
(C/5013-1)

**Institution Address:**      Département Productions Végétales  
   CRREA de l'Ouest  
   Institut de l'Environnement et de Recherches Agricoles  
   Station de Farako-Bâ  
   01 BP 910  
   Bobo-Dioulasso 01  
   Burkina Faso

**Budget approved:** 12000

**Budget Co-funded:** 6000

**Project Title:** Evaluation de la stabilité de nouvelles sources de résistance aux *Xanthomonas oryzae*, agents pathogènes de la bactériose vasculaire et à stries foliaire translucides du riz au Burkina Faso

**Project Summary:** La bactériose vasculaire et à stries foliaires respectivement dues à *Xanthomonas oryzae* pv. *oryzae* (Xoo) et *X. oryzae* pv. *oryzicola* (Xoc) sont deux maladies émergentes du riz qui sévissent en Afrique de l'Ouest et particulièrement au Burkina Faso. De nouvelles sources de résistance ont été identifiées dont les analyses en laboratoire ont permis de montrer leur grande efficacité d'action face à un large spectre de souches africaines de *X. oryzae*. Il s'agit précisément de variétés adaptées au régime de culture pluviale telles les NERICA 12, NERICA 13 et NERICA 17 et les variétés améliorées FKR19 et FKR43, efficaces à la fois contre Xoo et Xoc en conditions d'inoculation artificielles. De plus, le phénotype de résistance à Xoo a pu être observé à tous les stades de croissance végétative (plantule, début tallage, tallage maximale-maturité) de la plante. Ces données sont d'autant plus importantes que le riz est très sensible aux bactérioses durant le stade plantule, notamment du fait des blessures provoquées lors de la transplantation. Avant leur utilisation dans des programmes d'amélioration et leur déploiement à grande échelle, il est nécessaire d'évaluer la stabilité des résistances de ces variétés afin de réduire les risques de contournement face aux potentielles adaptations des souches de *X. oryzae*.

Le projet vise à suivre l'évolution des populations pathogènes de *X. oryzae* identifiées sur des parcelles expérimentales semées avec les accessions résistantes y compris des lignées isogéniques sur des sites connues pour subir une forte pression épidémique à l'aide de marqueurs VNTR/MLVA développés avec l'IRD. L'objectif à terme est de caractériser des gènes de résistance stable à une large gamme de races de *X. oryzae*.

## Cameroon

Nr. B/5115-1  
(B/5115-2) **HAKO TOUKO, Blaise Arnaud Gender: Male**

**Institution Address:** Department of Animal Science  
School of Agriculture & Natural Resources  
Catholic University Institute of Buea  
P.O. Box 563  
Buea South West region  
Cameroon

**Budget approved:** 12000

**Budget Co-funded:** 6000

**Project Title:** Upgrading natural disease resistance against Avian paramyxovirus 1 (Newcastle disease) and in situ in vivo conservation of selected local chickens

**Project Summary:** In Cameroon, indigenous chicken plays a key role to food security and poverty alleviation. It is an important source of meat and eggs and a means of investment to improve the welfare of rural people estimated 70% of national population. Needless to say, diseases are their serious threat with up to 70% of local chicken killed by the Newcastle disease virus (NDV) in affected areas after outbreaks. This situation is an alarm to draw the attention researchers, governmental and non-governmental organisations and local authorities on the severe decrease of family poultry productivity as well as the loss of the indigenous chicken biodiversity in a context where 34% of the avian breeds in Africa are on the verge of extinction. In a bid to contribute to a sustainable use and management of indigenous chicken genetic resources for better health and wealth at households, effects of the naked neck gene (Na) on adaptability and immune response against the NDV was successfully achieved in our previous IFS research work. The improvement of selected tolerant genotypes as their in vivo in situ conservation was strongly recommended hence, the goals of this project. Indirect ELISA method will be used to assess antibody responsiveness to vaccination and to experimental infections while effective breeding schemes will be recommended to transfer resistant genes to susceptible genotypes. Newcastle disease resistant or tolerant breeds and a community based management of selected genotypes are the main expected output of the project. An application to the African Bioscience Challenge Fund 2015 will be an extra activity for an accurate identification of tolerant genes genotyped in the previous IFS project. The project will cover 32 months.

## Cameroon

Nr. F/32611-0  
(F/5779-1)                      **NOUBISSI, Paul Aime** Gender: Male

**Institution Address:** Department of Zoology and Animal Physiology  
Faculté des Sciences  
Université de Buéa  
BP 63  
BUEA, Southwest Province  
Cameroon

**Budget approved:** 12000

**Budget Co-funded:** 6000

**Project Title:** Study of Anti diarrheal and anti microbial effects of *Crinum jagus* (Amaryllidaceae) extracts

**Project Summary:** Despite the technological advancements in modern medicine, approximately 80% of the populations in Africa still rely on traditional healing practices, especially medicinal plants for their different health problems. A good knowledge of the efficacy and safety of these plants, as well as the nature of the active principles for human diseases treatment can help to improve therapies with a more affordable pharmacopoeia. Among these numerous species, *Crinum jagus* (Amaryllidaceae) is a plant used in Cameroon folk medicine to treat memory loss, cough, asthma, rheumatism, diabetes, and gastrointestinal disorders. The gastrointestinal diseases commonly exhibit symptoms of constipation and diarrhea affecting more than 70% of the population worldwide. In developing countries like Cameroon, diarrheal disease constitutes a leading cause of mortality and morbidity. It causes the death of millions of people each year. Particularly children are more prone towards this disease which acts as the second leading cause of death of children age group below five years. Diarrhea is one of the GIT disorder characterized by an increase in frequency and change in stool consistency in the processes of defecation. GIT disorders are the symptoms of many other diseases like diabetes mellitus, inflammatory bowel disease, and HIV AID. The proposed research project aims at investigating the effects of six different extracts from *Crinum J.* on different models of diarrhea (infectious, secretory, osmotic), on intestinal motility, and their antimicrobial properties (In Vitro and In Vivo). The various extracts will be prepared using solvent systems of different polarity profiles; and their pharmacological effects tested by standard methods previously described, and well established in our laboratory. Achievement of this work will contribute to the valorisation of Cameroonian traditional medicine.

## Cote d'Ivoire

Nr. E/3890-1  
(E/3890-2)

**AGBO, Adouko Edith Chiakoun** Gender: Female

### Institution Address:

UFR Sciences et Technologies des Aliments  
Université Nangui Abrogoua  
02 BP 801  
Abidjan 02  
Cote d'Ivoire

**Budget approved:** 12000

**Budget Co-funded:** 6000

**Project Title:** Amélioration de l'état nutritionnel des populations par l'action anti-oxydante des épices sur les micronutriments au cours de la cuisson des légumes feuilles.

**Project Summary:** Afin de pallier à la malnutrition qui est un problème de santé publique, la consommation des fruits et des légumes est recommandée. Cependant, les légumes feuilles se consomment cuits et la cuisson entraîne la perte d'une importante partie des micronutriments et des composés phénoliques essentiels à la nutrition humaine. Le présent projet vise à réduire la perte des micronutriments des légumes feuilles par l'action anti-oxydante des épices. Cette étude portera sur trois légumes feuilles (la feuille de patate, la feuille d'aubergine et la morelle noire) très consommés en Côte d'Ivoire. Les épices à tester sont le clou de girofle, le poivre de Guinée, le gingembre, la noix de muscade et le curcuma. Ce projet se déroulera en 30 mois et comprend trois principaux volets. Le premier volet sera consacré à étudier l'effet des épices incorporées seules ou en combinaison. Le deuxième volet portera sur l'impact du mode et de la durée de cuisson des légumes feuilles avec les épices. Le troisième volet va étudier in vitro et in vivo l'influence des épices sur le pouvoir antioxydant des légumes feuilles. Les résultats escomptés devraient permettre de réduire le taux de prévalence de la malnutrition en Côte d'Ivoire et particulièrement en milieu rural.

## Djibouti

Nr. W/32636-0                      **OMAR, Assowe Dabar Gender: Male**  
(W/5800-1)

### Institution Address:

Earth Science Institute  
Centre de Recherche et des Etudes de Djibouti (CERD)  
Route de l'aéroport  
486 Djibouti  
Djibouti

**Budget approved:** 9500

**Budget Co-funded:** 4750

**Project Title:** Geochemical modeling of the groundwater evolution in Bara plain (Djibouti)

**Project Summary:** water with good quality and sufficient quantity from different resources is a backbone for economic development of a country. The demand of water in Djibouti has increased rapidly with the construction of power plant, urbanization, to improve in living standards and environmental construction. In southern of Djibouti, particularly in the Bara area, the main water supply for drinking and irrigation activities will be established.

The purpose of this project is to examine the evolution mechanisms of a geochemical field and to promote its benefits to the living standards of local people and to the local economy in the Bara area, in Djibouti. Based on understanding of the hydrogeological conditions in Djibouti, the chemical evolution characteristics of groundwater in the Bara plain area will be analyzed. To the best of my knowledge no attempt has ever been made to identify the hydrogeochemical processes that control the groundwater chemistry, origin of the water and the mixing of water resources of this region. Therefore, the primary methods adopted in this study to investigate groundwater recharge and geochemical evolution include the following: field surveys, sampling, field testing, laboratory experiments, interpretation of hydrochemical and isotopic data in conjunction with basic hydrogeologic background information to generate inferences regarding recharge patterns and geochemical evolution, statistical classification of hydrochemical data using the method of Q-mode hierarchical cluster analysis and correlation of the classified groups. In the field of geochemical modelling, PHREEQC software will be used to perform hydrochemical modeling of water-rock interaction and to quantitatively analyze the evolution processes and the formation mechanisms of the local groundwater.

## Egypt

Nr. A/30366-0                      **ZAHARAN EL-NAGGAR, Eman** Gender: Female  
(A/5786-1)

**Institution Address:**      Dept of Internal Medicine, Infectious & Fish Diseases  
   Faculty of Veterinary Medicine  
   Mansoura University  
   Mansoura - 60 Elgomhoria Street  
   35516 Mansoura  
   Egypt

**Budget approved:** 12000

**Budget Co-funded:** 6000

**Project Title:** Molecular characterization of Nile tilapia antimicrobial polypeptides with dietary administration of AMPP recombinant enhances innate immune responses and elicits protection against *S. iniae*

### **Project Summary:**

Aquaculture, which contributes greatly to the world's wellbeing and prosperity, is set to remain one of the fastest-growing animal food-producing sectors. To meet the ever-increasing demand for fish, intensive fish farming is widely practiced. A major problem of this is that fish in crowded environments often succumb to infectious diseases. *Streptococcus iniae* (*S. iniae*) is a significant pathogen in finfish aquaculture. In Egypt, Nile tilapia (*O. niloticus*) is a major cultured fish, and streptococcal infection causes huge significant losses and is associated with large-scale mortality. The use of antibiotics and chemotherapeutics in large quantities to control fish diseases inevitably leads to resistance of the pathogens and pollutes the environment. These effects are serious enough to warrant a ban on sub-therapeutic use of antibiotics in Europe, US and other countries. In this regard, antimicrobial polypeptides (AMPPs) as a key feature of the innate immune response in fish are thought to play a crucial role as a first-line of host defense against potential pathogens. Thus, to investigate the AMPPs role in the innate immune response; we will use the molecular approaches to clone and identify the AMPPs against *S. iniae* and the possible use of their recombinant proteins such as antibacterial peptides to reduce the susceptibility of various teleost species to disease would provide several advantages. Furthermore, we'll assess the Antibacterial activity and survival analyses of the oral administration of their recombinant proteins. In addition, the expression pattern of the Nile tilapia immune-related genes transcripts and oxidative stress response will be analyzed by real-time PCR surveys after oral administration of recombinant protein and *S. iniae* infection

## Egypt

Nr. W/32906-0                      **ABDEL-WAHED, Mahmoud Saad**   **Gender: Male**  
(W/ 5803-1)

**Institution Address:**      Department of Water Pollution Research  
   Faculty of Environmental Sciences  
   National Research Centre  
   El-Tahrir Street, Dokki  
   CAIRO  
   Egypt

**Budget approved:** 12000

**Budget Co-funded:** 6000

**Project Title:** Overcome Water and Energy Shortage by Magnetic Photocatalytic Materials

**Project Summary:** Egyptian aquatic environment faces a great threat due to the pollution of water resources with hazardous materials generated from industrial activities. Thus, focusing on using advanced treatment technologies (ATTs) and innovative materials for the removal of such pollutants is an emerging concern. Among the various ATTs, photocatalysis is considered as a promising technology for their worthy advantages in remediation of wastewater. Additionally, photocatalysis can be adapted for saving energy through either using solar light and/or generation of energy. These features of photocatalysis may help in solving water and energy shortage in Egypt. However, photocatalysis suffers from the problem of the photocatalysts separation which limits its application practically. Therefore, the proposed work aims to prepare magnetically separable photoactive materials and to use them for the elimination of pollutants from water/wastewater with possible energy generation. This will be achieved via the treatment of highly polluted wastewater by photocatalysis under visible light and reduction of the photo-produced CO<sub>2</sub> to natural gas (Renewable energy).

Conclusively, the innovative character within this proposal is considered to be very high. The proposal will not only deliver a novel magnetic separable materials, but also it will deliver the ways for utilizing these materials in treatment wastewater and overcome energy shortage.

## Mali

Nr. C/30445-0                      **DICKO, Amadou Hamadoun** Gender: Male  
(C/5808-1)

**Institution Address:**      Departement de Biologie  
   Faculté des Sciences et Techniques  
   USTTB  
   Colline de Badalabougou  
   BP E-3206  
   Bamako  
   Mali

**Budget approved:** 11500

**Budget Co-funded:** 5750

**Project Title:** Les rhizobactéries et les champignons mycorhiziens pour une production durable et avantageuse du riz au Mali

**Project Summary:** La production du riz, une source significative de nourriture et de revenus pour les petits producteurs, a baissé de plus de 30% principalement à cause de la pauvreté des sols ou de l'inaccessibilité des éléments minéraux importants à la croissance du riz. Une alternative est d'utiliser comme engrais phosphatés, le phosphate Naturel de Tiliemsi (PNT) comme source de Phosphore avec inoculation de champignons mycorhiziens arbusculaires (CMA) et PGPRs "Plant Growth Promoting Rhizobacterias" pour améliorer l'efficacité et donc les rendements des cultures de riz. Pour cela, nous : (i) Isolerons et identifierons des PGPRs et des CMA de la rhizosphère du riz, (ii) Sélectionnerons les isolats promoteurs pour la formulation de biofertilisants (iii) Formulerons, au moins un biofertilisant efficace et peu coûteux, et (iv) Testerons en serre et en champ d'expérimentation les isolats sélectionnés. Ce projet est basé sur nos travaux et principalement sur ceux de nos collaborateurs qui ont mis au point des méthodes novatrices de production de bio-engrais. Les chercheurs impliqués dans ce projet possèdent l'expertise pour réaliser le travail proposé. Tous effectuent présentement des travaux sur les rhizobactéries favorisant la croissance des plantes ou la formulation de bio-inoculant. Le travail s'effectuera au Laboratoire de Recherche en Microbiologie et Biotechnologie Microbienne de la Faculté des Sciences et des Techniques. Le principal résultat attendu pour ce projet est la mise en place d'une stratégie de production de bio-engrais à base de PNT+CMA+PGPR pour le riz au Mali, qui sera testée par les producteurs. Le projet durera deux ans.

## Nigeria

Nr. C/30261-0                      **AGBELEYE, Opeyemi Adeola** Gender: Female  
(C/5807-1)

**Institution Address:** Grain Legume Improvement Programme  
Institute of Agricultural Research and Training (IAR&T)  
Obafemi Awolowo University  
PMB 5029, Moor Plantation  
Ibadan Oyo State  
Nigeria

**Budget approved:** 12000

**Budget Co-funded:** 6000

**Project Title:** Genetic Diversity, Genotype x Environment Interaction, path and stability analysis in African Yam Bean ( *Sphenostylis stenocarpa* Ex. A. Rich.)

**Project Summary:** African yam bean (AYB), *Sphenostylis stenocarpa* is a grain legume belonging to the family Fabaceae. It is an underutilized crop with crude protein that compares favourably with that in cowpea. Presently, there are no released varieties/ cultivars and the species is gradually facing extinction as it is only found in the hands of old farmers (Saka et al., 2004). Analysis of genetic relationships among and within crop species is a prerequisite to any viable genetic improvement hence the need to understand genetic relationships within the species. The phenomenon of synteny and comparative genomics will be explored to determine genetic diversity within the test lines using Simple sequence repeat markers for cowpea (*Vigna unguiculata*) and Soybean (*Glycine max*). The genetic variability in African yam bean will be determined and transferability of SSR markers from well researched legumes to underutilized legume will be ascertained. Genotype x Environment interactions is an important aspect of plant breeding. It is necessary to identify stable genotypes across environments which can be used for cultivar development. Grain yield of 15 AYB genotypes in 6 environments will be analysed using AMMI and GGE biplot to identify stable genotypes across environment and the best genotype for each environment (which-won-where). Genotypic and phenotypic correlation among quantitative traits e.g. no. of pods/plant, no. of seeds/pod, 100 seed weight(g) etc. will be evaluated. Path analysis, a statistical technique which uses regression to test causal relationships between variables will be used to determine what makes for superior grain yield in AYB following the method of Dewey and Lu (1959). From the research, genetic variability within AYB will be known. Also, characters contributing directly and indirectly to superior grain yield will be determined.

## Nigeria

Nr. F/31935-0                      **MOKWUNYE, Idongesit**   **Gender: Female**  
(F/5775-1)

**Institution Address:**

Cocoa Research Institute of Nigeria  
PMB 5244, Idi Ayunre  
Ibadan Oyo State  
Nigeria

**Budget approved:** 12000

**Budget Co-funded:** 6000

**Project Title:** Development of a kairomone-based lure for the management of *Helopeltis* spp in Nigeria

**Project Summary:** Cashew is a major source of income and livelihood for many rural households and significantly contributes to food security in Africa with an estimated \$414 million earned through its foreign export. In Nigeria, it is an important cash crop that thrives well in all the agro-ecological zones especially in areas with sandy soil types, unsuitable for cultivation of food crops. Growing global demand for cashew nut at 9% annually makes it an attractive crop. Current yield stands at 840 kg/ha, globally, with only 45 - 60 % of this yield being achieved in Nigeria. Poor yields have been attributed to factors like agronomic, diseases and pests considered the most economically damaging. *Helopeltis* spp are ranked top among cashew pests, causing up to 50% yield loss by feeding on young shoots, flower and fruitlets. Additionally, their feeding predisposes the plants to secondary pathogenic organisms capable of causing tree death. With the near inexistence of control tools against these mirids and increase in global demand for this nut, we anticipate a possible switch in farmers' behaviour from non-use of pesticides to dependence on them following renewed interest from the government to promote this sector. To prevent the aforementioned scenario, this project proposes to develop a green and environment-benign control option based on plant odours that are attractive to the mirid using standard and proven chemical ecology approach that combines behavioural and analytical chemistry techniques. This will contribute to increased cashew productivity by maintaining affordable production costs and minimising adverse effects from agrochemicals.

## Pakistan

Nr. W/33181-0                      **GHUFFAR, Sajid Gender: Male**  
(W/5805-1)

### Institution Address:

Department of Space Science  
Institute of Space Technology  
P.O. Box 2750  
Islamabad 44000  
Pakistan  
1, Islamabad Highway

[www.ist.edu.pk](http://www.ist.edu.pk)

**Budget approved:** 12000

**Budget Co-funded:** 6000

**Project Title:** Glacier Monitoring using High Resolution Satellite Stereo Imaging

**Project Summary:** The Karakoram mountain range is covered by about 19,950 sq. km of glaciers. The glacial and snow melt in Karakoram mountain region is a major source of water for Indus River, which is the longest river of Pakistan. Millions of people living in the Indus Basin depend on the water from this river. The climate change could result in glacial retreat and meltdown, therefore, it is essential to monitor the state of glaciers in this region as large population is dependent on the water coming from these glaciers.

In this project, the aim is to monitor the surface changes and movements across the glacier using high resolution satellite stereo imaging. With the increase in availability of high resolution satellite stereo images, topographic modelling of the glacier surface can be performed with high spatial and temporal resolution. Recent progresses in photogrammetry and computer vision has led to more accurate and efficient stereo matching algorithms, which will be used to reconstruct the surface of the glacier using two (Stereo) or three (Tristere) images. Using stereo images from several epochs (time instants), high resolution Digital Elevation Models (DEM) of the glacier will be computed. By using surface matching algorithms, changes in the surface of the glacier like elevation changes and 3D mass movements will be estimated. Furthermore, by analysing differential DEMs, topographic changes in the glacier and the surrounding area will be detected, which can be highly beneficial in anticipating events like Glacial Lake Outburst Flood (GLOF), which can be a serious threat to the neighbouring human inhabitants. For this project, the Batura Glacier, which lies in the Karakoram Range in Gilgit -Baltistan (Pakistan) region is chosen. Stereo images at different times from SPOT, IKONOS and Pleiades satellites will be used to build temporal DEMs, which will be used to estimate surface changes and mass movements in the Batura Glacier.

## Pakistan

Nr. C/33282-0  
(C/5815-1) **TANWIR, Samina Gender: Female**

**Institution Address:** Department of Botany  
Faculty of Sciences  
University of Agriculture  
Agriculture University Road  
Faisalabad 38000  
Pakistan

**Budget approved:** 12000

**Budget Co-funded:** 6000

**Project Title:** Improving drought tolerance of wheat by mapping quantitative trait loci of some important physiological traits

**Project Summary:** Wheat is an important cereal crop and used as a staple food in many parts of the world. However, its production is not at pace with the rising demands of the growing population. The rapidly changing climatic conditions of the world have lead to increase in arid areas and losses of water resources due to which crops like wheat and rice are suffering from water shortage or drought stress. Drought is a complex physiological trait governed by a number of genes. Despite many decades of extensive research, it is still a challenge for plant biologists because of its quantitative nature. With the advent of DNA marker technology, improving drought tolerance through genetic manipulation of plants has become possible. Integration of genetic markers such as SSRs to map QTLs (Quantitative trait loci) related to drought tolerance traits such as high net photosynthetic rate, cell membrane stability, transpiration rate, relative water content etc would help in tailoring of drought resistant wheat cultivars. In the present project, an F2:3 population derived from the intraspecific cross of two contrasting parents (a drought tolerant and a drought sensitive genotype) will be grown under drought stress. The population will be evaluated/screened for the physiological traits related to drought (net photosynthetic rate, stomatal conductance, transpiration rate, cell membrane stability, osmotic potential, relative water content). The population will be harvested and yield parameters will be estimated. DNA of parents and each genotype of their population will be isolated for SSR analysis through PCR. The phenotypic and genotypic data of the F3 population will be subjected to computer software (MAPMAKER and QTL Cartographer) to map QTLs on various chromosomes on the wheat genome. This work will help in marker assisted breeding. Moreover, the tagged genes may be cloned and further used in genetic engineering of drought tolerant wheat.

## Pakistan

Nr. A/33316-0  
(A/5791-1)      **SHAH, Syed Zakir Hussain** Gender: Male

**Institution Address:** Dept of Zoology, Wildlife & Fisheries  
Faculty of Sciences  
University of Agriculture  
38040 Faisalabad  
Pakistan

**Budget approved:** 11600

**Budget Co-funded:** 5800

**Project Title:** A comprehensive study to evaluate the Zinc bioavailability from organic and in-organic sources in practical diet for *Labeo rohita* fingerlings

**Project Summary:** Zinc (Zn) is an important nutrient for growth and health of fish as it acts as cofactor for more than 200 metalloenzymes. Due to inadequate availability of Zn from water media, fish depends on dietary Zn supplementation to meet their Zn-dependent metabolic functions. However, Zn bioavailability mainly depends on the source of supplementation. Traditionally, inorganic sources of Zn (salts) are supplemented in the fish diet. Zinc from these inorganic salts is dissociated into free ion which is difficult to absorb in the intestine due to its complex forming ability with other nutrients present in the gut. Alternative to this, chelated Zn with an organic molecule like gluconic acid can facilitate its absorption through gut membrane. Purpose of present study is to evaluate the bioavailability of Zn from organic (chelated) and in-organic (salts) sources in practical diet for *Labeo rohita* fingerlings. One organic source of Zinc (Zinc gluconate) will be compared with three in-organic sources (ZnSO<sub>4</sub>, ZnO & ZnCl<sub>2</sub>). These four different sources will be supplemented in the basal practical diet at two different levels (25 and 50 mg/kg) resulting in the formulation of eight experimental diets. Fish growth will be estimated fortnightly. For Zn absorption measurements, feces will be collected throughout the trial. At the end of trial, fish will be harvested for whole body proximate analysis and Zn contents. Zn contents will also be measured in eyes, liver, pancreas, spleen, scales, bones and muscles. Other than this, activity of alkaline phosphatase (ALP) will also be measured in different tissues including liver, spleen, heart, kidney intestine and fillets. Thiobarbituric acid reactive substances (TBARS) assay will also be carried to estimate the antioxidant property of Zn in different tissues of the body. Resulting data will be subjected for one way analysis of variance (ANOVA). Results will be helpful for the formulation of cost effective and environment friendly feed.

## Sudan

Nr. B/33204-0  
(B/5806-1) **MOHAMMEDSALIH, Khalid** Gender: Male

**Institution Address:** Department of Clinical Studies  
Faculty of Veterinary Science  
University of Nyala  
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Nyala  
Sudan

**Budget approved:** 12000

**Budget Co-funded:** 6000

**Project Title:** Evaluation of Albendazole resistance status of gastrointestinal nematode in cattle and goats in South Darfur State, Sudan

### **Project Summary:**

Gastrointestinal parasites are a limiting factor for the production of ruminants in various regions of the world, with the haematophagous nematode *Haemonchus contortus* standing out as a parasite of major significance due to its high prevalence, pathogenicity and present apparently global expansion in range. Albendazole is a benzimidazole derivative, which authorized for use in veterinary medicine, and has been used for decades in the treatment and control of gastrointestinal nematodes as well as liver flukes and cestodes. The development of anthelmintic resistance is a great challenge for the production and the well-being of ruminants on pasture. Anthelmintics resistance development leads to lowering of animal productivity as a result of the heavy nematode burden and to loss of money. One of the important anthelmintics to which gastrointestinal nematode and especially *H. contortus* developed resistance is Albendazole were reported in several countries. This study will be carried out in South Darfur State, Sudan, four areas will be represented Nyala (Capital of the State), El-Tomat, Rehid Elberdi and Kass. Albendazole resistance status against gastrointestinal nematode in naturally infected cattle (16 male and female) and goats (20 male and female) will be evaluated in each location, the resistance will evaluate depends on the faecal egg count and then molecular biology. Secondly, questionnaire survey will conduct to evaluate the use and misuse of the drugs in the study area (200 samples will conduct). Finally, FAMACHA card will be evaluated in 300 goats to assess its validity for diagnosis of *H. contortus* in area of study. The duration of this project is 2 years, expect starting time April 2015, because the rainy season in Sudan during June to November, were is the best time for heminth study.

## Tunisia

Nr. W/32764-0                      **MASMOUDI, Khaoula** Gender: Female  
(W/5801-1)

### Institution Address:

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Water Research and Technologies Centre (CERTE)  
Route touristique de Soliman, POBox 273  
8020 Soliman  
Tunisia

**Budget approved:** 12000

**Budget Co-funded:** 6000

**Project Title:** Modelling and Life Cycle Assessment of biological MF/UF membrane reactors for the treatment and reuse of grey water

**Project Summary:** Membrane bioreactors (MBRs) have been increasingly employed for municipal and industrial wastewater treatment in the last decade. This project will investigate the treatment process of grey water in a membrane bioreactor (MBR) employing two different membrane configurations, the flat sheet and the hollow fiber membranes. The development of Activated Sludge Models (ASM) using mathematical modelling has been an important evolution of Conventional Activated Sludge (CAS) processes modelling and their use is actually well established.

In fact, mathematical modelling and simulation are powerful tools by which the specialists can predict the potential systems performances under different operating conditions. In particular, the dynamic models are very useful since they allow to study the evolution of the biodegradation characteristics of grey water or the membrane fouling over time. The modelling of those systems could help to instaurate new decentralized strategies for the treatment of domestic wastewater in a local management context, taking into account the cost-effective aspect through the optimisation of the treatment cycle.

In this study, we will apply ASM1 to MBR processes using Simba software (ifaksystem GmbH, Germany) as a simulation tool and a respirometric technique for the estimation of kinetic parameters. A comparative life cycle assessment (LCA) of both membrane bioreactors will be carried out in order to evaluate the performances of the two reactors from an environmental aspect using Simapro software version 8.0.4 (from Préconsultants, Netherlands) which allows life cycles to be modelled and analysed.