



**INTERNATIONAL  
FOUNDATION FOR  
SCIENCE**



## **Update on the Collaborative Research Approach**

**Graham Haylor**

**October 2015**



## Contents

Section	Title	Page
<b>1</b>	<b>Introduction</b>	<b>1</b>
<b>2</b>	<b>Planning and Preparation</b>	<b>1</b>
<b>3</b>	<b>Collaborative Research Pilot 1</b>	<b>2</b>
<b>4</b>	<b>Capability Building Workshop (2013 Ghana)</b>	<b>2</b>
<b>5</b>	<b>Collaborative Research Teams – Pilot 1</b>	<b>3</b>
<b>6</b>	<b>Carolina Mac Gillavry Prize</b>	<b>11</b>
<b>7</b>	<b>Collaborative Research Pilot 2</b>	<b>12</b>
<b>8</b>	<b>Capability Building Workshop (2014 Benin)</b>	<b>13</b>
<b>9</b>	<b>Benin Workshop Background Materials</b>	<b>13</b>
<b>10</b>	<b>Collaborative Research Teams – Pilot 2</b>	<b>14</b>
<b>11</b>	<b>Asia-Pacific Collaborative Research – Pilot 3</b>	<b>18</b>
<b>Appendix 1:</b>	<b>The Team Timelines</b>	<b>19</b>
<b>Appendix 2:</b>	<b>Guidelines for Collaborative Research Report</b>	<b>22</b>
<b>Appendix 3:</b>	<b>Cover Letter Requesting Collaborative Research Report</b>	<b>32</b>
<b>Appendix 4:</b>	<b>Media to Support Learning</b>	<b>33</b>

## 1 Introduction

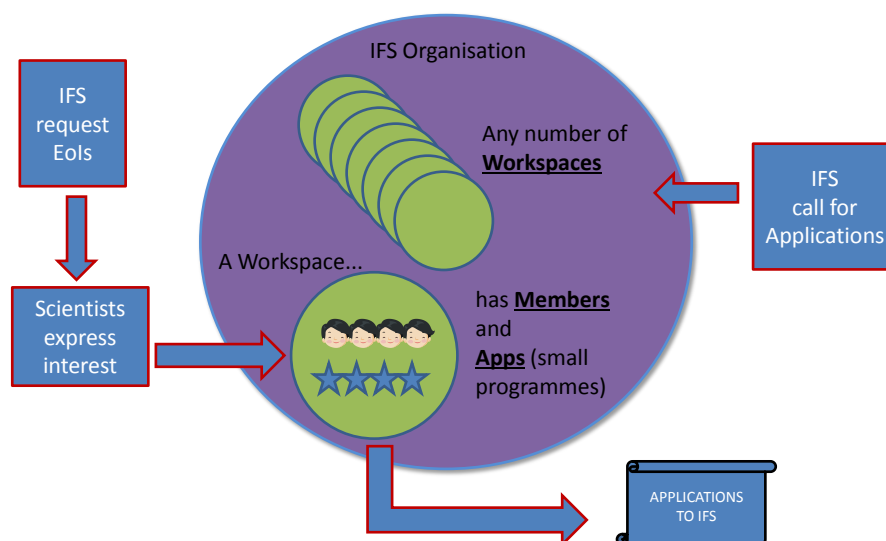
Collaborative research was introduced into the 10-year strategic plan for IFS in 2011 and first piloted by IFS in 2012-13.

## 2 Planning and Preparation

We first characterized challenges and requirements, and built on our understanding of science research funding to individuals. We visited and sought learning from experienced organisations, reviewed the academic literature and articulated our new ideas. We investigated, designed, built and tested ICT tools, selecting PODIO as an appropriate social networking platform, and negotiated free user licences as a donation to IFS. The process invited eligible scientists, who expressed interest into an online environment where they were able to interact with other applicants. They were provided with relevant tools that enabled searching, interaction and collaboration, and we facilitated their use, providing mentors to support the process.

In keeping with our individual granting approach, collaborative research at IFS aims to be small scale and a capability-building experience for early-career scientists. Teams can comprise 3, 4 or 5 colleagues collaborating together with a designated Team Coordinator. The total value of a Collaborative Research Grant is between USD 45-75,000. This breaks down to 80% for research and 20% for team coordination and collaboration activities. The actual value of a grant and the distribution of the grant money among the collaborators are then determined by need and the team's budget. IFS has an individual relationship with each team member. An overview of the Podio setup for the collaborative research grants pilot is presented in Figure 1.

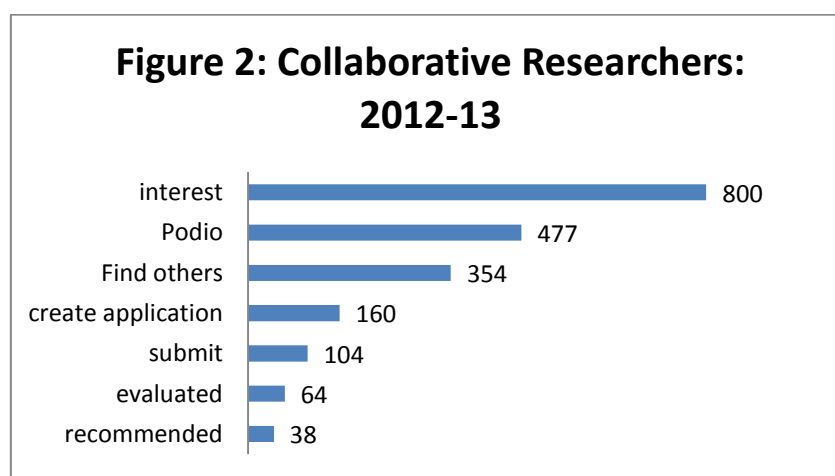
**Figure 1: OVERVIEW OF PODIO SETUP**  
for the Collaborative Research Grants Pilot



### 3 Collaborative Research Pilot 1

The first call for Expressions of Interest asked for people to express interest to collaborate to research **Neglected and Underutilised Species**. The Pilot 1 countries were Ghana, Nigeria, South Africa, Tanzania and Uganda and the undertaking was financed by the Carnegie Corporation of NY.

Eligible ‘aspirants’ were invited into a specially designed **social networking platform** built on PODIO software (<https://podio.com/ifsse/candidates-for-collaborative-research-grants>). In a ‘plenary workspace’ people discovered each other’s profiles and against a call for collaborative research applications advertised on the platform, coalesced into 40 teams, each receiving access to a private team workspace built on the social networking platform where they could plan and write their team applications. At the submission deadline (we adjudged 14 weeks for the submission) 25 teams submitted proposals, 17 passed pre-screening, and were sent out for review to multiple advisers. We convened a Collaborative Research Scientific Assessment Committee to recommend teams for funding, and following the director’s decision, ten teams were funded. The graphic below shows the numbers of young scientists at each stage in the process.



### 4 Capability Building Workshop (2013 Ghana)

The seventeen teams which passed pre-screening were invited to a three-day workshop from 16-18 July 2013 in Ghana associated with the **Forum for Agricultural Research in Africa** (FARA) Science Week and run in conjunction with the **Stockholm School of Entrepreneurship** (SSES) Collaborative Research Specialists.

All but two of the 64 scientists accepted the invitation and joined the workshop, entitled ‘**When Scientists and Poets were Friends; A Workshop On Interdisciplinary and Creative Problem Solving Methods**’. We provided a wide range of media to support learning (available on IFS Podio Ghana workshop workspace and also here in Appendix 4).

## 5 Collaborative Research Teams – Pilot 1

The following teams were funded.

### Domestication of *Tetrapleura tetraptera* in Africa (Tete)

Coordinator: Paul Bosu  
Collaborator: Edmund Owusu  
Collaborator: Esther Kemigisha  
Collaborator: Christianah Elusiyan



*Tetrapleura tetraptera* (Family: Fabaceae), known locally in Ghana as *prekese*, is a tropical tree species of substantial nutritional and medicinal value to local communities throughout Africa. However, *T. tetraptera* is underutilized and to some extent neglected. Fruits from the tree are still collected from the wild in an unsustainable manner for household use or sold in local markets or along roadsides. Pressure on land for settlement, slash and burn agriculture and cash crop production has resulted in the *T. tetraptera* decline in wild tree populations and erosion of the genetic diversity. This project, which is a subsidiary of a main project implemented by a four-member team, seeks to promote domestication of the species in Africa through the identification of superior genotypes using provenance assessment, planting of the species in local communities, and awareness creation through the publication of extension material.

The principal investigator will collect *T. tetraptera* germplasm from various ecological zones in Ghana for the studies. He will also facilitate collection of germplasm from countries in Africa other than Nigeria and Uganda, where two of the project investigators are. We already know for certain that *T. tetrapleura* seed trees occur in various ecological zones in Ghana, Nigeria and Uganda. We also know from contacts and check-ups with colleagues that *T. tetraptera* trees can be found in Togo, Cote d'Ivoire, Cameroun and Tanzania. The PI will identify individuals in other African countries to obtain additional germplasm. In our research methodology, we plan to acquire germplasm from as many countries and ecological zones as possible. But, in case we are not able to acquire seeds from places other than the six countries mentioned above, our alternative plan (Plan B) will be to acquire and test seed sources from diverse ecological zones in the above-mentioned countries. He will produce and supply seedlings to farmers. Lastly, Paul will coordinate the preparation, printing and distribution of extension materials, as well as drafting of a handbook to be published on the internet.

All project activities will be undertaken in the respective institutions of the four team members and be under the general supervision of the heads of the institutions through the central office of research of the respective institutions. Thus, if for any reason any member of the team is unable to continue, the institutional head will be contacted to ensure that someone is appointed to continue with the work, after discussion with IFS. If the PI is unable to continue, Dr Christianah Elusiyan from



Nigeria will take over as PI. In order to monitor the progress of implementation by various team members, and ensure that any problems with regard to the smooth execution is identified and quickly addressed, each member of the team will prepare and submit half-yearly reports on their activities to the PI. The PI will review the reports and distribute to the other members for comments. This will give us the opportunity to review the progress of work at least twice before the proposed mid-term review in Uganda.

**A window to population genetic differentiation and phylogeography of neglected and underutilised intra-African migratory landbirds in sub-Saharan Africa (AvianGen)**

Coordinator: Desiré Lee Dalton  
Collaborator: Samuel Temidayo Osinubi  
Collaborator: Helene Brettschneider



The change in agricultural land use is an important driver of biodiversity loss in developing countries and may affect the genetic diversity of several intra-African migratory bird species. This project aims to determine the genetic and demographic structure of several cuckoo (African, Black, Diederick's), kingfisher (Grey-headed, Woodland) and bee-eater (Carmine) species that travel between Ghana and South Africa on a yearly basis. The objective of this project is to determine if inter-African migratory land birds migrate from Ghana to South Africa and back again, thus facilitating genetic exchange between populations. Thus far, little if any research has been conducted on intra-African migratory land birds, emphasising the need for such a study. In order to achieve the objectives of the study, several tools will be used and developed, including species-specific microsatellites, mitochondrial DNA, stable isotopes, bioacoustics and body-mass-indices (BMI).

Expected outcomes of the project include: determination of genetic structure, variability and demographic history of these birds, identification of unique gene pools or evolutionary significant units (ESUs), and resolution of phylogenetic and taxonomic uncertainties. Stable isotope analyses will also facilitate identification of potential meeting sites between migrating populations and these areas of conservation concern.

## **Studies on the shelf life and microbiology of *Ximenia caffra* fruits (*Ximenia*)**

Coordinator: Aliyu Ibrahim Dabai  
Collaborator: Mary-Magdalene Pedavoah  
Collaborator: Ojali Usman  
Collaborator: Taiwo Aderinola  
Collaborator: Neill Goosen



It will be of immense advantage for spoilage organisms of fruits to be detected at early spoilage stage because there may be interventions that could halt or delay deterioration, and on the other hand food that had reached the end of its designated shelf life, but was not spoiled, could still be used for other purposes (Doyle, 2007). Microbiological, chemical and sensory changes are important for the determination of the shelf life of short- and medium-life foods (McGinn, 1982). The fruits will be stored using traditional methods such as clay pot, saw dust and refrigeration under different conditions to determine the best storage conditions for the fruits. Chemical, sensory and microbiological changes of the fruits will be determined before and during storage. The chemical change will be determined using Gas chromatography-Mass spectroscopy (GC-MS). A twenty person panel will be formed and informed on the sensory parameters to be accessed and the result will be subjected to statistical analysis. The normal flora and spoilage organisms will be isolated from the fruits and juice. The isolates will be subculture to obtain pure culture using classical microbiology methods and identified using biochemical (indole, MrVp, sugar fermentation, urease, citrate etc).

## **Physicochemical characterization of grain amaranth: Its application as an ingredient in fish feed (amaranth)**

Coordinator: Martin Mutambuka  
Collaborator: Christianah Amusan  
Collaborator: Ekaete Anwa-Udondiah





The nutritional and physicochemical characteristics of leafy and grain amaranth (*Amaranthus cruentus* L. and *A. hypochondriacus* L.) varieties commonly grown in Uganda will be determined to assess its suitability as an ingredient in fish feed. High protein and low anti-nutritional factor content are desirable for fish feed and it is important to establish how these are affected by extrusion cooking. Starch characterization of raw grain will also be carried out to explain its performance on extrusion cooking.

Amaranth leaves and grains will be procured from local farmers, cleaned, milled and analyzed for physicochemical properties in triplicates. Proximate composition (protein, fat, fibre, carbohydrates and lipids) and anti-nutritional factors (haemagglutinating activity, trypsin inhibitors, polyphenols and phytic acid) will be determined using standard procedures. Starch will then be extracted and characterized for thermal and pasting properties. The ratio of amylose:amylopectin will also be determined. Grain amaranth samples will then be extrusion-cooked and the physicochemical properties (moisture content, water activity, thermal properties, expansion ratio, unit density, bulk density, water absorption, solubility and pellet durability indices, and color) of the extrudate determined. The amaranth species that possesses desirable starch characteristics, high protein and low anti-nutritional factors will be selected for incorporation into fish feed for tilapia (*O. niloticus*). A collaborating researcher will then develop fish feed formulations incorporating the grain amaranth and, after carrying out a feeding study, will analyze the optimal formulation for physicochemical properties and also carry out preliminary feeding studies of the developed feed on commercial fish farms in Uganda.

#### **Characterisation and conservation of Bambara groundnut germplasm in Uganda (Bambaranut)**

Coordinator: Gabriel Ddamulira  
Collaborator: George Mbyazita Karwani  
Collaborator: Grace Alenoma  
Collaborator: Ifeyinwa Okpara Monica  
Collaborator: Obiageli Umeugochukwu



Bambara groundnut is mainly grown for food by women with few or no improved techniques. Over time, in Uganda Bambara production has declined due to research neglect in genetic conservation and agronomic improvement. Nonetheless, through breeding this trend can be reversed and Bambara production enhanced. The study aims at collecting, characterizing and conserving Bambara nut germplasm for future breeding work in Uganda and Africa at large.

In order to achieve this, Bambara germplasm will be collected from five production areas of Uganda and characterized for morphological traits, nutritional value and yield performance. Part of the characterised germplasm will be conserved in a national gene bank and the rest tested for yield performance. The superior germplasm selected from characterised materials will be exchanged among partners to test their adaptability in other areas.

The project is expected to generate information and materials needed for future breeding, conservation and improving yield performance of Bambara in Uganda.

### **The potential of Bambara groundnut's haulm as ruminant feed and mitigation of methane from enteric fermentation (Campnut)**

Coordinator: Christopher Antwi  
Collaborator: Moses Kiryowa  
Collaborator: Adeola Ayano



Neglected and underutilized crop species have been traditionally used by the rural poor for several decades though they are not considered in the estimation of national gross domestic product and improvement of household food security, hence the little research attention given to these crops. The project seeks over a three-year period to strengthen and enhance the utilization of neglected crop “Bambara groundnut” to improving food security, nutrition and livelihoods of small-holding farming communities. The activities cover: 1) selection and dissemination of Bambara groundnut; 2) assessment of feed quality (using the proximate and *in vitro* systems of feed evaluation) during storage (box baling) for dry season feeding; 3) evaluate the effect of the use of the Bambara groundnut as feed supplement on feed intake, digestibility of basal diet and growth performance of small ruminants (sheep and goats); and 4) *in vitro* assessment of the haulm of Bambara groundnut lines’ potential for mitigating enteric methane emission. Selected lines of the Bambara groundnut will be established on the arable fields of my institution and assessed for their agronomy, nutritional characteristics and potential utility index in order not to select against grain or haulm yield. It is expected that farmers would be able to predict yield at any season and year of establishment which will aid in risk assessment and that farmers’ capacity in feed conservation practices and feeding packages (which has a marked effect on animal performance and livelihood) will be enhanced.

**Chemical composition, tannin concentration, *in vitro* digestibility and methane gas production of five NUS from Africa (Diamond)**

Coordinator: Terry Ansah  
Collaborator: Robert Amayo  
Collaborator: Denis Asizua  
Collaborator: Salamatu Fada



The use of NUS as animal feed supplement has not received much attention, particularly among researchers. Free-ranging animals may be grazing these species but because records of this are not documented, little is known about their usefulness. The basic information required about any plant species for possible use as animal feed is its chemical composition. Information about the dry matter, crude protein, ether extract, neutral detergent fibre, acid detergent fibre and acid detergent lignin are some of the information required to select particular forage for further studies. One other important information is the tannin composition because of its role as a rumen methane gas suppressor and efficient protein utilization in ruminants. Methane gas has been found to have a global warming potential of 25 times that of carbon dioxide. The *in vitro* gas technique provides a reliable and faster way to assess the digestibility of feed materials. It measures the gas produced by microbes from the fermentation of feed as an indication of the digestibility of the feed. This method also makes it possible for the gas measured to be collected analysed for the methane composition to determine the potential of the feed as a methane gas suppressor. The proposed study seeks to determine the proximate composition, the tannin concentration, *in vitro* dry matter digestibility and methane gas production of five NUS selected within Africa. This information will form a basis for recommending the selected NUS as ruminant feed supplement particularly during the dry season.

**Socio-economic status, genetic diversity and conservation implications of neglected and underutilized plants in arid and semi-arid regions of Tanzania (Multinus)**

Coordinator: John IGOLI  
Collaborator: Esther NAKAMATTE  
Collaborator: Catherine MASAO  
Collaborator: Uterdzua ORKPEH



While most neglected and underutilized species (NUS) in Tanzania continue to be maintained by socio-cultural preferences of indigenous communities, a majority is inadequately characterized and remains neglected by research and informed sustainable conservation initiatives. The goal of this research is to study Tanzanian NUS to determine and promote their utilization potentials in fighting hunger, malnutrition and disease, while enhancing sustainable conservation of their diversity. The study will be conducted in the arid and semi-arid regions highly affected by hunger and malnutrition, yet have high potentials of NUS species to be promoted for both economic and agro-diversity management. Specifically the study will: 1) determine which of the NUS are more frequently utilized by locals than others, 2) determine the level of genetic variation within and between populations of some of the collected species, 3) compare the level and patterns of genetic diversity between and within populations of the most widely and least utilized species, and 4) assess whether discernible genetic groups exist between *Cleome gynandra* from Tanzania, Uganda and Nigeria. Data collection will involve transects picking fresh leaf samples in the selected regions, structured questionnaire-based germplasm exploration, market surveys and interviews with relevant stakeholders (such as farmers, traders and conservationists). These will be followed by amplified fragment length polymorphism (AFLP)-based assessment of Tanzanian diversity of selected NUS plants, including *Cleome gynandra*. The results from this work will contribute to science through publications, herbarium and germplasm collections. Also through simplified information dissemination techniques, these results will be useful in promoting sustainable use of the NUS among rural poor communities of Tanzania.

#### **Isolation of antimycobacterial from marine endophytic fungi found in Ghana (Nanomed)**

Coordinator: Patrick Kobina Arthur  
Collaborator: Joan J E Munissi  
Collaborator: Lydia Mosi  
Collaborator: Paul E Kazyoba



In this project, we plan to explore the endophytic fungi found in the tissues of seaweeds in Ghana for the presence of antimycobacterial compounds. Our preliminary studies have clearly demonstrated the presence of strong growth inhibitory activities against *Mycobacterium smegmatis*. We plan to isolate many more fungi from this source and proceed to purify the bioactive compounds, which are expected to be novel in their mechanism of action and molecular targets. We will employ additional screening strategies to increase the possibility of isolating more compounds from the same source. The



compounds isolated from this project will be passed on to my colleagues in the Team Nanomed for nanoparticle incorporation and efficacy assessments in *in vivo* models of mycobacterial infection.

#### **Sub-Saharan African Cocoyam Research Team (SSACRT)**

Coordinator: Kofoworola Olatunde  
Collaborator: Kolawole Adebayo  
Collaborator: John Bosco Muhumuza



Cocoyam (*Colocasia esculenta* and *Xanthosoma spp*) is an important nutritious tuber crop for many people in developing countries of Africa, Asia and the Pacific. The crop is an important source of carbohydrates, proteins and vitamins. Cocoyam has relatively higher protein content (2.5-9.4%) than other traditional root and tuber crops (e.g., sweet potatoes, potatoes, yam, and cassava) with even more proteins available in its leaves. The crop is economically important for its corm, cormels and its leaves. The corm of taro (*Colocasia esculenta*) and the cormels of *Xanthosoma* are used in many food preparations whereas the leaves of the crop are valuable vegetables. No doubt cocoyam is a potential food security crop; however, it has received little attention in terms of research and development worldwide. Cocoyam production is still low and has continued to decline in major producing areas of West and East Africa largely due to lack of superior varieties, among other factors. Characterization of plant genetic resources and search for desirable traits is a prerequisite for establishment of an effective crop genetic improvement program. The extent of genetic variability among cocoyam accessions in Uganda, as well as their agronomic performance, is unknown. Morphological characterization and evaluation of cocoyam accessions in Uganda and Nigeria may reveal a potential for genetic improvement of the crop and selection of superior genotypes for adoption. This study therefore intends to characterize and evaluate the agronomic performance of Ugandan and selected Nigerian cocoyam accessions under upland conditions.

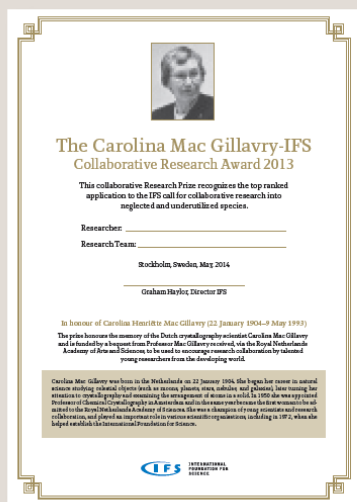


## 6 Carolina Mac Gillavry Prize

In honour of the memory of Dutch crystallography expert and erstwhile IFS Trustee (pictured right), following a bequest to IFS, we established the Carolina Mac Gillavry Prize for the highest ranked team application(s). As Prof Mac Gillavry was a sponsor of the artist M C Esher, we were given permission from the Esher Foundation to use the image of the artist reflected in a metal sphere (below).



# The Carolina MacGillavry Award



The prize honours the memory of the Dutch crystallography scientist Carolina MacGillavry and its purpose is to encourage research collaboration by talented young researchers from the developing world.

Carolina MacGillavry was born in the Netherlands in 1904. She began her career in natural science studying celestial objects such as moons, planets, stars, nebulae, and galaxies, later turning her attention to crystallography and examining the arrangement of atoms in a solid. In 1950 she was appointed Professor of Chemical Crystallography in Amsterdam and

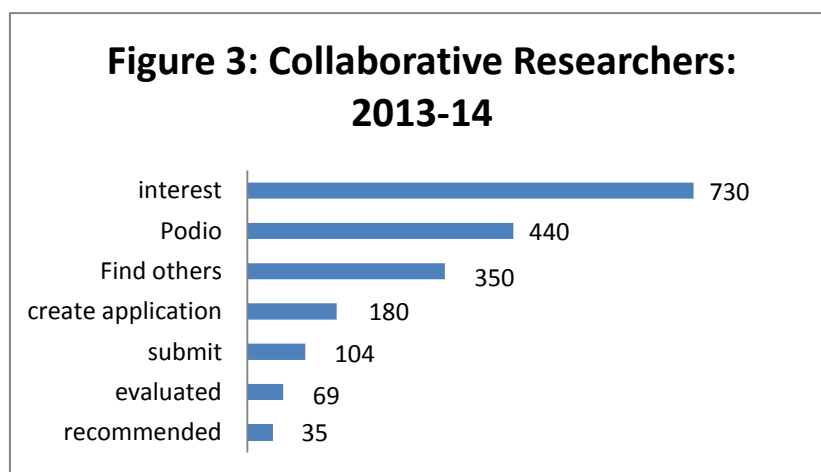
in the same year became the first woman to be admitted to the Royal Netherlands Academy of Sciences.

She was a champion of young scientists and research collaboration, and played an important role in various scientific organisations, including in 1972, when she helped establish the International Foundation for Science.

## 7 Collaborative Research Pilot 2

The 2nd call for Expressions of Interest 2013-14 asked for people to express interest to collaborate to research **Biodiversity**. The Pilot 2 countries were Benin, Burkina Faso, Cote d'Ivoire, Ghana, Nigeria, South Africa, Tanzania and Uganda, financed by Carnegie and BELSPO.

Eligible 'aspirants' were invited into a specially designed **social networking platform** built on PODIO software (<https://podio.com/ifsse/2014-crg-candidates>). In a 'plenary workspace' people discovered each other's profiles and against a call for collaborative research applications advertised on the platform, coalesced into 45 teams, each receiving access to a private team workspace built on the social networking platform where they could plan and write their team applications. At the submission deadline (we adjudged 14 weeks for the submission) 26 teams submitted proposals, and 13 passed pre-screening and were sent out for review to multiple advisers. We convened a Collaborative Research Scientific Assessment Committee to recommend teams for funding, and following the director's decision, nine teams were funded. The graphic below shows the numbers of young scientists at each stage in the process.



The teams comprised 35 researchers from eight countries (Benin, Burkina Faso, Cote D'Ivoire, Ghana, Nigeria, South Africa, Tanzania and Uganda), 17 women and 18 men. There were six women coordinators and three men. Seven teams were mixed Anglophone-Francophone and two teams Anglophone only. The overall success rate was < 5%. After two pilots we can say that the process takes 18 months.

## **8 Capability Building Workshop (2014 Benin)**

The thirteen teams which passed pre-screening were invited to a four-day workshop from 8-11 December 2014 in Benin associated with the University of Abomey Calavi (UAC) Benin and run in conjunction with the Belgian Science Policy Office (BELSPO). The workshop was a collaborative research capability-building event. Part of the workshop programme was designed to overlap with the workshop entitled "Sharing our Progress" held simultaneously, bringing together team coordinators from nine of the ten research teams that received IFS Collaborative Research Grants in 2013 to investigate Neglected and Underutilized Species. This arrangement allowed for the 2014 cohort of applicants to learn from the experiences of the 2013 grantees regarding different aspects of planning, organizing and carrying out collaborative research. Full details are available at (<https://podio.com/ifsse/benin-workshop-2014/apps/document-library/items/38>).

## **9 Benin Workshop Background Materials**

A list of links to useful internet sites and downloaded background documents were provided to participants. They are divided in three subfolders of topics related to biodiversity, collaboration, and science. French versions of the various documents are sometimes available through the website of the organization. They are found in Appendix 4.

## 10 Collaborative Research Teams – Pilot 2

The following teams were funded.

### Team Livingstones

Coordinator: Assede Emeline  
Collaborator: Akomian Fortuné Azihou  
Collaborator: Sayuni Mariki



The team aims to predict risks of local extinction by monitoring:

- Over harvesting of multipurpose tree species in community forests
- Impacts of selective pruning in woodland (both in the Biosphere Reserve of Pendjari [BRP] in Benin), and
- Impacts of uranium mining in Selous Game Reserve, Tanzania.

### Team AVI-WEST

Coordinator: Constance Agbemelo-Tsomafo  
Collaborator: Leonce Kouakanou  
Collaborator: Jesca Nakayima  
Collaborator: Taiwo Crossby Omotoriogun



The team will assess the effect of pathogen interaction within avian host species on host fitness with respect to habitat loss. Data collection will be carried out in selected study sites in Ghana, Nigeria and Uganda.

### **Team PANORAMA**

Coordinator: Romaric Vihotogbé

Collaborator: Paula Spies

Collaborator: Nambejja Cissy



The team aims to determine the backgrounds in which efficient conservation, use and development of White's Ginger *Mondia whitei* might be rooted. It will also look at the geographic distribution and genetic variability, local management strategies, uses, and market demand in the different countries.

### **Team BIODIVERSITY**

Coordinator: Adedayo Oyedele

Collaborator: M Edith Ilboudo

Collaborator: Emanuelli Mathayo Ndossi



The team aims to characterize soil biodiversity (specifically microorganisms and insects) and soil properties associated with maize fields under different agricultural practices (tillage systems, crop rotation and farmers' traditional practices such as slash and burn) and to compare soil biodiversity conservation techniques as potentially less harmful management practices.

### **Team AMKID**

Coordinator: Afolayan Adedotun Onoyinka

Collaborator: Isabela Thomas Mkude

Collaborator: Kingsley Kodom





The team aims to assess the concentrations of seven heavy metals and some commonly used pesticides in river-shore soils, surface water, underlying sediments and most consumed species of fish and shellfish species from selected African wetlands (Wami river sub-basin in Tanzania, river Niger at Lokoja, Nigeria, and Lake Volta at the Volta river basin, Ghana).

#### **Team ARTHROPOD DIVERSITY**

Coordinator: Claire Mugasa Mack  
Collaborator: Moses Olotu  
Collaborator: Joy Anogwih  
Collaborator: Barnabas Zogo



Several insects have been suspected as possible reservoirs of *Mycobacterium ulcerans*, the pathogenic agent of Buruli ulcer (BU) disease. The team aims to investigate the role of mosquitoes, in the ecology of *M. ulcerans* in BU in Uganda, Benin, Nigeria and Tanzania.

#### **Team PHYTODIVERSITY**

Coordinator: Lawrence Sheringham Borquay  
Collaborator: Francis Atanu  
Collaborator: Paulo Okumu Ochanga  
Collaborator: Olorunfemi Eseyin  
Collaborator: Opio Dickson Robert



The team aims to prospect for new anti-plasmodial compounds capable of being developed into malaria drugs from Africa's rich flora. Plant species used to treat malaria and malaria-like symptoms will be collected from Ghana, Nigeria, Tanzania and Uganda and tested to evaluate their anti-plasmodial activity. Highly potent extracts will undergo further purification to isolate the bioactive compounds responsible for the observed anti-plasmodial efficacy.

### **Team AFRICAN RESEARCHERS**

Coordinator: Renan Ernest Traore  
Collaborator: Nkeiruka Ann Kanu  
Collaborator: Kouadio Florent N'guessan  
Collaborator: Naomi Asomani Antwi  
Collaborator: Pius Kavana



The team aims to unveil the enigma of African taro biodiversity through multidisciplinary collaborative research. The research will be conducted in study areas within Burkina Faso, Cote d'Ivoire, Ghana, Nigeria and Tanzania. The main objectives of the research will be to delineate biodiversity of taro in Africa and their potential as human and livestock food.

### **Team INV-AFRICA**

Coordinator: Palesa Mothapo  
Collaborator: Agboola Oludare Oladipo  
Collaborator: Betty Nalikka  
Collaborator: Marie-Solange Tiébré  
Collaborator: Biplang Godwill Yadok



The team will investigate the ecosystem impacts of the Triffid weed, *Chromolaena odorata* (*Asteraceae*), in three regions in Africa: Banco National Park, Cote d'Ivoire; Ezemvelo Wildlife Reserve, KZN, South Africa; and South West Nigeria.

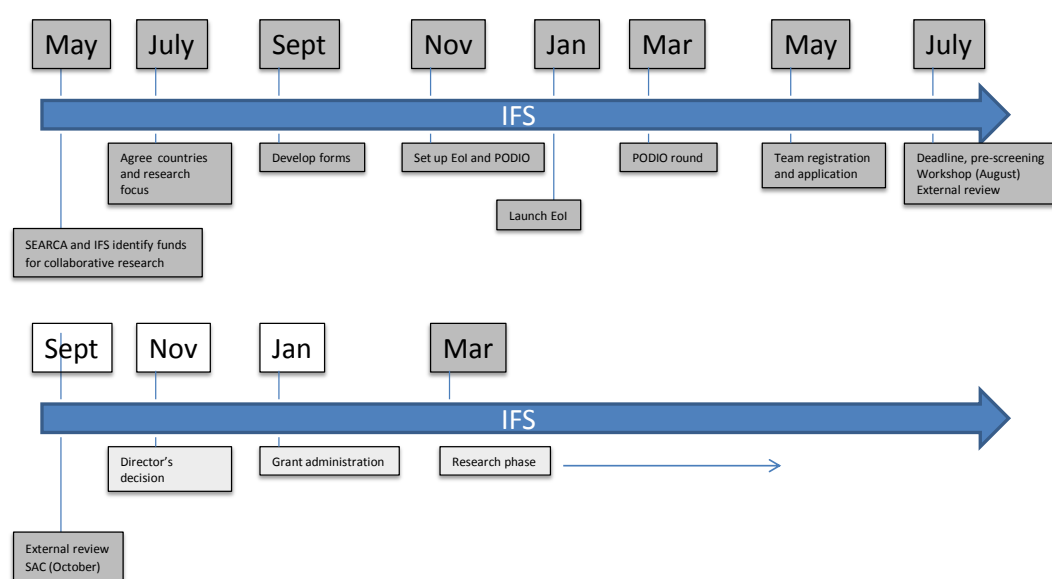
The Collaborative SAC awarded the Carolina Mac Gillavry prize to Team INV AFRICA.

## 11 Asia-Pacific Collaborative Research – Pilot 3

The 3rd call for Expressions of Interest will be in January 2016 asking for people to express interest to collaborate to research **Climate Change**. The pilot 3 countries are **Cambodia, Lao PDR, Myanmar, Philippines, Timor-Leste** and **Vietnam** financed by Carolina Mac Gillavry and Southeast Asia Regional Centre for Graduate Study and Research in Agriculture (SEARCA).

Eligible ‘aspirants’ will be invited into a specially designed **social networking platform** built on PODIO software. In a ‘plenary workspace’ people will discover each other’s profiles and against a call for collaborative research applications advertised on the platform, coalesce into teams, each receiving access to a private team workspace built on the social networking platform where they can plan and write their team applications. We will convene a Collaborative Research Scientific Assessment Committee to recommend teams for funding, leading to the director’s decision. The graphic below shows the timeline for the next steps.

**Figure 4: IFS-SEARCA Collaborative Research 2015-16**



A capability building workshop will be hosted by SEARCA in Los Banos, Philippines, in August 2016.

## Appendix 1: The Team Timelines

Team Grant	Individual Grant Number	Name	Individual starting date	expected end date	Country	Funding
100 - Tete /36 months	J/3537-2	P Bosu	2014-04-14	2017-04-14	Ghana	Carnegie
	J/5500-1	C Elusiyan	2014-04-14	2017-04-14	Nigeria	Carnegie
	J/5501-1	E Kemigisha	2014-04-14	2017-04-14	Uganda	Carnegie
	J/5502-1	E Owusu	2014-04-14	2017-04-14	Ghana	Carnegie
101 - Ximenia /28 months	J/5503-1	N Goosen	2014-04-01	2016-08-01	South Africa	MacGillavry
	J/5504-1	A Ibrahim Dabai	2014-04-01	2016-08-01	Nigeria	MacGillavry
	J/5505-1	M Pedavoah	2014-04-01	2016-08-01	Ghana	MacGillavry
	J/5506-1	T A Aderinola	2014-04-01	2016-08-01	Nigeria	MacGillavry
	J/5507-1	G O Usman	2014-04-01	2016-08-01	Nigeria	MacGillavry
102 - Amaranths 12 months	J/5508-1	C Amusan	2014-05-01	2015-05-01	Nigeria	Carnegie
	J/5509-1	E Anwa-Udondiah	2014-05-01	2015-05-01	Nigeria	Carnegie
	J/5510-1	M Mutambuka	2014-05-01	2015-05-01	Uganda	Carnegie
103 - AvianGen 24 months	J/5531-1	H Brettschneider	2014-06-01	CLOSED 2015-03-25	South Africa	Carnegie
	J/4611-3	D L Dalton	2014-06-01	2016-06-01	South Africa	Carnegie
	J/4829-2	S T Osinubi	2014-08-01	2016-08-01	Ghana	Carnegie
104 - Bambaranut /29 months	J/5511-1	G Alenoma	2014-07-20	2016-12-20	Ghana	Carnegie
	J/5512-1	G Ddamulira	2014-05-01	2016-10-01	Uganda	Carnegie
	J/5513-1	G M Karwani	2014-04-01	2016-09-01	Tanzania	Carnegie
	J/5514-1	I M Okpara UZOH	2014-06-20	2016-11-20	Nigeria	Carnegie
	J/5515-1	O Umeugochukwu	2014-04-15	2016-09-01	South Africa	Carnegie
105 - Campnut /36 months	J/5516-1	C Antwi	2014-03-15	2017-03-15	Ghana	Carnegie
	J/5517-1	M Kiryowa	2014-04-01	2017-04-01	Uganda	Carnegie
	J/5518-1	A Ayano	2014-04-01	2017-04-01	Nigeria	Carnegie

Team Grant	Individual Grant Number	Name	Individual starting date	expected end date	Country	Funding
106 - Diamond /24 months	J/5519-1	R Amayo	2014-04-15	2016-04-15	Uganda	Carnegie
	J/5520-1	T Ansah	2014-04-01	2016-04-01	Ghana	Carnegie
	J/5521-1	D Asizua	2014-04-01	2016-04-01	Uganda	Carnegie
	J/5522-1	S Fada	2014-05-30	2016-05-30	Nigeria	Carnegie
107 - Multinus /24 months	J/4028-2	J Igoli	2014-04-15	2016-04-15	Nigeria	Carnegie
	J/5523-1	C Masao	2014-04-14	2016-04-14	Tanzania	Carnegie
	J/5524-1	E Nakamatte	2014-04-14	2016-04-14	Uganda	Carnegie
	J/5525-1	U Orkpe	2014-04-15	2016-04-15	Nigeria	Carnegie
108 - Nanomed /12 months	J/5526-1	P K Arthur	2014-05-01	2015-05-01	Ghana	Carnegie
	J/4894-2	P E Kazyoba	2014-06-01	2015-06-01	Tanzania	Carnegie
	J/5527-1	L Mosi	2014-05-01	2015-05-01	Ghana	Carnegie
	J/5528-1	J J E Munissi	2014-10-14	2015-10-14	Tanzania	Carnegie
110 - SSACRT /26 months	J/3612-3	K Adebayo	2014-06-02	2016-08-02	Nigeria	Carnegie
	J/5529-1	JB Muhumuza	2014-06-02	2016-08-02	Uganda	Carnegie
	J/5530-1	O Kofoworola	2014-06-02	2018-08-02	Nigeria	Carnegie
125 - Avi-West /36 months	J/5721-1	AGBEMELO-TSOMAFO	2015-06-01	2018-06-01	Ghana	Carnegie
	J/5722-1	KOUAKANOU	2015-05-25	2018-05-25	Benin	Belspo
	J/5723-1	NAKAYIMA	2015-08-20	2018-08-20	Uganda	Carnegie
	J/5724-1	OMOTORIOGUN	2015-06-01	2018-06-01	Nigeria	Carnegie
128 - InvAfrica /24 months	J/5725-1	MOTHAPO	2015-09-07	2017-09-07	South Africa	MacGillavry
	J/5726-1	AGBOOLA	2015-08-01	2017-08-01	Nigeria	MacGillavry
	J/5727-1	NALIKKA	2015-05-30	2017-05-30	Uganda	MacGillavry
	J/5728-1	TIEBRE	2015-07-01	2017-07-01	Cote d'Ivoire	MacGillavry
	J/5729-1	YADOK	2015-09-07	2017-09-07	Nigeria	MacGillavry
129 - LivingStones /36 months	J/5730-1	ASSEDE	2015-06-15	2018-06-15	Benin	Belspo
	J/5731-1	AZIHOU	2015-06-15	2018-06-15	Benin	Belspo
	J/5732-1	MARIKI	2015-06-01	2018-06-01	Tanzania	Carnegie



Team Grant	Grant Number	Name	Individual starting date	expected end date	Country	Funding
132 - Panorama /20 months	<b>J/4672-2</b>	VIHOTOGBE	2015-06-01	2017-03-01	Benin	Belspo
	<b>J/5733-1</b>	NAMBEJJA	2015-06-01	2017-03-01	Uganda	Carnegie
	<b>J/5734-1</b>	SPIES	2015-06-01	2017-03-01	South Africa	Carnegie
133 - Soil Biodiversity /24 months	<b>J/5735-1</b>	OYEDELE	2015-05-15	2017-05-15	Nigeria	Carnegie
	<b>J/5736-1</b>	ILBOUDO	2015-06-01	2017-06-01	Burkina Faso	Belspo
	<b>J/5737-1</b>	NDOSSI	2015-06-01	2017-06-01	Tanzania	Carnegie
135 - AMKID /30 months	<b>J/5738-1</b>	AFOLAYAN	2015-05-20	2017-11-20	Nigeria	Carnegie
	<b>J/5739-1</b>	KODOM	2015-05-29	2017-11-29	Ghana	Carnegie
	<b>J/5740-1</b>	MKUDE	2015-05-30	2017-11-30	Tanzania	Carnegie
136 - Arthropod Diversity /18 months	<b>J/5741-1</b>	MUGASA	2015-06-05	2017-01-05	Uganda	Carnegie
	<b>J/5742-1</b>	ANOGWIH	2015-06-25	2017-01-25	Nigeria	Carnegie
	<b>J/5743-1</b>	OLOTU	2015-06-15	2017-01-15	Tanzania	Carnegie
	<b>J/5744-1</b>	ZOGO	2015-07-01	2017-02-01	Benin	Belspo
134 - African Researchers /36 months	<b>J/5745-1</b>	TRAORE, Renan	2015-06-01	2018-06-01	Burkina Faso	Belspo
	<b>J/4167-3</b>	N'GUESSAN	2015-06-15	2018-06-15	Cote d'Ivoire	Belspo
	<b>J/5746-1</b>	KANU	2015-06-15	2018-06-15	Nigeria	Carnegie
	<b>J/2982-2</b>	KAVANA	2015-06-01	2018-06-01	Tanzania	Carnegie
	<b>J/5747-1</b>	ASOMANI ANTWI	2015-06-01	2018-06-01	Ghana	Carnegie
137 - Phytodiversity 2014 /36 months	<b>J/5748-1</b>	BORQUAYE	2015-07-01	2018-07-01	Ghana	Carnegie
	<b>J/5749-1</b>	ATANU	2015-05-25	2018-05-25	Nigeria	Carnegie
	<b>J/5019-2</b>	ESEYIN	2015-07-01	2018-07-01	Nigeria	Carnegie
	<b>J/5750-1</b>	OCHANGA	2015-07-01	2018-07-01	Tanzania	Carnegie
	<b>J/5751-1</b>	OPIO	2015-07-01	2018-07-01	Uganda	Carnegie



## GUIDELINES FOR REPORTS

### REPORTS

A detailed scientific report on the IFS supported project has to be submitted at the end of the research period. All reports will be presented to the IFS Scientific Advisers for evaluation.

Reports should be written like scientific publications with the following structure:

- a. *First page: Include your name, the IFS research grant agreement number, the team name, the title of the project, the name and address of the institution where your work has been carried out, and the dates of the research period*
- b. *A brief summary of the report (max. one page)*
- c. *Introduction*
- d. *Materials and methods*
- e. *Results and discussion*
- f. *Conclusions*
- g. *Literature cited*
- h. *List and **send copies** of publications, reports and manuscripts that evolved from the IFS supported project (if manuscripts are ready for publication indicate the journal[s] to which you intend to submit them)*

Reports should be written in English or French on A4 paper. **Please do not bind the report.**

IFS grantees are encouraged to publish their results in scientific journals. **Please remember to acknowledge the IFS support in your publications and to share a copy with us.**

The **copies listed under h. can serve as reports** if accompanied by separate pages containing the information set forth in points a and b above. If the publications do not cover all aspects of the project, the additional information should be submitted on separate pages.

## **FINAL REPORTS**

The final report, covering the last granting period and written when the IFS supported project is terminated, has to follow the structure as described above. In addition, a project completion report has to be submitted which shall be a synthesis of the total period during which you had IFS support. A PROJECT COMPLETION FORM with questions covering this whole complex is attached.

## **REPORT OF PROJECT EXPENDITURES FOR GRANT FUNDS TRANSFERRED**

If grant funds were transferred to your institution, you must provide a summary of the expenditures in USD on a form attached. It should be signed by a responsible financial officer of your institution. Invoices and other detailed records are not required to be sent, but they should be available upon request by the Foundation. The completed form has to be returned to IFS at the end of the research period, normally together with the report.



## Report Of Project Expenditures Using Transferred Funds<sup>(\*)</sup>

Instructions: This form is to be completed following the completion of an IFS supported research project. In the spaces provided below please provide information pertaining to any IFS funds that were transferred to your institution for the purchase of research supplies and services. This form should be returned to IFS together with your application for a renewal grant and/or your final report to IFS.

**IFS Grant Agreement No.**

**Amount of grant approved by IFS: USD**

**Amount transferred to your institution: USD**

Transferred funds were spent on**:	Amount in USD:	Supplier (company name and country)
Equipment		
Supplies:		
Literature		

Local travel		
Extra manpower		
Other (please specify):		

(\*) Please feel free to write about your experiences with regard to the transfer of the grant and purchasing matters on the reverse side of this paper or on a separate page.

(\*\*) List equipment items, categories of expendable supplies (eg glassware, reagents, etc), literature (eg books, journals, reprints, etc), local travels (no of trips, destination), extra manpower (no of persons, duration of employment), other expenditures (must be specified).

Date and Signature of the	Date and Signature	Name and Position
Principal Investigator	For the Institution	(type)



**Other comments:**



**IFS – COLLABORATIVE RESEARCH PROJECT COMPLETION FORM**

Grantee:

IFS grant No:

Team name:

Total amount granted (incl. supplementary grants, travel grants etc.) USD to you..... to your team.....

Start of the project:      Termination of the project: \_\_\_\_\_

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Please check if the above is correct and fill in the date of project completion. Add to this form your current **Curriculum Vitae**.

Please answer the following questions. Use separate paper if necessary for your answers.

1. Have any of the results from your project been put into practical use?  
If yes, please describe in what way(s).

2. Approximately how many persons in the following categories have benefited in some way from your IFS grant?

<u>Category</u> _____	<u>Number</u>
Other scientists in your institution	
Technicians in your institution	
Research students	
Others (specify)	

3. Please list your publications relating to the IFS supported work during the granting period(s).

4. Were there any other benefits for your institution resulting from your IFS grant? Which?

5. With how many of each of the following persons have you established lasting working contact - through IFS itself, or through attending IFS workshops or using IFS travel grants?

<u>Category</u> _____	<u>Number</u>	
	<u>in your country</u>	<u>in other countries</u>
Other IFS grantees		
IFS advisers		
Other scientists		

6. Please name any learned societies or scientific networks you are an active member of, and mark with 'IFS' those which you first made contact with through IFS.

7. What is your present position? (institution, post, responsibility, research [%])

8. Please list any degrees, diplomas, promotions, awards, prizes you received since the time your IFS support started. Give also the year they were received, and mark with 'IFS' those received in connection with your IFS-supported project.

9. Have you been able to obtain any research funding from other sources since the time your IFS support

started? If yes, state the topic or purpose for the funding and give the name of the awarding body as well as the year the funds were approved.

10. What significance - if any - has the IFS support had for your career?

11. Are you a member of the IFS Alumni Association – if yes – has this been helpful?

12. Did you use the IFS equipment procurement service – if so – was equipment provided efficiently?

13. Did you use IFS digital workspaces – if so – what did you think of them?

14. Have you presented your research? – if so – was this an invited presentation?

15. Have you disseminated your approved research results in popular form (TV, radio, workshops, Policy Briefs, booklets/cartoons - please state which)?

16. Has your research resulted in: New products? New services? Influence on policy? A patent?

**THANK YOU FOR YOUR HELP AND CO-OPERATION.**

You are invited to give any further comments or describe major problems you encountered. Suggestions regarding ways in which IFS could further assist its grantees would be much appreciated.

### Appendix 3: Cover Letter Requesting Collaborative Research Report

Dear.....,

Our records show that your research period conclusion date is .....

This message is to remind you of your responsibility as the Investigator, as stated in the GENERAL CONDITIONS of your research contract with IFS:

- The Investigator shall at the end of the research period immediately submit to IFS a project report in English or in French. This report shall be accompanied by a statement of expenditures for funds transferred.
- The Investigator shall send one copy of each publication related to the project to IFS and also keep IFS informed about any applications of the research results.

We therefore look forward to receiving your report and accompanying statement of expenditure against the attached proforma.

Yours sincerely,

The following grantees are due to report and have been sent their end reporting proformas:

Team Grant	Grant Number	Name	Individual starting date	expected end date	Country	Funding
108 - Nanomed /12 months	J/5526-1	P K Arthur	2014-05-01	2015-05-01	Ghana	Carnegie
	J/4894-2	P E Kazyoba	2014-06-01	2015-06-01	Tanzania	Carnegie
	J/5527-1	L Mosi	2014-05-01	2015-05-01	Ghana	Carnegie
102 - Amaranths 12 months	J/5528-1	J J E Munissi	2014-10-14	2015-10-14	Tanzania	Carnegie
102 - Amaranths 12 months	J/5508-1	C Amusan	2014-05-01	2015-05-01	Nigeria	Carnegie
	J/5509-1	E Anwa-Udondiah	2014-05-01	2015-05-01	Nigeria	Carnegie
	J/5510-1	M Mutambuka	2014-05-01	2015-05-01	Uganda	Carnegie



## Appendix 4: Media to Support Learning

### 4.1 Ghana Workshop Background materials

**‘When Scientists and Poets were Friends; A Workshop On Interdisciplinary and Creative Problem Solving Methods’.** We provided a wide range of media to support learning (available on IFS Podio Ghana workshop workspace) including: Institute of Design at Stanford ‘Bootcamp Bootleg’ (a compilation intended as an active toolkit to support design), NY Times ‘Where science and design collide’, Harvard Business Review ‘Perfect Cross Pollination’ and a range of videos of interdisciplinary leadership:

IDEO ABC News

Part One (<http://www.youtube.com/watch?v=M66ZU2PClM>).

Part Two (<http://www.youtube.com/watch?v=pVZ8pmkg1do&feature=related>)

Part Three (<http://www.youtube.com/watch?v=nyugyrCQTuw&feature=related>)

Where Good Ideas Come From

(<http://www.youtube.com/watch?v=NugRZGDbPFU&feature=related>)

### 4.2 Benin Workshop Background materials

The following list of links to useful internet sites and downloaded background documents were provided to participants. Here they are divided in four subfolders, i.e. biodiversity related, collaboration related, and science related topics. French versions of the various documents are sometimes available through the website of the organization.

#### **Biodiversity related Links:**

- ABN, the African Biodiversity Network <http://africanbiodiversity.org/>, based in Kenya
- Alert, the Alliance of Leading Environmental Researchers & Thinkers, <https://alert-conservation.squarespace.com/about-us/> , promoting and disseminating environmental research mainly through social media
- Biodiversa, a network of European research funding agencies with some interesting resources <http://www.biodiversa.org/7>
- Biodiversity Indicators Partnership, for tracking global biodiversity <http://www.bipindicators.net/>

- Biodiversity Initiative: <http://www.unesco.org/new/en/natural-sciences/special-themes/biodiversity-initiative/>, a UNESCO initiative
- Bioversity International, a CGIAR centre researching agricultural and tree biodiversity <http://www.bioversityinternational.org/>
- Convention on Biological Diversity, <http://www.cbd.int/default.shtml>
- Debates on cost/benefits of post-2015 biodiversity goals by the Copenhagen Consensus Center, a US based think tank, <http://www.copenhagenconsensus.com/post-2015-consensus/biodiversity>. Also, a lot of other interesting information and opinions regarding post-2015 development.
- Diversitas, a programme aiming at integrating biodiversity science for human well-being <http://www.diversitas-international.org/>
- ESPA, Ecosystem Services for Poverty Alleviation, a UK funded international research programme established in 2010, with some interesting links and examples of research projects, <http://www.espa.ac.uk/>
- Global Biodiversity Information Facility (GBIF), an international open data facility, <http://www.gbif.org/>
- Global Environment Facility, <http://www.thegef.org/gef/>
- IPBES, the intergovernmental science policy platform on biodiversity and ecosystems services <http://www.ipbes.net/>
- Poverty and Conservation, the information portal of the Poverty and Conservation Learning Group, UK based and linked to IIED, the International Institute for Environment and Development (<http://www.iied.org/>), with lots of interesting links to relevant organisations and documents (some downloaded on your USB) <http://povertyandconservation.info/en/pclg-publications>
- Issuu, a free platform for magazines, catalogues, newspapers, etc. where many international organisations put their reports. An example for a search on “biodiversity and poverty alleviation” generates a lot of potentially interesting documents: <http://issuu.com/search?q=biodiversity+and+poverty+alleviation>
- PEN, Poverty Environment Network, working on tropical forests and poverty <http://www1.cifor.org/pen.html>, with a lot of useful resources including prototype questionnaires
- PROLINNOVA, Promoting Local Innovation, <http://www.prolinnova.net/>, an international network under the umbrella of the Global Forum on Agricultural Research (GFAR), to

promote local innovation in ecologically oriented agriculture and natural resource management

- Ramsar at <http://www.ramsar.org/> , information on the Ramsar convention, a convention on wetlands of international importance, as one example of the many different organisations aiming at the conservation and wise use of specific ecosystems
- SANBI, South African National Biodiversity Institute, with many resources <http://www.sanbi.org/information>
- Tropical Biology Association <http://www.tropical-biology.org/> with many useful resources including information on training opportunities, manuals and a newsletter, as well as an African alumni association.
- Various: Research papers from different scientific journals. Generally speaking, it should not be difficult for any of you to get hold of scientific papers through your institutional libraries. However, in case it turns out to be difficult, you could always try to send an e-mail to the corresponding author. Remember that nowadays many subscription journals every now and provide open access articles. Usually, you can subscribe to these through an RSS feed. Here an example of a recent open access articles from Current Opinion in Environmental Sustainability: <http://www.sciencedirect.com/science/journal/18773435/9>, where the open access articles are marked in a different colour, and another one from a new open access journal from Springer group: <http://www.forestecosyst.com/>
- WRI, World Resources Institute, <http://www.wri.org/>, a non-governmental global research organisation on sustainable natural resource management.

Downloaded documents:

- Africa Ecological Footprint Report 2012, joint report by the Global Footprint Network, WWF, the Zoological Society of London, and others (<https://files.podio.com/140287464>)
- Biodiversity, Ecosystem Services and Poverty Alleviation: What constitutes good evidence? PCLG discussion paper (2013) (<https://files.podio.com/140287655>)
- Biodiversity and ecosystem services science for a sustainable future: the Diversitas vision for 2012-2020 (2012), by Laurigauderi *et al.*, downloaded from the Diversitas home page, describing their view on the challenges in the near future (<https://files.podio.com/140290353>)
- Building capacity to implement the Nagoya Protocol, a review of GEF support (2014) (<https://files.podio.com/140290068>)
- Ecosystems services guide for decision makers (2008), a product from WRI (<https://files.podio.com/140290119>)

- Integrating Biodiversity Conservation into National Development Policy: a case study of Cameroon (2012), a PCLG discussion paper providing a country example of how conservation and development can be linked (<https://files.podio.com/140290236>)
- Investing in life, the 10 year report of the Critical Ecosystem Partnership Fund (2010) (<https://files.podio.com/140290275>)
- Key Knowledge for Developing Successful Biodiversity indicators (2014), a document on the development and use of biodiversity indicators by the Biodiversity Indicator Partnership (<https://files.podio.com/140290316>)
- Living Planet 2014, joint report by Global Footprint Network, WWF, the Zoological Society of London, and others (<https://files.podio.com/140290542>)
- Tracking key trends in biodiversity science and policy, a UNESCO publication of 2013 (<https://files.podio.com/140290620>)
- Toolkit for the indicators of resilience in socio- ecological production landscapes and seascapes (2014) (<https://files.podio.com/140290586>)

#### Videos:

- Greg Asner: Ecology from the air (2013), [http://www.ted.com/talks/greg\\_asner\\_ecology\\_from\\_the\\_air?utm\\_content=awesm-publisher&utm\\_medium=on.ted.com-static&awesm=on.ted.com\\_Asner&utm\\_campaign=&utm\\_source=ideas.ted.com#t-320808](http://www.ted.com/talks/greg_asner_ecology_from_the_air?utm_content=awesm-publisher&utm_medium=on.ted.com-static&awesm=on.ted.com_Asner&utm_campaign=&utm_source=ideas.ted.com#t-320808), and a written comment learning about biodiversity through aerial technology: <http://ideas.ted.com/2013/11/19/birds-eye-science-what-were-learning-about-the-planet-using-aerial-technology/> , as an example of the type of research that can be done using modern technologies from different disciplines
- Jonathan Foley: The other inconvenient truth (2011) [http://www.ted.com/talks/jonathan\\_foley\\_the\\_other\\_inconvenient\\_truth?language=en#t-20561](http://www.ted.com/talks/jonathan_foley_the_other_inconvenient_truth?language=en#t-20561)
- Alex Staffen: The route to a sustainable future (2005) [http://www.ted.com/talks/alex\\_steffen\\_sees\\_a\\_sustainable\\_future](http://www.ted.com/talks/alex_steffen_sees_a_sustainable_future)
- Pavan Sukdev: Put a Value on Nature! (2011) [http://www.ted.com/talks/pavan\\_sukhdev\\_what\\_s\\_the\\_price\\_of\\_nature?language=en](http://www.ted.com/talks/pavan_sukhdev_what_s_the_price_of_nature?language=en)
- Scale – Time – Complexity: engaging, entangling, and communicating ecology; Jamieson, N; Denton, A; Reay, S 2012 [http://socialmedia.hpc.unm.edu/isea2012/sites/default/files/ISEA2012\\_confproceedings\\_WEB.pdf](http://socialmedia.hpc.unm.edu/isea2012/sites/default/files/ISEA2012_confproceedings_WEB.pdf) Via: <http://aut.researchgateway.ac.nz/handle/10292/4846>

- Toward a greener future: Conservation success stories from Africa  
<https://www.youtube.com/watch?v=bUZvXQg7tJc>, a promotion video by the World Bank

#### **Collaboration related Links:**

- Institute of Development Studies: <http://www.ids.ac.uk/> , with several interesting links and resources, i.e. IDS Policy briefings:

<http://opendocs.ids.ac.uk/opendocs/bitstream/handle/123456789/4021/PB68.PDF?sequence=1> ; on foresight to cope with uncertainty:

<http://opendocs.ids.ac.uk/opendocs/bitstream/handle/123456789/4021/PB68.PDF?sequence=1>;

knowledge services <http://www.ids.ac.uk/knowledge-services/evidence-into-action>

- Various medical sites. The health sector provides many good examples of collaboration and the science of collaboration that can be very useful for non-health professionals and for scientists from other disciplines:

- The Sept 2014 issue of the Journal of Translational Medicine and Epidemiology is entirely devoted to collaboration science and translational medicine and can be freely downloaded from <http://www.jsmedcentral.com/TranslationalMedicine/translationalmedicine-spider-collaboration-science-translational-medicine.php>

- Team Science Toolkit, managed by the National Cancer Institute (US) <https://www.teamsciencetoolkit.cancer.gov/public/Home.aspx> .This site has many resources that are very useful to scientists other than those working on health related issues. A good place to start on this site is to look at the Editor's Pick, under the resources heading in the right hand column, or to check their blogs for interesting items, i.e. <https://www.teamsciencetoolkit.cancer.gov/public/ExpertBlog.aspx?tid=4> .

#### **Downloaded documents:**

- A short guide to leading interdisciplinary initiatives (2011)
- Creative Collaborations (2012) by the Helsinki Design Lab
- How and why to teach interdisciplinary research (2007), an article from the Journal of Research Practice (<https://files.podio.com/140288098>)
- lass workshop3 Interdisciplinarity Discussion paper
- Interdisciplinary Research Guide: Facilitating Interdisciplinary Research and Education: A practical guide (2012): with lots of links to interesting literature, from the American Association of the Advancement of Science (AAAS) (<https://files.podio.com/140288176>).

- Interdisciplinary Teams, key concepts, a short ICRA document, in the ICRA learning materials series.

- Team Science Field Guide: Collaboration and Team Science (2010), a useful book based on team building in health research by the National Institutes of Health (US) (<https://files.podio.com/140288211>).

#### Videos:

Several videos on interdisciplinary leadership Videos for Interdisciplinary Leadership.

- IDEO ABC News

- art One <http://www.youtube.com/watch?v=M66ZU2PClCM>

- Part Two <http://www.youtube.com/watch?v=pVZ8pmkg1do&feature=related>

- Part Three <http://www.youtube.com/watch?v=nyugyrCQTuw&feature=related>

- Where Good Ideas Come From  
<http://www.youtube.com/watch?v=NugRZGDbPFU&feature=related>

#### Science related Links:

- Caast Net Plus, a network on Science, Technology and Innovation Cooperation between Sub-Saharan Africa and Europe <http://www.caast-net-plus.org/> funded by the EU.

- Critical Thinking and why it counts (2013). (<https://files.podio.com/140294579>)

- Impact toolkit, a website by the Economic and Social Research Council in the UK at <http://www.esrc.ac.uk/funding-and-guidance/impact-toolkit/>. Although focussing on the UK, it has resources that are useful outside UK also.

- IFS Individual research application form can be downloaded from the IFS web [www.ifs.se](http://www.ifs.se) at times when there is a call open. The actual application form can be downloaded until 31 Dec 2014.

- Sense about Science, a UK based NGO promoting the public understanding of science. Although this organisation is focussing on the UK, it provides interesting links to other organisations and documents (some downloaded on this stick) <http://www.senseaboutscience.org/>

#### Downloaded documents:

- The African Manifesto for Science, Technology and Innovation (2010) (<https://files.podio.com/140289711>).



## **Other useful resources from IFS on the Collaborative Research Approach**

Other useful resources include:

Breaking Fences May Make for Good Neighbours in Collaborative Research: Why the International Foundation for Science will introduce a Collaborative Research Approach, available at

<http://ifs.modx.kaigan.se/IFS/Documents/Publications/Breaking%20fences%20may%20make%20for%20good%20neighbours%20in%20collaborative%20research.pdf>

Investigating Costs and Benefits of Collaborative Research: The results of surveys of IFS collaborative research aspirants and grantees regarding IFS efforts to promote the benefits and reduce the costs of research collaboration assessed after one year, available at

<http://www.ifs.se/IFS/Investigating%20the%20costs%20and%20benefits%20of%20collaboration.pdf>

A workshop entitled “Sharing our Progress” (December 2014) was a follow up with the team coordinators from the ten teams who received IFS Collaborative Research Grants in 2013 to investigate Neglected and Underutilized Species.

<http://www.ifs.se/IFS/Workshop%20Report%20Sharing%20our%20Progress%20Ouidah%20Benin.pdf>

A collaborative research capability building workshop entitled “Getting Started” for those colleagues passing pre-screening in the second IFS Collaborative Research Grant pilot in 2014 to investigate Biodiversity.

[http://www.ifs.se/IFS/Getting%20Started%20Workshop%20\(final\)%20.pdf](http://www.ifs.se/IFS/Getting%20Started%20Workshop%20(final)%20.pdf)