



GATSBY

BUILDING AGRICULTURAL SCIENCE CAPACITY

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Improving agricultural output in Africa is vital to reducing poverty. A key pillar of achieving this is catalysing partnerships between African and European scientists. With sustained efforts such partnerships can empower resource-poor countries to identify locally appropriate solutions to problems in rural agricultural development.



- In 2004 Gatsby supported Rothamsted International to establish the African Fellows Programme (AFP) to enable African scientists to identify a problem in their home country and take up a placement at a European centre of excellence to gain access to the technology and expertise needed to develop solutions. Gatsby provided core funding from 2004 to the programme's close in 2011
- A condition of support was that each scientist return home to disseminate their findings to local farmers
- While the AFP was a success for Fellows and scientific institutions in Africa and Europe, the extent to which farmers benefited depended greatly on the capacity of local extension services

BACKGROUND

Rothamsted International (RI) is a charity that aims to share research excellence in science for the benefit of worldwide agricultural and environmental sustainability. It is based at Rothamsted Research, the oldest agricultural research station in the world.

In 2004 Gatsby supported RI to establish a fellowship programme to fund African agricultural scientists to undertake short periods of research in leading European agricultural research institutions.

The objective was to enable African scientists to leverage advanced science and facilities to solve specific problems in African agriculture, with each Fellow committing to return to their home country and disseminate their findings in ways that would benefit local farmers.

ACHIEVEMENTS

Throughout seven years of operation, the AFP held nine rounds, attracted over 900 pre-proposal applications, and funded 44 scientists from 16 different African countries working on a broad range of research issues. A total of 28 scientists were placed within UK institutions and 16 across the rest of Europe.

Projects included:

- Identification of bee pests and diseases in different agro-ecological zones of Uganda, with prevalence measured for the first time. A Pest and Disease Surveillance Protocol for the Ugandan bee industry was drawn up.
- Identification of five lentil varieties with boron tolerance for possible dissemination in Ethiopia, which is suffering from boron toxicity in newly

irrigated areas where rapid evaporation is leaving salt deposits.

- Use of models to interpret a set of soil samples and data in the semi-deciduous forest zone of Ghana. Results suggested that it was best to improve soil function by managing the distribution of organic matter within the soil matrix, leading to organic inputs such as sawdust being used to improve soil productivity in smallholder farming communities.
- Documentation of the genetic variation among and between populations of baobab trees in Benin. This allowed strategies for in-situ conservation and management of the species in traditional agroforestry systems to be defined and discussed with local people.
- Molecular genetic investigation of resistance to mastitis disease in Maasai and Boran cattle in Tanzania. This disease causes a severe reduction in the quantity and quality of milk. The project showed a vast diversity of alleles in Maasai cattle and opened the possibility of using typing technology as part of a control strategy involving selection of animals for cross-breeding.

SCIENTIFIC IMPACT

When surveyed, all fellows reported that they learned new scientific methods and to use new equipment and new techniques. The majority also reported learning new ways of thinking, while three-quarters learnt new ways of organising and disseminating research. Almost two-thirds reported that the Fellowship was a “step

change” in their understanding of their research.

Many scientists received recognition as a result of their fellowship: 50% were given increased responsibility; 25% were promoted; and 55% received a follow-up fellowship or award from a different body.

“The AFP Fellowship allowed me to broaden my outlook by exposing me to novel methods of answering scientific questions. The work that I did in Switzerland equipped me with the necessary practical and theoretical knowledge to carry out related studies in the future and enabled me to form a long-lasting scientific support network.” – Alicia Timm, Molecular diagnosis and genetic diversity of economically important thrips species in southern Africa.

The programme also had a strong impact on the institutions - both African and European - involved, including through follow-on partnerships and networks. 93% of fellowships provided new knowledge to scientists' home institutions and 81% of fellowships provided new skills and new contacts for the home institution. The

majority of scientists have maintained institutional relationships beyond their placement and more than 80% have since written joint publications.

FARMER IMPACT

The impact of the AFP on farmers is much more difficult to determine. As the achievements listed above demonstrate, many fellowships had a considerable impact on local communities.

However, the extent to which this occurred depended almost entirely on African home organisations having the mechanisms to feed knowledge through to the next stage in the pipeline – whether this was applying the knowledge in field experiments, or delivering it to extension services who link with farmers.

LESSONS

Some major strengths of AFP highlighted by Fellows were:

- its focus on action;
- the programme's flexibility;
- the close relationship cultivated between RI, the host institute/supervisors and the Fellows;
- its focus on one-to-one interaction, particularly in comparison to group trainings where the attention of experts is divided.

Fellows identified the major weaknesses of the AFP as its inability to provide pre-fellowship support for preparatory activities in-country (e.g. collection of samples) and post-fellowship support to ensure follow-up and application of knowledge. While in-country “into practice” support could potentially strengthen the link between science and its application, the problem of how to get research results to end-users remains a critical challenge in African agriculture.

The AFP had a triple impact, benefitting scientists, institutions in both Europe and Africa, and farmers in communities where extension services were in place and had the capacity to disseminate knowledge. To receive the full benefit of similar projects in the future, the critical issue of adequately resourcing extension in African countries has to be addressed.

CASE STUDY – IDENTIFYING PAPAYA DISEASES IN CÔTE D'IVOIRE

Papaya fruit production was promoted in Côte d'Ivoire when the government recommended small growers should diversify and cultivate plants other than banana. However, in the mid-2000s an unknown viral disease was sweeping through the papaya industry, causing lower yields and poor quality fruit riddled with ringspots and streaking.

Hortense Diallo from the Université d'Abobo-Adjamé applied for a Fellowship to find a solution. During her placement at Rothamsted Research working with Prof Philip Jones, Hortense used techniques such as electron microscopy to identify and characterise the strain of Papaya ringspot virus (PRSV) that was prevalent. This was the first time PRSV had been identified in papaya in Côte d'Ivoire.

Hortense submitted the PRSV sequence to the international gene bank, published her findings in several journals and produced a technical leaflet advising the Ministry of Agriculture on the disease's management.

When she returned to Côte d'Ivoire she participated in a pilot plant clinic project for rural communities to ensure local farmers benefitted from her work.