EUROPEAN UNION

icipe

BRIEFING NOTE

# EU – *icipe* partnership towards strengthening agriculture in Africa's development

**Over the past 10 years, the European Union (EU) and *icipe* have formed a solid partnership towards strengthening agriculture as a core and effective component in Africa's development. Within this period, the EU has provided grants amounting to approximately Euro 38 million to support a range of *icipe* initiatives including: tsetse repellent collars technology, climate-smart Push-Pull technology, management of fruit flies, research on insect transmitted camel diseases, bee research, and more recently, control of the fall armyworm.**

## Projects/ Programmes

### Validation and Initiation of Diffusion of Pro-poor and Poor Environment Tsetse Repellent Technology (2011 – 2012)

EU supported *icipe* to conduct large scale trials to test the effectiveness of the tsetse repellent collars around the Shimba Hills area, coastal Kenya, where trypanosomiasis is the main constraint to livestock keeping. The trials showed that, though not yet fully optimised, the repellent collar technology can control tsetse, reducing the rate of nagana by more than 80%, thereby contributing to increased milk and meat production, as well as draught power to cultivate land, making a significant impact on the livelihoods of benefitting farmers.

## Overview of *icipe* technologies and research areas being supported by the EU

The **tsetse repellent collar technology** is an innovative technology designed by *icipe* based on research and development activities undertaken by the Centre over the past 20 years towards the sustainable control of tsetse flies, which transmit trypanosomiasis (nagana), a fatal disease that kills millions of cows every year, and the fatal sleeping sickness in humans. The collars contain a blend of chemicals identified from waterbuck, an animal that is present in tsetse fly infested areas, but which is rarely fed on by the flies. Worn around the neck of cattle, the repellent collars provide substantial protection to cattle.

**Push-Pull** is a platform technology developed over the past 20 years by *icipe* in collaboration with Rothamsted Research, United Kingdom, and partners in eastern Africa. This simple intercropping strategy simultaneously addresses the five key constraints of cereal–livestock mixed production systems in Africa – insect pests (stemborers), the parasitic weed *Striga* (and other weeds). In addition, Push-Pull also controls maize ear rots and mycotoxins, while improving soil health and providing high quality fodder, since the intercrops are superior forages. Most recently the technology has been found to be effective against the notorious invasive fall armyworm.

The **fruit fly integrated pest management (IPM) packages** are aimed at reducing yield losses and the huge expenditure incurred by farmers to purchase pesticides in trying to deal with the plethora of these devastating pests. One objective is to minimise the health and environmental risks associated with the use (and misuse) of such chemicals. Ultimately, *icipe* aims to enhance fruit productivity in sub-Saharan Africa (SSA) and increase the competitiveness of the produce in local and international markets, to improve the income and livelihoods of people involved in the value chain, especially women and the youth.

Research on the control of **camel disease vectors** in arid and semi-arid lands of SSA is using the experience and knowledge gained by the Centre in the development

### Adaptation and Dissemination of Push-Pull technology (ADOPT) (2013 – 2015)

Through EU support *icipe* undertook research to develop a climate smart version of Push-Pull, in view of the increasingly dry and hot climatic conditions in Africa. This modification has allowed the extension of Push-Pull to drier agricultural areas, while ensuring its resilience in the longer term. Close to 50,000 farmers who initially adopted the climate smart Push-Pull in the drier areas of Ethiopia, Kenya and Tanzania were able to stabilise their cereal–livestock mixed production systems, increasing yields by 2.5 times while also integrating dairy farming into their production systems, despite challenges posed by climate of change.


### Integrated Biological Control Applied Research Program (IBCARP) (2015 – 2018)

The Programme is supporting the adoption of *icipe* technologies by an estimated 350,000 additional farmers and pastoralists in Kenya, Ethiopia and Tanzania. The researchers are also modifying the technologies in view of changing agricultural practices.

IBCARP has four components, the first two being the tsetse repellent collars and the Push-Pull technologies. *icipe* is collaborating with private sector partners to optimize and scale-up the mass production and rollout of the tsetse repellent collar technology. The researchers are investigating ways to integrate the use of the technology with other approaches, and to develop effective barriers to stop flies from reinvading tsetse controlled areas, while also evaluating it for use in the control of vectors of human African trypanosomiasis (known more commonly as sleeping sickness). In addition, *icipe* and partners are addressing the limitations to the adoption of the climate-smart Push-Pull, while also continuing to adapt it to the other agricultural conditions and farmer practices.

of technologies for the control of tsetse flies – which, in addition to the repellent collars, include traps and odour baits. Specifically, the focus is on surra, a parasitic disease of camels and other mammals caused by trypanosomes, transmitted by biting flies. Currently, there is limited understanding of the actual vectors involved in surra transmission and no vector control technologies are available. In addition, there is poor diagnosis of the disease, as well as increasing resistance to drugs.

The **fall armyworm** is a destructive moth that causes devastating damage to almost 100 plant species including sorghum, rice, wheat and sugarcane, as well as a variety of horticultural crops, thereby threatening food and nutritional security, trade, household incomes and overall economies. Until 2016, the fall armyworm was constrained to its native region of origin, the Western Hemisphere (from the United States of America to Argentina). However, in January 2016, the pest was reported in Nigeria and it has since spread at an alarming rate across Africa, with its presence confirmed in 38 African countries. Although management strategies have been developed for the pest in its native regions, they are not always applicable or effective in the context of African farming systems. Therefore, within FAW-IPM, *icipe* will conduct research towards an integrated pest management (IPM) strategy of FAW that is suitable for Africa.

The **bee research** activities revolve around three thrusts. First, *icipe* is addressing the rising threats to bees in Africa resulting from factors such as climate change and habitat loss due to deforestation caused by population pressures, among other factors. The Centre aims to complete gaps in knowledge and to rectify the absence of systematic procedures and capacity to monitor, analyse and safeguard bees.

Second, *icipe* shares with the global community rising anxieties surrounding bee health against the background of the colony collapse disorder (CCD). *icipe* aims to contribute knowledge on CCD, and in collaboration with partners, the Centre is mapping bee health risk factors, while investigating mitigating strategies in Africa and globally.

The third thrust is based on *icipe* research which has found that Africanised honeybees in the USA, many of which are hybridised crosses with European species, tolerate maladies associated with CCD better. Therefore, by understanding this inherent resilience of African honeybees, *icipe* could contribute towards alleviating global honeybee threats. Towards this goal, *icipe* researchers are characterising the gut microbiota of African honeybees, the 'friendly bacteria' that aid insect defence against pathogens. It is hoped that this increased understanding of how gut mircobiota influences the health of bees will lay a foundation for microbe-based strategies for bee health management.

The third IBCARP component is the expansion of the fruit fly IPM packages to new regions in Kenya, Ethiopia and Tanzania. The activities also include strengthening the capacity of national and private sectors partners to upscale the technologies, and continuously monitor native fruit flies, while also detecting invasive species, to reduce the risk of their entry, establishment and spread in Africa. So far, close to 20,000 mango growers have been trained, resulting in three-fold yield increases, and reduction of expenditure on pesticide by at least 45%.

The fourth IBCARP component is research on camel diseases and their vectors. So far, the researchers have identified the major vectors, clinically important pathogens, traps, attractants and repellents semio-chemicals identified that can be used to control the pests.

### The Africa Reference Laboratory for Bee Health

This Facility, launched in 2014, embodies the EU-*icipe* collaboration on bee research. With its central reference laboratory in Kenya, satellite stations in Ethiopia, Burkina Faso, Cameroon, Liberia and a diagnostic laboratory in Madagascar, the African Reference Laboratory for Bee Health is a partnership between *icipe* and the African Union Inter-African Bureau for Animal Resources (AU-IBAR). The only one of its kind in Africa, this state-of-the-art facility provides a focal point for cutting edge research towards improved bee health and pollination services, with the ultimate aim of enhancing the livelihoods of beekeepers and farmers across Africa, through improved honey products and crop productivity. Through the satellite stations, *icipe* and AU-IBAR have been building the capacity of beekeepers and national agricultural research institutions on colony management, diagnostic tools for detection of bee diseases and pests and pollination. The importance and global esteem of the Africa Reference Laboratory for Bee Health is signified by its designation, in May 2017, as an OIE Collaborating Centre for Bee Health in Africa by OIE – World Organisation for Animal Health (the intergovernmental organisation responsible for improving animal health worldwide). This recognition is significant as it formally acknowledges *icipe's* role as a hub of bee health expertise in Africa and globally.


### FAW-IPM project (2018-2022)

Most recently, the EU has approved a Euro 7 million grant to *icipe* for a project titled FAW-IPM that aims to rapidly develop research-led solutions that are environmentally friendly, accessible, affordable and easy-to-use, and most importantly, specific to Africa, in the management of the fall armyworm menace.

One key area of focus will be understanding the interrelation between African farming systems and the pest's incidence and damage. A good example of how knowledge on factors that make the systems resilient or susceptible to the pest can be exploited to create solutions is Push-Pull. A recent *icipe* study has shown that the climate-adapted version of the technology is effective in controlling the fall armyworm, providing a suitable, accessible, environmentally friendly and cost-effective strategy for management of the pest.

*icipe* and partners will also build on previous studies by the Centre, which have indicated the potential of several other indigenous natural enemies of other armyworms in Africa, which have the potential to control the fall armyworm. These insects include a wasp that has recently been found and described by the Centre's researchers in Kenya, which has been given the scientific name *Cotesia icipe*. Parasitoids introduced from America, the original home of the fall armyworm, will also be evaluated for their effectiveness in managing the pest in Africa.

A third thrust of the FAW-IPM project will be the development of biopesticides developed by *icipe* from entomopathogenic fungi (some of which have already been commercialised) and from *Bacillus thuringiensis*, to manage the fall armyworm.

Fourth, the *icipe* researchers will advance research on the use of smell-based fall armyworm traps, which could be useful in timely detection and management of the pest. The project will also assess the socio-economic impacts of the fall armyworm damage, and the benefits of the management interventions. Ultimately, the goal is to translate the knowledge generated through the research into outcomes that are accessible and affordable to farmers. For this purpose, a strong component of FAW-IPM will be to build partnerships with national and international research institutions, private sector partners, non-governmental organisation, while also enhancing their research capacity and ability to transfer the technologies to African farmers.