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GOVERNING COUNCIL

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RECENTLY FUNDED

icipe BY NUMBERS (1 JANUARY — 30 JUNE 2021)

31,426

(63% female) youth partners
of the MOYESH project
supported since inception.

50

Funding agreements
(27 signed and 23 approved)

138

peer-reviewed journal
articles published

10

Women scientists undertaking
fellowships under
BioInnovate Africa Programme

13

Recently graduated
scholars

36,486

Visitors to *icipe*
website



Prof. Dr. Bill Hanson
Chair, *icipe* Governing Council



We recognise the contribution of our donors, partners and collaborators in the achievements captured in this publication.

Dear Friends and Colleagues,

Greetings from the *icipe* Family. It is our hope that the first half of 2021 has provided reasons for hope and renewal as we continue to reimagine our present and future from the COVID-19 pandemic.

We are most pleased to present this *e-bulletin* that sums up *icipe*'s activities and progress over this period. This publication consists of the regular sections: Institutional News, featuring the Centre's participation in key national, regional and international fora; Research Highlights, spotlighting some projects and programmes accomplishments; Selected Recently Published, illustrating continued generation of world-class scientific knowledge; Newsmakers, showing national, regional and global recognition and visibility of our teams; Staff News, presenting recently appointed colleagues; and Recently Funded, capturing new investments to our Centre. Our efforts to nurture African scientific talent for research and development, as well as innovation, are summed up in the sections on Capacity Building and Institutional Development; and the Regional Scholarship and Innovation Fund (<https://www.rsif-paset.org/>) and BioInnovate Africa Programme (<https://bioinnovate-africa.org>), both managed by *icipe*.

Also, we have introduced several new elements, intended to bring you the stories, the voices and faces behind the statistics and

data. The new products featured in this issue are: an audio podcast with Merid Getahun, *icipe* resident neuroethologist; a video podcast with Komivi Akutse, Biopesticides Development Scientist; an in-depth interview with Moses Osiru, Manager, RSIF; and personal narratives by two of our PhD scholars. These products are located on the *icipe* website and social media platforms where you can access them at your convenience.

Over the recent past, a movement around the ideology of Decolonising Knowledge has gained force across academic and international networks. This campaign has been spurred on by global threats like the COVID-19 pandemic, which have amplified longstanding cracks in international research and knowledge systems. There is also renewed consciousness that a just, equitable, peaceful and prosperous world will not be possible without inclusive processes that draw on the intellectual capacity, talent, as well as desires and aspirations of people, especially the most vulnerable. The *icipe* Director General's Thought Leadership column states the Centre's stand on Decolonising Knowledge, while also challenging the African intellectual community not to forfeit its right and responsibility to theorise on this critical issue.

We hope you will enjoy reading this *e-bulletin*.

Stay safe.



Dr Segenet Kelemu
Director General, *icipe*

DECOLONISING KNOWLEDGE:

icipe takes a stand

Over the recent past, a movement around the concept of Decolonising Knowledge has gained force across academic and international networks. The decolonial ideology is not new and in Africa, the philosophy was most prominent in the 1960s–1980s among postcolonial theorists, radical pan-Africanists and literary giants agitating for Decolonising the Mind, meaning liberation through endogenous, Africa-centred knowledge production.

The ideology gained new impetus in 2015 through a crusade led by South African students on Decolonising the University, which rapidly spread across the globe as a call to liberate curriculum and cultures in institutions of higher learning. This campaign spurred numerous others like decolonising the city, diets, architecture and even Hollywood.

Ongoing global challenges like the need to accelerate attainment of the Sustainable Development Goals (SDGs), as well as the COVID-19 pandemic, have strengthened global awareness that 'knowledge is power'. These issues have also amplified longstanding cracks in international research and knowledge systems. And there is renewed consciousness that a just, equitable, peaceful and prosperous world will not be possible without inclusive processes that draw on the intellectual capacity, talent, as well as desires and aspirations of people, especially the most vulnerable. This is happening against the background of a world that is growing weary of inequities and injustices, and the appreciation of movements of protest and more importantly, those of solidarity.

The coordinates of decolonial thinking are contestations of institutions and structures of power that sustain relations of exploitation, inequalities, injustices, intersubjective, domination, repression and dispossession. Specifically, Decolonising Knowledge interrogates, challenges and aims to dismantle hierarchical models in systems of knowing resulting from political, economic and socio-cultural global inequalities.

Within the Decolonising knowledge debate, *icipe* occupies a unique practical and epistemic space as an African yet global institution; one that thrives on the ethos of equal, respective partnerships; and one that ascribes to the principles of the international scientific community while remaining committed to transformation of livelihoods across Africa. We believe that the goals of knowledge decolonisation are necessary, overdue and attainable.

POINTS OF CONTENTION

In Africa, Decolonising Knowledge requires contemplation and remedies of two sets of factors. The first category consists of functional aspects like how the research agenda is shaped, whose interests the research is conceived to serve and how it is conducted; who owns the knowledge produced, who has access to it and who benefits from it. The second group is composed of conceptual or epistemic aspects like the hegemonic notions that dictate what counts as knowledge, who legitimises it, who rewards it, and the remunerations that are granted, and to whom.

WHY NOW?

WHAT NEEDS TO CHANGE?

From a living laboratory to a site of unity

Africa is an intriguing continent that has long fascinated researchers, innovators and investors alike, earning the continent the moniker of a living laboratory. This scenario has led to several thorny issues, for example perceived extractive behaviour of international “experts” and the subjugation of researchers in Africa to data collectors, logistic organisers and facilitators. Many of *icipe*'s globally collaborative research initiatives show that Africa can become a site of unity to produce the best knowledge for the greatest impact. In our partnerships, we contribute scientific and technological capacity; indigenous understanding of insect biodiversity; linkages to national and regional institutions and communities; and insights on developmental urgencies, agendas and aspirations. Our collaborators benefit from these vital perceptions and the opportunity to study insects in their actual environment, while complementing our expertise. Together, we harmonise our institutional mandates and visions.

Homegrown resources

The old adage holds: charity begins at home, and reducing over-reliance of African research institutions on external funding may well be the ultimate trump card for Decolonising Knowledge in Africa. As discussed in subsequent sections of this publication, the *icipe*-managed RSIF demonstrates how investments from African governments and international partners, as well as high-net-worth individuals, foundations and private sector across the continent, can be harnessed for Africa-led research and innovation priorities and doctoral training through innovative, participatory and effective intra-African and global collaborations.

International funding models

A disenfranchising factor, and one of the most deep-rooted concerns in knowledge generation in Africa, is the structure of some funding models, for example those that assign research leadership and direction to organisations in the donor countries or regions. In effect, researchers in such institutions assume the role of principal investigators (PIs), with authority over most aspects of the project. Such stipulations may have several adverse impacts, for example depreciated role of researchers in developing countries, power and resource allocation asymmetries and diminished local ownership of initiatives. Regional standards are needed in Africa to guide funding models and provide a template to: ensure agency of local researchers and partners; equitable resource allocations that strengthen capacities, capabilities and infrastructure; ensure visionary research agenda; guarantee efficient project administration and implementation; and demonstrate return of investment, as is indeed the shared desire between us and our esteemed development partners.

Epistemic liberation

There are two schools of thought on the epistemic aspects of Decolonising Knowledge. The first calls for diversification of thought by mainstreaming marginalised geo-histories and ways of knowing. The second rationale aims for outright rejection of western thought and its alleged hegemonic authority. At *icipe* we remain committed to the international norms and standards of scientific research. Indeed, we argue for improved access by African researchers to global epistemic resources; the ‘knowledge’ to generate new ‘knowledge,’ including scholarly publications, journals and learning materials. While progress has been made through open-access publishing many such resources remain out of access for researchers in Africa, blocked by paywalls, copyrights and patents. Also, a shift from predominant funding of applied aspects, and more support for basic research in Africa will enable the continent’s scientists to follow their intellectual curiosities, participate in the excitement of scientific discovery and augment their contribution to scientific knowledge.

The Matthew effect

Excellence in knowledge production is often equated to publication in peer-reviewed journals, especially those with a high impact. At *icipe*, we consider this criteria an important indicator of our global recognition and reputation, and we are extremely proud of the growing quality and quantity of our publications. However, various studies have shown that the sole attention on metrics like number of publications, ranking or citations, reinforces hierarchies in knowledge production. Indeed, the over-focus on this approach often leads to the Matthew effect, a concept that describes the cumulative advantage accruing to some scientists, institutions and countries with comparative advantages for instance in terms of location, better capacity and resources. Conversely, this process leads to the marginalisation of scientists with lesser opportunities to publish. As such, the increasing calls for expanding the measures of scientific contribution to other factors like the relevance of research to national agendas and its socio-economic impact, are valid.

Decolonising the Decolonial Movement

Decolonisation of knowledge will require participation of all stakeholders. But concerns have been raised about the extent to which African intellectual communities are contributing to the theorisation that will eventually inform the outcomes of this movement. There is also a possibility that in many instances, inputs from African researchers are being mediated by northern institutions. The Decolonising Knowledge movement should be a call to action for us in Africa; we should not forfeit our right and responsibility to think and to theorise from our distinctive geographic and socio-cultural perspective.

The Stockholm Convention on Persistent Organic Pollutants

commemorated its 20th Anniversary on May 22, which is also the International Day for Biological Biodiversity. Having served as the Stockholm Convention Regional Centre since 2011, *icipe* celebrated these two events through a webinar themed: 'Towards a clean and healthy Africa for sustainable livelihoods, food and nutritional security'. A total of 113 participants from 20 countries in five continents participated in the forum. The focus was on the achievements of *icipe* and partners in developing nature-based solutions from biodiversity for mitigation of persistent organic pollutants and the impacts of climate change; as well as improving food nutrition security and health, while creating employment opportunities and better livelihoods across Africa. A high-level panel discussion centred on research for development actions, constraints and challenges, and strategies to ensure a clean, healthy and biodiverse Africa.

As the world implements COVID-19 vaccinations, concerns have emerged that countries in the global south might not have equal access to vaccines. In solicitude, the *icipe* DG participated in a virtual **public debate on vaccine equity**, organised by SOAS University of London, in partnership with the African Research Universities Alliance (ARUA). Other discussants were: Adam Habib, Director, SOAS University of London (Chair); Peter Singer, Special Advisor to the Director General, World Health Organization (WHO), and Martin Wolf CBE, Chief Economics Commentator, *Financial Times*.

Strategic stakeholder engagements

icipe has participated in a number of global, regional and national stakeholder consultations like the United Nations Food Systems Summit Dialogues; process for the formulation of a continental plant health strategy organised by the African Union for the Inter-African Phytosanitary Council (IAPSC); development of four new national standards on edible insects in Rwanda; and validation of the Kenya draft national research system policy 2021 organised by the Kenya Agricultural and Livestock Research Organisation (KALRO).

In March, *icipe* Director General (DG), Segenet Kelemu participated in a virtual workshop on **'Science Diplomacy to Promote and Strengthen Basic Research and International Cooperation'**, convened by the National Academies of Sciences, Engineering, and Medicine (the National Academies). The DG emphasised *icipe*'s commitment to international partnerships and appreciation for the global re-focus on the power of science due to COVID-19 pandemic. She noted that to build on this progress, collective action is necessary to bolster communication and awareness among policymakers and governments on the importance of science and technology, and to address inequities in research partnerships.



On 25 March, a webinar was co-organised by *icipe* and the Boris Mints Institute (BMI) for Strategic Policy Solutions to Global Challenges, Tel Aviv University (TAU), Israel, to **celebrate the synergy between research and practice, through the Institute's researchers and the winners of the 2020 Curt Bergfors Food Planet Prize**. Itai Sened, Dean of the Gershon H. Gordon, Faculty of Social Sciences and Head of the Boris Mints Institute, TAU and Segenet Kelemu, Director General & CEO, *icipe*, made presentations on the BMI – *icipe* collaboration, which includes two initiatives; on combatting fruit flies, funded by the Matanel Foundation, Israel, and on fall armyworm management, supported by the Gates Foundation. Chrysantus Tanga, Research Scientist, *icipe*, made a presentation on insects for food and feed as an example of Research and Practice for a Better World.

In honour of **International Women's Day** (8 March), Dr Kelemu, at the invitation of Her Excellency Sahle-Work Zewde, President of the Federal Democratic Republic of Ethiopia, participated in a virtual webinar of prominent Ethiopian women and women of Ethiopian origin. This forum was part of month-long activities to highlight and tackle issues of women's leadership, education, economic empowerment and gender-based violence in Ethiopia. She also took part in a Stakeholder Engagement Workshop organised by the International Development Research Centre (IDRC) on Women in STEM (Science, technology, engineering, and mathematics), spotlighting systemic barriers to participation and quality of experiences in postgraduate training programmes and careers in East Africa.

COVID-19 vaccinations

With the support of the Directorate of Health Services, Nairobi Metropolitan Services, *icipe* staff, dependents, hosted and invited institutions have received two doses of COVID-19 vaccinations.



The Mastercard Foundation has announced a new partnership with the Africa Centres for Disease Control and Prevention (Africa CDC)

aimed at *Saving Lives and Livelihoods in Africa* and hastening economic recovery. The three-year, US \$1.3 billion partnership will:

- Acquire vaccines for at least 50 million people;
- Support the delivery of vaccinations to millions more across Africa;
- Lay the groundwork for vaccine manufacturing in Africa through a focus on human capital development; and
- Strengthen the Africa CDC's capacity to oversee a historic vaccination effort and respond to future health outbreaks.

icipe commends this outstanding and compassionate gesture, as well the commitment to Africa, by the Mastercard Foundation, an esteemed partner of our Centre. [Read more](#)

SPOTLIGHT

Developing biopesticides

Over the past six months, we have made progress in regard to the following isolates:

Metarhizium anisopliae ICIZE 7 for tick control, with the receipt of a no objection authorisation from the Director of Veterinary Services, Kenya, for *icize* to undertake experimental trials.

M. anisopliae ICIZE 30 for the control of stable flies, *Stomoxys calcitrans*, with the peer-reviewed publication of knowledge on how the fungal infection affects biology of the flies.

M. anisopliae ICIZE 69 for the control of the melon fly, *Zeugodacus cucurbitae*, with trials showing high pupal mortality, compatibility with cue-lures, as well as horizontal transmission among male and female flies.

M. anisopliae ICIZE 69 with completion of studies that show the isolate's compatibility with the African stingless bee, *Meliponula ferruginea*, with no negative effect on mortality, foraging behaviour and pollination success. Thus, the isolate can be safely used in crop systems that are dependent on pollination by this stingless bee species.



The '**Integrated agroecological approach to mango production in Southern Ethiopia**', a three-year project, has been started by *icize* in partnership with Biovision Foundation for Ecological Development, Switzerland. The initiative will be implemented in the Southern Nations, Nationalities, and Peoples' Regional State (SNNPS), Ethiopia, to benefit about 3400 smallholder farmers directly and over 30,000 value chain actors indirectly.

icize in partnership with **Improving Market Systems in Rwanda for Agriculture (IMSAR)**, an initiative funded by UK Aid through the Foreign Commonwealth and Development Office (FCDO), Rwanda Agricultural Board (RAB) and private sector partners, has commenced the development of a commercial model to produce high-quality insect-based meal for chicken, fish and pig feed in Rwanda.

icize is a partner in **Agripath, a research and innovation project** of the University of Bern, Switzerland. This project is aimed towards strengthening

Push-pull advances

icize has begun expansion of the push-pull technology into West Africa, starting in Ghana in partnership with the country's Crop Research Institute. As West Africa has a different ecosystem to East Africa where push-pull was developed, we have tested various adjustments to the technology like modifications of the spatial arrangement of its intercrops in relation to the maize crop. Our findings show that both the conventional and spatially modified push-pull versions retain their effectiveness, including reducing fall armyworm infestations and damage, and improving maize yield across seasons and locations.

Results from long-term experiments confirm that the push-pull technology provides significant soil health benefits. The findings indicate that push-pull cropping systems increase soil organic carbon and soil organic nitrogen, while also improving availability of phosphorus in plants. Further studies assessed carbon stocks in push-pull farms taking into account climatic conditions and the duration push-pull had been practised on a farm, and also aimed to establish the relationship between biomass carbon and soil organic carbon. The results demonstrate that the push-pull technology can help to mitigate climate change through carbon sequestration.

A Multi-Actor Community of practice (MAC) has been established to support the 'Upscaling the benefits of push-pull technology for sustainable agricultural intensification in East Africa' (UPSCALE) project, launched in 2020. The MAC will ensure comprehensive participation of agricultural value chain stakeholders, including farmers, input supply chain actors, government agencies, non-governmental organisations and higher learning institutions.

sustainable farming methods among smallholder families in Africa and Asia using digitally supported agricultural extension services. The Swiss Agency for Development and Cooperation (SDC) is supporting Agripath (to be implemented from 2021 – 2025) through the TRANSFORM programme. The project is based on close collaboration with Grameen Foundation agricultural advisors and Farmbetter Ltd, Switzerland.

A second phase of the **Community Based Fall Armyworm Monitoring,**

Forecasting and Early Warning (CBFAMFEW II) in eastern and southern Africa, an initiative coordinated by the Food and Agriculture Organization of the United Nations (FAO), with *icize* and CABI as partners, has been launched. The first phase of the initiative was implemented from January 2018 – June 2019. The second phase, to be implemented in Ethiopia, Uganda and Rwanda, will continue to strengthen community capacity, while also focusing on actionable IPM options.

Video podcast: *icize* boasts one of the strongest and most effective biopesticides research for development (R4D) programmes in Africa. Komivi Akutse, Biopesticide Development Scientist, presents a detailed overview of the Centre's approach, from bioprospecting to commercialisation and application for controlling pests and vectors.



Audio podcast: Insects are one of the most successful, diverse and adaptable organisms on Earth, partly because of their unique sensory system. We converse with Merid Getahun, *icize* resident neuroethologist, about the Centre's exciting research on insect neuroscience.



MORE YOUNG ENTREPRENEURS IN SILK AND HONEY (MOYESH) PROJECT

According to a survey, as of May 2021, MOYESH project had enrolled 41,642 youth partners since start of its implementation in 2019. The project has achieved its gender target of having 60 percent women representation among its enrolled youth partners. Of the 17,000 youths recruited in Year 1, 80 percent have begun production of bees and silk products and 32 percent of them have commenced sideline income-generating activities like vegetable farming, production of multipurpose tree seedlings and development of feedlots for meat animals.

About 97 percent of the youth enterprises initiated through MOYESH have been allocated land by local governments, particularly the district land administration, to practice beekeeping, silkworm farming and complementary side businesses. The Year 1 cohort youth have been trained and equipped, and they have produced 46 tonnes of honey and 60 kilogrammes of silkworm cocoons worth ETB 8.7 million (USD 170,000). They also earned a total of ETB 5.2 million (USD 27,500) income from complementary side businesses.

The MOYESH project has created employment for an estimated 4760 people along the value chain through the establishment of youth-owned small and medium-sized enterprises (SMEs) in the Amhara, Oromia and Southern Nations, Nationalities, and Peoples' (SNNP) regions. The SMEs are the result of efforts by MOYESH to develop technical, entrepreneurship, and business skills, to manufacture and supply beekeeping and sericulture inputs like frame beehives, beekeepers' protective clothing, silkworm rearing trays and cocoon mountages.

Over the past several months, a total of 3800 (38% female) youth partners, project staff and local extension staff have been trained. Topics covered include gender in value chain and online data management systems for staff refresher training of trainers on entrepreneurship skills development, business development services (financial and marketing management), honey harvesting and postharvest handling of honey.

Communication and awareness raising activities included participation by MOYESH youth beneficiaries in the Apiculture Development Initiative and Honey Festival, hosted by the Oromia National Regional State on 28 March 2021. This high-profile event, broadcast nationwide and attended by high government officials, brought together producers, value chain actors, policymakers, and research and development institutions to exhibit products and services, share best practices and experiences on apiculture development in Ethiopia.

YOUNG ENTREPRENEURS IN SILK AND HONEY (YESH) PROJECT

PROGRESS

The YESH project has exceeded its youth employment target by 2.5 percent by creating jobs for 12,815 youth. Of the total youth employed, 10,214 youth (34 percent female) are involved in the apiculture business and 2601 youth (65 percent female) in the sericulture business. YESH helped to establish 1060 youth enterprises – 904 in apiculture and 156 in sericulture. Over the last four years, the youth enterprises have produced more than 86 tonnes of honey and beeswax, and 13 tonnes of silkworm cocoons, earning more than USD 1.1 million (≈ ETB 44 million) income.

DOCUMENTARY

A 30-minute documentary on the YESH project has been produced and aired by the Ethiopian Broadcasting Corporation. The widely disseminated documentary presents detailed silk farming processes, and the engagement of value chain actors. <https://www.press.et/>



BIOINNOVATE AFRICA PROGRAMME

WOMEN FELLOWS

A total of 10 scientists from Tanzania, Uganda, Kenya, and Ethiopia, have commenced fellowships to be undertaken between January and September 2021, under the BioInnovate Africa Women Fellowship, an initiative aimed at enhancing participation of women scientists in the African bioeconomy. The fellowships are tenable within projects funded by BioInnovate Africa, enabling the fellows to gain expertise in the development of innovations for healthy foods, industrial enzymes, biopesticides, biofertilisers, insect-based proteins, phytochemicals, and to contribute to the evolution of strategies to foster a bioeconomy in the eastern Africa region. [Profiles link](#)

BUILDING FORWARD BETTER

On 10 February 2021, BioInnovate Africa, in collaboration with Invest in Africa (IIA), a not-for-profit organisation with the vision to create prospering African economies, held a webinar for the Programme's partners on 'Building Forward Better from the COVID-19 Pandemic'. A total of 55 participants attended the interactive session, which provided strategies that organisations and firms should consider to hedge against future disease outbreaks, disasters and related risks.

PARTNERSHIP FOR TEA

BiInnovate Africa and Thayer School of Engineering, Dartmouth College, USA, have commenced a partnership to build capacity for techno-economic analysis (TEA) of innovation projects, through a six-month tailor-made remote course. The TEA model helps to assess potential economic feasibilities, bottlenecks, operation targets for process improvement and to identify further research and development requirements during early stages of bio-based technologies. Six competitively selected students from eastern African universities partnering with BiInnovate Africa commenced online studies in January 2021. As part of their training, they have conducted TEA assessments on selected BiInnovate Africa supported projects.

EXTERNAL EVALUATION

Between January and March 2021, three independent consultants were commissioned by *icipe* and the Swedish International Development Cooperation Agency (Sida), to undertake a review of bioscience research and innovation in East Africa since 1999, and to evaluate performance of BiInnovate Africa Phase II. The team, consists of Bruce Pengelly, agricultural consultant, Australia; Timothy Esemu, business development consultant Uganda, and Simon Otieno, Monitoring and Evaluation consultant, Kenya. Preparation of the evaluation report is in progress.

COMING SOON

Second Eastern Africa Bioeconomy Conference

Dates: 10 – 11 November 2021

Co-organisers: BiInnovate Africa, East Africa Science and Technology Commission (EASTECO), Biosciences eastern and central Africa - International Livestock Research Institute (BecA-ILRI) Hub, Stockholm Environment Institute (SEI) – Africa Centre, and several other partners.

Theme: Bioeconomy for a sustainable and resilient future

CAPACITY BUILDING AND INSTITUTIONAL DEVELOPMENT

RECENTLY GRADUATED SCHOLARS

Between January – June 2021, 13 *icipe* postgraduate scholars from Cameroon, Kenya, Nigeria, Uganda and Zimbabwe have graduated. Their theses contributed knowledge on the management of *Tuta absoluta* using an imported parasitic wasp, *Dolichogenideia gelechiidivoris*; changes in grain legumes during hermetic storage in triple layer bags; a software to optimise application of biopesticides; and phosphorus fluxes and vegetable growth as influenced by phosphate rock management under acid soils. Further studies explored the possible use of the curry tree, *Murraya koenigii*, to control *Anopheles gambiae* mosquitoes, and chemical analysis of organic micropollutants in water, sediment and biota in relation to schistosomiasis in western Kenya.

The students also generated new information on a One Health approach to vector biology and arbovirus epidemiology in smallholder livestock systems; human rhinovirus transmission pathways using whole genome sequences; optimising annotation of bovine immunoglobulin sequences, novel germline allele discovery and simulation of antibody repertoire evolution in African bovine breeds. New information has been provided on the impact of including black soldier fly larvae meals on commercial chicken layers, efficiency of modified traps for the longhorned grasshopper, *Ruspolia differens*, and assessment of pesticide residues in the insect.

[Read More](#)



PERSONAL NARRATIVES

Two *icipe* PhD scholars narrate their personal journeys in science, their research at the Centre and its contribution to the sustainable development goals (SDGs), as well as COVID-19 pandemic recovery. They are: Fairo Dzekashu Foryuy (Cameroon); hosted within the Environmental Health Theme, conducting research on 'Diversity of plants, pollinators, and their network in natural and agricultural habitats of the Eastern Afromontane biodiversity hotspot in Kenya'; and Ruth Kihika (Kenya); hosted within Behavioural and Chemical Ecology Unit, conducting research on 'Identification of effectors and allelochemicals regulating root-knot nematode parasitism'.

[Read More](#)



Ruth Kihika-Opanda (Kenya)



Fairo Dzekashu Foryuy (Cameroon)

Insects as potential antibiotic producers

icipe has conducted a review of the recent advances in exploring insect antibacterial and antifungal peptides and polypeptides (AMPs) that could be used to develop next-generation drugs to combat multidrug-resistant pathogens. Consisting of amino acids, AMPs are an innate component of insect immunity and they are known to be active against fungi, viruses, parasites and, most importantly, antibiotic-resistant bacteria. [Paper link](#)

Improved grasshopper traps

Trapping the longhorned grasshopper, *Ruspolia differens* is big business in many African countries where this insect is a delicacy. We have developed an improved trap consisting of collection drums fitted with a funnel to improve retention of the catch, meshes to filter bycatches and light emitting diode bulbs to replace the potentially hazardous mercury lamps. Our cost-benefit analysis shows this tool to be more profitable than the existing technique due to lower energy costs, reduced harvesting of harmful non-target insects, especially the Nairobi fly (*Paederus* spp.) that causes dermatitis. [Paper link](#)

Fertility boosting flies

Our studies have revealed an ingenious habit used by stable flies to improve their fertility. Known scientifically as *Stomoxys calcitrans*, stable flies are obligate blood feeders, meaning that they must obtain blood to advance from one life stage to the next. Our studies show that, surprisingly and perhaps deliberately, the flies also supplement their diet with nectar, which improves the quality of their eggs. [Paper link](#)

Silencing genes

As is the case with all other living things, in insects, the sense of smell is orchestrated at different stages, each involving various proteins. We have investigated the role of odourant-binding proteins found inside the antennae of *Glossina fuscipes fuscipes*, the main vector of human African trypanosomiasis. Also, we have successfully silenced a specific protein, via the double-stranded RNA interference (dsRNAi) technique. As a result, the tsetse flies were unable to interact with an attractant chemical and failed to locate their hosts. These findings are important as they review the mechanisms of *icipe*'s successful repellent and attractant tsetse control tools. Moreover, the ability to conduct dsRNAi gene silencing is a milestone that can be extended to plant and human health disease control through interference of genes in relevant pests and vectors. [Paper link](#)

Zebra odours

Previous studies by *icipe* have established that zebras produce certain scents that repel tsetse flies. We have evaluated a

three-component blend of these odours for repellency against the riverine tsetse fly, *Glossina fuscipes fuscipes*, a major vector of the trypanosome pathogens that cause human African trypanosomiasis. We found that the odour blend increases effectiveness of existing tsetse management tools like the *icipe* tsetse repellent collar technology and NGU traps. Previously, traps and targets baited with visual cues have been used in vector control, but the development of olfactory-based tools has been challenging. We also established geranyl acetone to be the compound responsible for this repellency. Thus, these findings present the possibility of developing tsetse odour-based tools, which has so far remained an elusive goal. [Paper link](#)

Health systems strengthening

Between January and March 2021, *icipe*, in collaboration with the School of Health Systems and Public Health, University of Pretoria, published a series of journal articles on the development of a framework to improve the implementation of disease surveillance and response systems for neglected tropical diseases (NTDs) in Kenya. The research identified important gaps in the reporting, feedback, training, supervision, timeliness and completeness of the current surveillance system, which require policy action and refinement. Beyond surveillance and response in relation to vector-borne NTDs, the insights are applicable to pandemics like the COVID-19. [Paper link 1](#) and [Paper link 2](#)

Pesticide characterisation tool

Further to our research that established pesticide pollution as a risk factor for schistosoma-host snail occurrence and thus *Schistosomiasis* transmission, we have assessed the SPEAR_{pesticides} bioindicator developed in Central Europe and validated in other parts of Europe, Australia and South America that quantifies pesticide-related changes in the macroinvertebrate community composition. With minimal adaptations, we were able to use the index to characterise pesticide pollution in streams located in western Kenya and estimate pesticide pollution through rapid macroinvertebrate sampling. [Paper link](#)

Comoros honey bees lineages

Our studies on wild honey bee populations in the Comoros Islands reveal two coexisting mitochondrial lineages. One belongs to the typical African A-lineage. The second, which we have newly described, is the L-lineage closely related to *Apis koschevnikovi*, a honeybee species native to Southeast Asia. It is possible that the Asian honey bee was transported from Southeast Asia to Madagascar and Comoros via human migrations 6000 years ago. This species has hybridised with African honey bees at the nuclear genome, but its maternal ancestry can still be traced using the mitochondrial DNA markers. This is the

first study to show the coexistence of the two honey bees' mitochondrial haplotypes. In all known cases, mitochondrial lineages replace indigenous bees that they come into contact with. [Paper link](#)

Land-use satellite mapping

In Africa, knowledge on the structure of smallholder agroecological subzones, and accurate land-use and land-cover classifications is needed, to design biodiversity and ecological conservation processes. We have explored the use of multisource satellite datasets to mapping coffee-based landscape in central Kenya. We recommend adoption of Sentinel 2 satellites, which are freely available, to support generation of information for land-use planning in smallholder agroecosystems. [Paper link](#)

Models for peach fruit fly

The invasive peach fruit fly, *Bactrocera zonata*, is causing substantial losses to the horticulture industry worldwide. Currently, the pest has been recorded in more than 20 countries, particularly in South and South-East Asia. We have developed models that indicate that under changing climatic conditions the pest could invade new areas particularly in West, East and Central Africa and to a lesser extent in Central and South America. The models also show that Western Sahara and southern Africa are susceptible to invasion of the pest due to their climatic suitability. Our findings could guide biosecurity agencies to make decisions and develop early warning tools to safeguard against the pest invasion in currently unaffected areas. [Paper link](#)

Integrated 4Hs interventions benefits

In a recently published study, we confirm the economic benefits of integrated human-plant-animal health interventions to achieve holistic outcomes for communities. Our assessment focuses on strategies being implemented in Ethiopia to control malaria, stemborer infestations in crops and trypanosomiasis in animals, alongside beekeeping as a livelihood diversification option. The results suggest that this combination of interventions enables farmers to at least double their income. Also, exploiting the potential synergies among the interventions can generate annual incomes 35 percent higher than the sum of the income gains from each intervention alone. [Paper link](#)

TOP CITED

A paper by *icipe* researchers on the effectiveness of the Centre's entomopathogenic fungal isolates on the invasive fall armyworm, *Spodoptera frugiperda*, published in the *Journal of Applied Entomology*, has achieved top cited, and most read status. [Paper link](#)

RSIF ON THE RISE

In May 2021, the Government of Mozambique signed an agreement with *icipe*, for the investment of USD 6 million in the Regional Scholarship and Innovation Fund (RSIF). *icipe* is the Regional Coordination Unit (RCU) of RSIF, the flagship programme of the Partnership for skills in Applied Sciences, Engineering and Technology (PASET), an initiative established in 2013 by African governments and partners. Mozambique becomes the eighth country to invest in RSIF, joining the governments of Benin, Burkina Faso, Côte d'Ivoire, Ghana, Kenya, Rwanda and Senegal, in addition to the World Bank, Government of Korea and the European Union.

INTERVIEW

Moses Osiru, Manager, RCU-RSIF, discusses the Fund's tremendous growth over the past two years including: rising investments, soaring demand for opportunities from prospective scholars and grantees, surging interest in partnerships, rapid increase in RSIF scholars and body of world class knowledge being generated, as well as progress in promoting gender representation in RSIF.



SELECTED PAPERS BY SCHOLARS

Scholar: Jorim Okoth Obila (Kenya)

Registered in: University of Nairobi, Kenya



This study demonstrates the potential of anilinium hypophosphite, a highly crystalline salt, in enhancing the performance of tin-based perovskite solar cells. Most perovskite solar cells are based primarily on lead as the light-harvesting active layer. But lead is toxic and can cause harm to people, animals and the environment. Although tin, a similar element to lead, has been considered a possible replacement, tin-based perovskite absorbers have been found to have low power conversion efficiency and poor stability. This paper reports that incorporation of anilinium hypophosphite addresses these two challenges, improving power conversion and retention in tin-based perovskite solar cells.

[Paper link](#)

Scholar: Ruth Lorivi Moirana (Tanzania)

Registered in: Nelson Mandela African Institution of Science and Technology, Tanzania



This study contributes to more effective use of inductively coupled plasma mass spectrometry (ICP-MS), one of the most powerful tools in analytical chemistry, to enable better monitoring and identification

of new and unknown fluorinated compounds. Flourine and its compounds occur naturally in the environment through volcanic activities and weathering of bed-rock material. However, man-made activities like industrialisation and fertiliser applications also release fluorine compounds that react with the naturally occurring flourines to form novel fluorinated compounds that could be toxic to people, animals and plants. Due to limitations in chemical analytical capabilities, it is often difficult to identify specific organic flourines. [Paper link](#)

STAFF



*icip*e Director General, Segenet Kelemu was **Recognised** among brilliant women breaking barriers, improving global health, and inspiring others to pursue careers in science, a 'modern Marie Curie', by The Borgen Project, a US-based initiative that

is working to make poverty a focus of US foreign policy in honour of International Women and Girls in Science Day (11 February) and International Women's Day. **Featured** among 'scientists you need to know' by *Tadias Magazine*, a news and profiles publication tailored towards Ethiopian-American and diaspora community.

Interviewed by *The Jerusalem Post* on how the world can provide enough food. As part of the Boris Mints Institute's celebration of the 2020 Food Planet Prize winners, which included a webinar focusing on research and development.



Clifford Mutero, Consultant Scientist, Human Health Theme: has been appointed by the Principal Secretary, Kenya Ministry of Health to a 10-member Kenya-Cuba Malaria Vector Control Task Force.



Joel Bargul, Postdoctoral Fellow, Animal Health: was ranked in first place (Partners only category) in the ILRI's CapDev Grand Challenge, a vibrant contest for young and upcoming livestock researchers to make an exciting pitch to explain their research in three minutes, to engage with donors and policymakers.

SCHOLARS

Stella Muthoni Gachoki (PhD scholar), has received a grant from the Netherlands based Academy Ecology Fund (KNAW) to support her research on the transferability of *Glossina pallidipes* occurrence models beyond Shimba Hills National Reserve in Kenya.

Kavengi Kitonga, Ruth Kihika, Maysoon Omar and Trizah Milugo (PhD scholars): Selected to participate in the inaugural Mawazo Learning Exchange (MLEx) Fellowship Programme, to receive training, mentorship and networking with national, regional and international researchers and experts.

Trizah Milugo (PhD scholar): Finalist, Falling Walls and Berlin Science Week, World Science Summit 2020 (1–10 November 2020) for presentation titled: Breaking the Wall of Malaria Elimination. Watch video: <https://www.youtube.com/watch?v=Krb3GBOx6e8>

Gladys Mosomtai (PhD scholar): Interviewed by CGTN television network, Global Business Show, on her research on how climate change is affecting coffee production in Kenya, Uganda and Ethiopia. Interview: <https://youtu.be/tW69h1hRct0>

Ruth Najala (Fellow, Eastern Africa Network of Bioinformatics Training): Winner of the speed presentations category at the 17th meeting of the H3Africa Consortium held in April 2021.

Four *icip*e-affiliated female students: Sylvia Wairimu Maina (Kenya), Susan Ojochide (Nigeria), Fatoumata Thiam (Senegal), all scholars of the Regional Scholarship and Innovation Fund (RSIF); and Selamawit Araya Kidane (Ethiopia), Nematology Research, were featured by the United Nations Economic Commission for Africa (ECA), under the banner: International Women's Day 2021: Future Women Leaders.

JOURNAL APPOINTMENTS

Menale Kassie, Head, Social Science and Impact Assessment Unit
Member, Editorial Board to manage the Insect Economics section, *Frontiers in Insect Science*

Michael Lattorff, Senior Scientist, Bee Research Programme
Managing Editor, *International Journal of Tropical Insect Science*
Associate Editor (Insect Health and Pathology section), *Frontiers in Insect Science*

Henri Tonnang, Head Data Management, Modelling and Geo-information (DMMG) Unit
Associate Editor, *Frontiers in Tropical Diseases*

Elfatih M. Abdel-Rahman, Scientist, DMMG Unit
Guest Editor, Special Issue on 'Environmental Sustainability with Remote Sensing in Africa', *ISPRS Journal of Photogrammetry and Remote Sensing*

David Tchouassi, Scientist, Behavioural and Chemical Ecology Unit
Editor, Vectors and medical and veterinary entomology section of 2022 *Current Opinion in Insect Science* (Vol. 52)

Amanuel Tamiru, Scientist, Plant Health Theme
Associate Editor, *Physiological Entomology* of the Royal Entomological Society



Sevgan Subramanian (India), Head, Environmental Health Theme

Prior to this appointment, Sevgan was a Senior Scientist, *icipe* Plant Health Theme, a position he had held since 2016, having joined the Centre in 2008 as a Postdoctoral Fellow. He has led numerous initiatives at *icipe*, including fall armyworm, thrips and tospovirus IPM, biopesticide research and development, Insects for Food, Feed and Other Uses, and insects and climate change. He holds a PhD in Agricultural Entomology from Tamil Nadu Agricultural University, India.



Marita Dieling (Germany), Manager, People and Organisation Development

From December 2013 – August 2020, Marita was the Executive Secretary of the Association of International Research and Development Centers for Agriculture (AIRCA), hosted by *icipe*. She has worked in international development for over 25 years, mainly agriculture, human resources, administration and finance for organisations that include the German Agency for International Cooperation (GIZ), non-governmental organisations and the Dutch Foreign Ministry in Malawi, Tanzania, Afghanistan and Kenya. She holds an MSc in Agricultural Sciences from the University of Hohenheim, Germany, and an MSc in Economic Development and International Trade from the University of Reading, UK.



Frank Chidawanyika (Zimbabwe), Scientist Push–Pull, Plant Health Theme

An entomologist with research interests in insect physiology, herbivory and olfactory-guided behaviour, as well as climate stress resistance and insect pest management, Frank will focus on new ways to build climate resilience in Push–Pull systems and novel tools for combating emerging invasive pests. He holds a PhD from the University of the Witwatersrand, South Africa; attained in collaboration with *icipe* and Rothamsted, UK; an MSc from Stellenbosch University, South Africa, and a BSc from the University of Zimbabwe. He has held positions as Environmental Entomologist at the Agricultural Research Council, South Africa, and as Senior Lecturer in Insect Physiological Ecology at the University of Free State, South Africa.



**Kelvin Mulungu (Zambia), Postdoctoral Fellow (Data Management),
Social Science and Impact Assessment Unit**

He holds a PhD, through a Fulbright Scholarship, in Agricultural and Resource Economics from Colorado State University, USA. Previously, he was a Research Fellow, Institute of Economic and Social Research, University of Zambia. He has also held positions as Monitoring and Evaluation Officer, World Vision; Research Manager, HarvestPlus Project, International Institute for Tropical Agriculture (IITA); Research Fellow, Africa Rice Center; and Sustainability Leadership Fellow, School of Global Environmental Sustainability, Colorado State University.



Syeda Tullu Bukhari (Pakistan), Postdoctoral Fellow, Human Health Theme

Her research interest is in the development and implementation of non-chemical vector control tools; genetics of immune responses and susceptibility of *Anopheles* mosquitoes to *Plasmodium* parasites; non-genetic factors that shape the *Anopheles* immune response.

Previously, she was a Lecturer at Maseno University, Kenya and a Postdoctoral Fellow, Genetics and Genomics of Insect Vectors Unit, Institute Pasteur, France. She holds a PhD in Medical Entomology from Wageningen University, The Netherlands.



Tobias Landmann (Germany, South Africa), Integrated Expert, Geospatial Science, DMMG Unit

His position is co-funded by the German Federal Ministry for Economic Cooperation and Development (BMZ) through the CIM-Integrated Experts Programme managed by GIZ, Germany.

Between 2012 – 2018, he was an Integrated Expert in the *icipe* Geo-Information Unit. He worked as a Project Manager and Senior Scientist in remote sensing at Remote Sensing Solutions GmbH in Munich (Germany). He holds a PhD in Physical Geography from the University of Goettingen, Germany. Previous positions include Senior Scientist, University of Wuerzburg, German Aerospace Centre (DLR) and UN FAO. His research interest is in the use of geospatial analysis to better understand global change effects and socio-ecological systems, to improve livelihoods in Africa.



Kathrin Krausa (Germany), Visiting Scientist, Environmental Health Theme

She is an entomologist with research interests in the communication behaviour of social insects, particularly stingless bees. She obtained a PhD, MSc and undergraduate training from Ruhr University Bochum, Germany, and Visiting Scientist, Taita Taveta University, Kenya, as a Lecturer in Agricultural Entomology and Experimental Design and Analysis. At *icipe*, her research will focus on foraging and recruitment behaviour of African stingless bees to identify the messages and meanings of signals employed in recruitment communication. Dr Krausa received a Feodor Lynen Research Fellowship of the Alexander von Humboldt Foundation.



Kennedy Senagi (Kenya), Postdoctoral Fellow DMMG, Unit

He holds a PhD in Computer Science (Artificial Intelligence and Parallel Computing) from universit  Paris 8, France, with research interests in Data Science, Machine Learning, Artificial Intelligence, Parallel Computing, Software Engineering and Distributed Computing. Previously, he was Lecturer and Chairman, Department of Computer Science, Dedan Kimathi University of Technology, Kenya. He has also served as a Software Engineer at Kimetrica Limited, Kenya and United Nations Educational, Scientific and Cultural Organization (UNESCO).



Mary Ngure (Kenya), Senior Business Support Officer, Information Resource Centre

She holds an MSc in Management and Information Systems from the University of Manchester (UK), BSc in Computer Science from Kenyatta University, Kenya, and certification in Records Management from the International Council on Archives (ICA). Previous positions include Senior Librarian, United States International University - Africa (USIU - Africa), Coordinator Digital, Media Aga Khan University (AKU), Nairobi, where she was a recipient of 2016 Huduma Bora Award for exemplary service at AKU.



Elizabeth Ngonyo Murimi (Kenya), Senior Business Support Officer I, RCU-RSIF

She holds an MBA in Strategic Management from Jomo Kenyatta University of Agriculture and Technology (JKUAT), a Bachelor of Agribusiness Management from Egerton University and a Diploma in Management of Information Systems (MIS) from Kenya College of Accountancy (KCA). Previously, she was responsible for the management of secondary school and university students scholarships, resource mobilisation, grants management and partnerships at the Cooperative Bank Foundation, Kenya.



Rachel Wanjiru Chege (Kenya), Business Support Officer (Project Assistant), RCU-RSIF

She holds a Diploma in Project Management from Kenya Institute of Management, and an ongoing Bachelor of Arts in Project Management from Management University of Africa. Previously, she was part of the *icipe* Capacity Building & Institutional Development Unit team and an Administrative Assistant at International Livestock Research Institute (ILRI), and RTI International.



Thomas Ogao Onchuru (Kenya), Postdoctoral Fellow, Symbiovector Project, Human Health Theme

His research interests are in mutualistic interactions between important insects and their native microorganisms, to investigate the role of microbial symbionts in shaping insect diversity, ecology, and evolution, and explore their potential in controlling insects of medical, veterinary, and agricultural importance. He holds a PhD in Natural Sciences (Biology) from Johannes Gutenberg University of Mainz, Germany. His previous positions include Researcher at Max Planck Institute for Chemical Ecology (MPICE), Jena, Germany, and Lecturer in Bomet University College and the Technical University of Kenya.

Donor: Government of Benin through the Ministry of Economy and Finance

Project title: Financial support to *icipe* for the implementation of the Regional Scholarship and Innovation Fund for Applied Sciences, Engineering and Technology (RSIF) project in sub-Saharan Africa.

icipe staff: Moses Osiru, Julius Ecuru and Rob Skilton (RSIF)

Collaborators: RSIF African Host Universities (AHUs) and RSIF International Partner Institutions (IPIs)

Donor: Government of Mozambique, through the Ministry of Economy and Finance

Project title: Financial support to *icipe* for the implementation of the Africa Regional Scholarship and Innovation Fund for Applied Sciences, Engineering and Technology (RSIF) project in sub-Saharan Africa.

icipe staff: Moses Osiru, Julius Ecuru and Rob Skilton (RSIF)

Collaborators: RSIF African Host Universities (AHUs) and RSIF International Partner Institutions (IPIs)

Donor: Organisation of African, Caribbean and Pacific States (OACPS), ACP Innovation Fund financed by the European Union

Project title: Accelerating inclusive green growth through agri-based digital innovation in West Africa (AGriDI)

icipe staff: Moses Osiru and Julius Ecuru (RSIF)

Collaborators: Agropolis Foundation, Gearbox Pan African Network and University Abomey-Calavi

Donor: Remote Sensing Solutions (RSS) GmbH, Germany

Project title: Dense Satellite Time Series for Agricultural Monitoring (DESTSAM)

icipe staff: Henri Tonnang and Elfatih Abdel-Rahman (Data Management, Modelling, and Geo-Information Unit)

Collaborators: Remote Sensing Solutions GmbH, Germany

Donor: The Rockefeller Foundation

Project title: Virtual training on beekeeping – The Rockefeller Foundation Africa Regional Office Day of Service

icipe staff: Kiatoko Nkoba and Michael Lattorff (Environmental Health Theme)

Collaborators: Karuma Beekeeping Group, Kenya

Donor: Europe Aid/Climate-relevant Development-Smart Innovation through Research in Agriculture (led by University of Helsinki)

Project title: Earth observation and environmental sensing for climate-smart sustainable agro-pastoralism ecosystem transformation in East Africa (ESSA)

icipe staff: Juan Paredes, Michael Lattorff and Kiatoko Nkoba (Environmental Health Theme)

Collaborators: University of Helsinki, Finland; International Livestock Research Institute (ILRI); IHE-Delft Institute for Water Education (IHE), The Netherlands; University of Nairobi, Kenya; Addis Ababa University, Ethiopia; Kenya Agricultural and Livestock Research Organisation (KALRO); Ethiopian Institute of Agricultural Research under the Ethiopian Agricultural Research Council Secretariat (EARCS) and Regional Centre for Mapping of Resources for Development (RCMRD)

Donor: Swiss Programme for International Research Projects by Scientific Investigation Teams (SPIRIT) grant from the SNF (Switzerland) led by University of Lausanne

Project title: Evolutionary dynamics of the gut microbiome across honeybees

icipe staff: Juan Paredes (Environmental Health Theme)

Collaborator: University of Lausanne

Donor: Biovision Foundation for Ecological Development, Switzerland

Project title: Scaling up successful beekeeping enterprises for improving livelihoods and resilience of especially women in degraded natural habitats in Wag Himra Zone, Ethiopia

icipe staff: Workneh Ayalew (Environmental Health Theme)

Donor: H2020/SFS-35-2019-2020 Sustainable Intensification in Africa/led by University of Copenhagen

Project title: A Cross-Disciplinary Alliance to Identify, PREdict and prePARE for Emerging Vector-Borne Diseases (PREPARE4VBD)

icipe staff: Jandouwe Villinger (Molecular Biology, Bioinformatics and Biostatistics Unit)

Collaborators: Makerere University, and Uganda Ministry of Health, Uganda; Sokoine University of Agriculture (SUA), and National Institute for Medical Research (NIMR), Tanzania; University of KwaZulu-Natal, South Africa; University of Copenhagen, Denmark; Swiss Tropical and Public Health Institute, and Switzerland University of Bern, Switzerland; Swiss Centre for Scientific Research in Côte d'Ivoire; and University of Naples Federico II, Italy

Donor: German Research Foundation (DFG)/led by Helmholtz-Zentrum für Umweltforschung GmbH – UFZ

Project title: Freshwater pollution and the links to the distribution of *Schistosoma* host snails in Western Kenya (SENTINEL)

icipe staff: Ulrike Fillinger and Akbar Ganatra (Human Health Theme)

Collaborators: Helmholtz Centre for Environmental Research, Goethe University Frankfurt, RWTH Aachen University, all from Germany; and Kenya Medical Research Institute (KEMRI) and Moi University, both in Kenya

Donor: Medical Research Council through The London School of Hygiene & Tropical Medicine

Project title: An inter-disciplinary approach to understanding the contribution of household flooring to disease burden in rural Kenya

icipe staff: Ulrike Fillinger (Human Health Theme)

Collaborators: London School of Hygiene & Tropical Medicine, UK; KEMRI; KEMRI-Wellcome Trust Centre Kilifi; Jomo Kenyatta University of Agriculture and Technology (JKUAT), Kenya.

Donor: Farmtrack Consulting Ltd

Project title: AEDES-SIT Exploring the prospect of applying the Sterile Insect Technique (SIT) to control *Aedes* mosquitoes, vectors of arboviruses, in the Indian Ocean context

icipe staff: David Tchouassi and Baldwyn Torto (Behavioural and Chemical Ecology Unit)

Donor: Biovison Foundation for Ecological Development, Switzerland

Project title: Developing a mosquito-repellent biofuel product for better health and environment

icipe staff: Tullu Bukhari and Ulrike Fillingner (Human Health Theme)

Collaborators: Practical Action Kenya and Clean Cooking Association of Kenya

Donor: Erasmus + Call for Proposals 2020 EAC/A02/2019- KA2: Cooperation for innovation and the exchange of good practices- Capacity Building in the Field of Higher Education

Project title: Nematology Education in Sub-Saharan Africa (NEMEDUSSA)

icipe staff: Solveig Haukeland (Plant Health Theme)

Collaborators: Ghent University, Belgium (Coordinator); International Institute of Tropical Agriculture (IITA); University of Abomey-Calavi and University of Parakou, Benin; Haramaya University and Jimma University, Ethiopia; Kenyatta University and Moi University, Kenya; Ahmadu-Bello University and University of Ibadan, Nigeria; North West University and Stellenbosch University, South Africa; Makerere University and Muni University, Uganda; Université Côte d'Azur, France

Donor: Swedish International Development Cooperation Agency (Sida)

Project title: Strategic support to *icipe* research and development programmes

icipe staff: Segenet Kelemu

Donor: Research Institute of Organic Agriculture (FiBL)

Project title: Long-term Farming Systems Comparison in the Tropics (SysCom) - What is the contribution of organic farming to sustainable development?

icipe staff: Edward Karanja (Plant Health Theme)

Collaborators: Kenya Agricultural Livestock and Research Organisation (KALRO); Kenyatta University; Kenya Organic Agriculture Network (KOAN); Kenya Institute of Organic Farming (KIOF); Jomo Kenyatta University of Agriculture and Technology (JKUAT); University of Embu; Taita Taveta University and Nairobi University (all from Kenya)

Donor: USAID-RTI International through County Government of Kitui (Service Contract)

Project title: Establishment of areas of fruit fly low pest prevalence in Kitui County, Kenya

icipe staff: Samira Mohamed, Shepard Ndlela (Plant Health Theme)

Donor: Code for Science & Society

Project title: Empowering researchers with skills and tools in Open Science and Bioinformatics

icipe staff: Caleb Kibet (Molecular Biology, Bioinformatics and Biostatistics Unit)

Collaborators: Bioinformatics Hub of Kenya Initiative, OpenScienceKE

Donor: Bill & Melinda Gates Foundation

Project title: Symbio Vector Project

icipe staff: Jeremy Herren, Henri Tonnang, Juan Paredes, Daniel Masiga, Sunday Ekesi, Segenet Kelemu (Human Health Theme)

Collaborators: Millennium Institute, Kenya Medical Research Institute (KEMRI) -Wellcome Trust Research Programme (KWTRP)

Donor: TRANSFORM* - Swiss Agency for Development and Cooperation (SDC) led by University of Bern

Project title: AgriPath- Empowering smallholder farmers' transition to sustainable agriculture through effective and efficient digital pathways

icipe staff: Menale Kassie (Social Science and Impact Assessment Unit)

Collaborators: University of Bern, Grameen Foundation USA, Grameen Foundation India, farmbetter Ltd

* *Research and innovation for sustainable development: strengthening partnerships between researchers and implementation partners to accelerate transformation towards global sustainable development» (TRANSFORM) for the period 2020-2025*

Donor: Participatory Ecological Land Use Management (PELUM)- Kenya

Project title: Capacity building and awareness creation on desert locust management

icipe staff: Saliou Niassy (Technology Transfer Unit)

Collaborators: GIZ, Biovison Africa Trust (BvAT)

Additional funding to existing agreements

Donor: European Commission through Kenya Agricultural and Livestock Research Organization (KALRO)

Project title: Development of technologies for improving productivity of apiculture in ASALS of Kenya (KALRO/CS APP/LOA No. 3/2019)

icipe staff: Baldwyn Torto, Michael Lattorff (Environmental Health Theme)

Donor: U. S. Agency for International Development (USAID) through Virginia Polytechnic Institute and State University

Project title: IPM for Rice, Maize and Chickpea in East Africa

icipe staff: Tadele Tefera (Plant Health Theme)

icipe gratefully acknowledges the financial support of the following organisations and agencies

Core donors

- Swiss Agency for Development and Cooperation (SDC), Switzerland
- Swedish International Development Cooperation Agency (Sida), Sweden
- UK's Foreign, Commonwealth & Development Office (FCDO)
- Ministry of Education, State Department of University Education and Research, Kenya
- Government of the Federal Democratic Republic of Ethiopia

Restricted project donors

- African Academy of Sciences
- African Union
- Bayer: Science for a Better Life
- Bertha Foundation
- Bill & Melinda Gates Foundation
- BioInnovate Africa Programme
- Biotechnology and Biological Sciences Research Council (BBSRC)
- Biovision Africa Trust
- Biovision Foundation for Ecological Development, Switzerland
- British Council- Newton Fund Institutional Links
- Code for Science & Society (CS&S)
- Cultivate Africa's Future (CultiAF) through International Development Research Centre (IDRC)/Australian Centre for International Agricultural Research (ACIAR)
- Danish International Development Agency (DANIDA)
- ETH Zurich
- Ethiopian Catholic Church Social Development Commission (ECC-SDCBOM)
- European Union
- Food and Agriculture Organization of the United Nations (FAO)
- French Agricultural Research Centre for International Development (CIRAD)
- Future Leaders – African Independent Research (FLAIR)
- German Academic Exchange Service (DAAD); Federal Ministry for Economic Cooperation and Development (BMZ), Germany
- German Research Foundation (DFG)
- Global Challenges Research Fund (GCRF)
- Impaxio GMBH
- Innovate UK
- Institute of Research for Development (IRD)
- International Atomic Energy Agency (IAEA)
- International Development Research Centre (IDRC); International Fund for Agricultural Development (IFAD)
- JRS Biodiversity Foundation
- Keele University, UK
- LEAP-Agri (A long-term EU-Africa research and innovation partnership on food and nutrition security and sustainable agriculture)
- Mastercard Foundation
- Max Planck Institutes, Germany
- Medical Research Council, UK
- Mozilla Foundation, USA
- National Geographic Society
- National Research Fund (NRF), Kenya
- National Science Foundation (NSF)
- Netherlands Organisation for Scientific Research (NWO)
- Norwegian Agency for Development Cooperation (Norad)
- Open Philanthropy
- Participatory Ecological Land Use Management (PELUM)- Kenya
- Remote Sensing Solutions (RSS) GmbH, Germany
- Research Institute of Organic Agriculture (FiBL)
- Rockefeller Foundation; Biotechnology and Biological Sciences Research Council, UK, through Rothamsted Research, UK
- Scottish Funding Council
- Swedish International Development Cooperation Agency (Sida)
- Swedish University of Agricultural Sciences (SLU)
- Swiss Agency for Development and Cooperation (SDC), Switzerland
- Swiss National Science Foundation (SNSF)
- The Curt Bergfors Foundation Food Planet Prize
- The Royal Society, UK
- The Stichting IKEA Foundation through Biovision Foundation for Ecological Development Cambridge Africa ALBORADA Research Fund
- TWAS, The World Academy of Sciences through Organization for Women in Science for the Developing World (OWSD)
- United Nations Environment Programme (UNEP)
- United States Agency for International Development (USAID)
- United States Agency for International Development-Partnerships for Enhanced Engagement in Research (USAID-PEER) Science program with funding from National Academy of Sciences (NAS)
- United States Department of Agriculture (USDA); United Nations Office for Project Services (UNOPS)
- United States National Institutes of Health (NIH)
- University of Cambridge, UK
- University of Glasgow, Scotland
- USAID – United States Agency for International Development's IPM Innovation Lab (Feed The Future Innovation Lab for Integrated Pest Management) of Virginia Tech, USA
- Wageningen University, The Netherlands
- Wellcome Trust, UK
- World Federation of Scientists
- World Health Organization (WHO)
- World Trade Organization (WTO) – Enhanced Integrated Framework (EIF)

Investors in the Regional Scholarship and Innovation Fund

- Government of Benin
- Government of Burkina Faso
- Government of Côte d'Ivoire
- Government of Ghana
- Government of Kenya
- Government of Mozambique
- Government of Rwanda
- Government of Senegal
- World Bank Group
- Government of South Korea
- ACP Innovation Fund of the European Union through the Organisation of African, Caribbean and Pacific States (OACPS)

In realising its mission, *icipe* also benefits from extensive partnerships with research partners (including universities and research institutes in Africa and beyond), private sector partners, and communities across Africa.

For more information on these and other topics, please visit our

Website: <http://www.icipe.org> or contact us through our

Email address: icipe@icipe.org

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