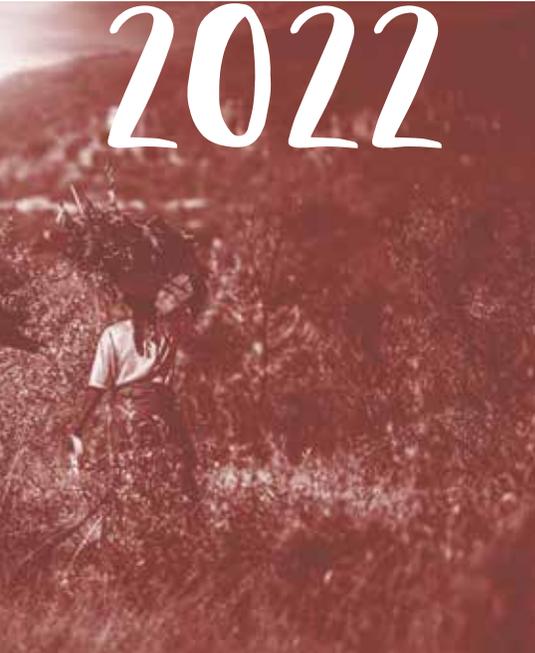




ISAAA

in

2022



STRIVING FOR
Sustainability

ISAAA is a not-for-profit international organization that shares the benefits of new bioscience technologies to key stakeholders, particularly resource-poor farmers in developing countries, through knowledge sharing, support to capacity building initiatives, and partnerships.





2022 was the first year in which the new ISAAA became operational as ISAAA-BioTrust, in concert with two independent affiliates, the ISAAA *AfriCenter* and the ISAAA SEAsiaCenter (ISAAA Inc.). In this new modality, the re-configured ISAAA entity actively pursued its mission through the impactful activities shared in this Accomplishment Report, despite some intense challenges in the operating environment.

In 2022, the world started to recover from the many restraining measures taken to manage the COVID-19 pandemic, but at the same time, facing climate change crises and the continuing effects of the Russia-Ukraine conflict.

The sustainability of global food systems and even political stability were severely tested. The Economic and Social Commission for Asia and the Pacific (ESCAP) has predicted that the Asia-Pacific region, in particular, is unlikely to achieve most of the SDGs until about 2065! However, there is hope that at least some of the SDGs, e.g., SDG 2 (Zero Hunger) may perform better through partnership efforts (SDG 17) that help to narrow or remove the gaps in knowledge and technology. This is where the extended ISAAA family, its partners, and supporters have shown in the past year that it is still possible to make substantive progress despite challenges. Significant progress was made to expand the number of countries and beneficiaries of biotechnology and to develop the enabling frameworks and systems for biotechnology specifically, but for agri-technology in general.

ISAAA continues to be viewed as a reliable partner and a trusted broker of scientific knowledge that benefits developing countries. The regular outreach to thousands of stakeholders built a global community of practice that supports the role of science and technology in development. Moving forward, the hope is to harness the many partnerships to become even more relevant and impactful in the coming years.

Dr. Paul Teng
Chair, ISAAA Board of Trustees

The two long, challenging years have come to an end, thanks to biotechnology and science. The realization that science should be celebrated, communicated, and embraced for future crises preparedness is gaining momentum. I have been invited non-stop for media interviews and to science communication conferences and workshops around the globe in the past year. It is my hope that one of the biggest lessons learned from the pandemic is that curating an active science discourse among the public empowers them to make informed choices in mitigating and navigating global challenges remains steadfast. I am a strong believer that science alone will not bring about changes unless it is effectively communicated to the wider public.

ISAAA pioneered knowledge transfer and public understanding of biotechnology in developing countries to get them on the race towards self-sufficiency and knowledge-based economies. Our initiatives facilitated the approval and adoption of biotech crops in many developing countries. In Africa, ISAAA *AfriCenter's* initiatives saw more countries joining the biotech league and even becoming leaders by adding local crops into the GM basket, encouraging home-grown technologies.

After three decades of successful endeavors, ISAAA and BioTrust are now marching towards other areas that could complement crop biotechnology to ensure food and energy security, sustainable development, and climate action. Last year, ISAAA embarked on supporting gene drive and COVID-19 awareness. Our website has rich resources on both these topics. We are now excited to set our footprints in the space of novel foods – alternative protein, cultured meat, plant-based meat, and precision fermentation. We believe science should provide more choices to reduce the current pressure on the planet and the growing diversity of diets.

We are also working on spreading our wings in Latin America and the Arab world to support modern crop biotechnology, especially gene editing. The new geographical areas we aspire to be in, as well as going beyond crop biotechnology, motivated us to create BioTrust as a brand while maintaining ISAAA as our legacy.

Stay tuned for ISAAA BioTrust's transformational initiatives and we look forward to joining hands and moving forward with old and new partners.

Dr. Mahaletchumy Arujanan
Global Coordinator, ISAAA-BioTrust
Executive Director, Malaysian Biotechnology Information Centre (MABIC)



Message
FROM THE BOARD CHAIR

Message
FROM THE GLOBAL COORDINATOR

Milestones

~100k
online and onsite participants
engaged
through workshops and trainings

Over 50
researchers
and regulators
from Asia and Australia
tackled policy considerations
for gene editing

ISAAA representatives
contributed to
COPMOP
discussions in Montreal

Over 28k
subscribers
received regular updates on
agbiotech, gene editing, gene
drive, and biosciences

High ratings
and positive
feedback
given to e-newsletter,
event approval database,
and adoption report

Target
stakeholders
joined workshops
for WinRock International
and US Embassy Hanoi

12
Southeast Asian
key biotech
players
joined short course on biotech

First
agbiotech
magazine
for senior high school in the
Philippines launched

Policy briefs
on biosafety, gene editing,
and gene drive
released

Ban
on GM foods
lifted
in Kenya

Policy shift
towards importation on
GM feeds

200
One Health
stakeholders
from 4 African countries
engaged

Over
538k
netizens visited
www.isaaa.org
for biotech information

GM Approval
Database
provided biotech events data
through
737k
pageviews

New breeding
innovations
primer
downloaded
3,645x

More than
2k farmers
sensitized
on biotech crops

20+
media events
attended by over
200 African journalists

Over
300 experts
from 30 African countries
capacitated
on science communication

184,640
individuals
engaged
on social media through
ISAAA and BIC accounts

52
blog articles
tackled the most pressing topics
on biosciences

Co-organized
international
workshop
on animal biotech with USDA

Launch of
Striga Smart
Sorghum
for Africa
Project

Regulators
and animal biotech
practitioners
from 12 African countries
engaged



FROM THE EXECUTIVE DIRECTOR, ISAAA INC.

Message

Once again, science and technology prevailed when the global community faced head-on the COVID-19 pandemic. With the application of modern biotechnology in developing and deploying effective vaccines, the lives and economies of badly hit countries were saved. After nearly three years, normalcy is being felt again, bringing hope, encouraging innovation, and forging partnerships toward economic recovery.

ISAAA Inc. faced the challenges brought by the pandemic and maintained our credibility in providing quality publications, capacity-building activities, and networking. In the past year, ISAAA Inc. has mastered the in-person and online outreach activities completing 23 learning activities (webinars, workshops, and training) and reaching over 95,000 individuals globally. New and old partnerships were forged and strengthened, broadening the scope of biosciences information that ISAAA Inc. covers.

With a talented technical and creative staff and the power of ISAAA communication platforms utilizing the internet, social media, print, and broadcast venues, ISAAA Inc. is on its path towards its ultimate goal of becoming the one-stop resource base for biotechnology information.

The narratives found in this Report attest to the evolving ISAAA Inc., in concert with the ISAAA-BioTrust Consortium. We are ready to partner and collaborate with old and new partners. We invite all interested collaborators to reach us, and together, we will explore the exciting frontiers of biotechnology and help feed the world with knowledge.

Dr. Rhodora Romero-Aldemita
Executive Director, ISAAA Inc.
Director, ISAAA-BioTrust Global Knowledge Center on Biotechnology



The Asia activities focused on capacity building on biotechnology regulation, related institutional support, and public information and outreach. The activities revolved around raising public awareness of biotechnology, the existing regulatory system, the adoption of commercialized biotech crops, and the status of new products in the pipeline. Recently, new technologies such as gene editing and gene drive have become a topic of interest to different stakeholders. Information, education, and communication (IEC) activities enabled continuing public information and knowledge sharing about biotechnology applications, products, and benefits of biotech products.

Better Learning and Engagement for Almost 100,000 individuals

ISAAA Inc. has evolved from conducting face-to-face IEC activities to utilizing online platforms to reach a larger audience. In 2022, the organization spearheaded workshops and webinars to provide a better learning experience for its target stakeholders. ISAAA Inc. engaged 95,575 individuals, including policymakers, regulators, scientists, students and academics, farmers, and consumers from 32 countries. They took part in briefings and in-depth discussions to fully enhance their understanding of the advances and regulations of modern biotechnology. Their participation helped build their personal and professional capacities, which will aid in improved productivity in their respective fields. ISAAA Inc. believes that the growth of each emanates from benefiting the whole society.



Online Seminars for Building Safe Agricultural Food Enterprises in the Philippines (B-SAFE) Project

With the goal of increasing the awareness of the Filipino public on modern biotech and to help assist the policy and regulation development in the country, ISAAA partnered with WinRock International's Building Safe Agricultural Food Enterprises in the Philippines (B-SAFE) project. The four-part webinar series was attended by a total of 565 participants from various stakeholder groups. The activity contributed to the greater acceptance and appreciation of biotech benefits, especially to the farming community and Filipino consumers.



Regional Workshop Tackles Policy Considerations for Gene Editing in Asia and Australia

Feeding the world can be done through the existing scientific innovations including gene editing, but achieving it depends on regulations. This was one of the main messages of the gene editing experts to over 60 participants of the *Workshop on Policy Considerations for Gene Editing: The Asian and Australian Perspective* organized by ISAAA Inc., BioTrust Global, Malaysian Biotechnology Information Centre (MABIC), Murdoch University, and the National Seed Association Malaysia. The workshop held face-to-face in Petaling Jaya, Malaysia, was aimed to raise awareness among stakeholders to enable science-based participation in the development of policy and regulatory frameworks for gene editing in Asian and Australasian countries. International experts presented about the science and status of gene editing research and regulations worldwide. Representatives from Asian and Australasian countries were also invited to share their perspectives on the policies and regulations on gene editing in their respective countries. A special session on science diplomacy and harmonization was conducted, where international negotiations were simulated through an interactive engagement called *Biotech Game*.



ISAAA Joins Negotiations to Protect Earth's Land and Water Areas by 2030

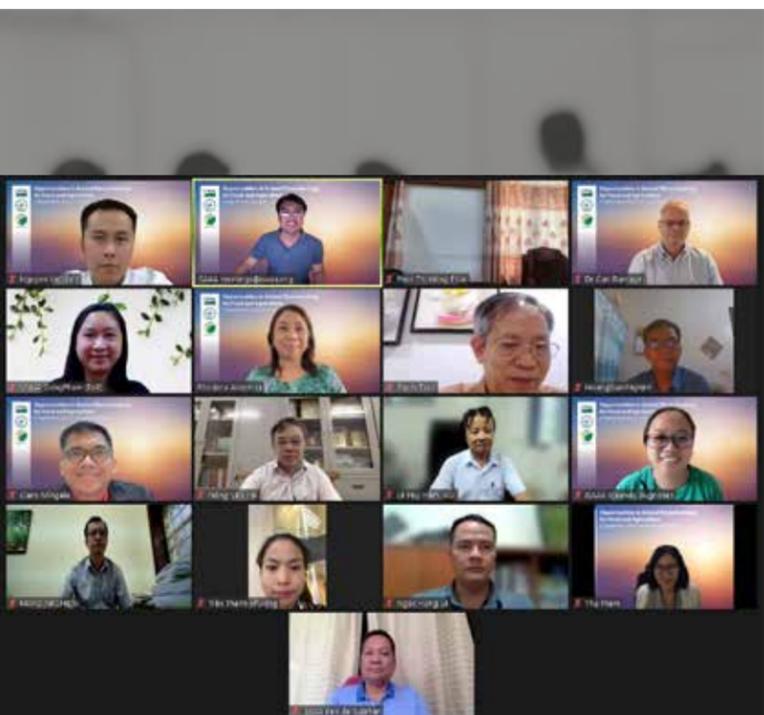
After a series of negotiations chaired by China and hosted by Canada, the 15th Conference of Parties to the UN Convention on Biological Diversity (COP15) adopted the Kunming-Montreal Global Biodiversity Framework (GBF) on December 19, 2022, in Montreal. ISAAA representatives participated in the negotiations to ensure that the benefits of genetically engineered and gene-edited products are given due consideration. ISAAA, Public Research and Regulation Initiative, Alliance for Science, and IGems formed the Biodiversity Innovation Coalition to have a uniform and strong voice during the meeting. The group was newly categorized under the Academia and Research which highlighted the importance of science and innovation in the negotiation.

Prior to the UN Biodiversity Conference in Montreal, ISAAA and partners organized debriefing (online) and preparatory (onsite) workshops, which served as a refresher of the previous discussions on key biotechnology and biosafety-related topics included in the conference agenda.



Webinar Series on Biotech Research for US Embassy Hanoi

ISAAA, in collaboration with USDA Foreign Agricultural Service (USDA FAS)/US Embassy Hanoi, and Agricultural Genetics Institute (AGI) of Vietnam, conducted the webinar series to provide key stakeholders with the latest updates about scientific research on biotechnology, the role of biotechnology to combat climate change, and the importance of positive media messaging toward biotechnology. The webinar series is part of the annual Biotech Outreach Program of USDA FAS/US Embassy Hanoi. The webinar series was attended by regulators from the Ministry of Agriculture and Rural Development and Ministry of Natural Resources and Environment, F&F Committee members, researchers various institutions and universities, industry representatives, and media practitioners in Vietnam.



International Diplomatic Negotiations through Science Communication

The 5th Asian Short Course on *Agribiotech, Biosafety Regulation and Communication* welcomed 12 regulators, scientists, and academics from five Southeast Asian countries in 2022. The course, organized in Manila, Philippines, emphasized science diplomacy and updates about the Convention on Biological Diversity (CBD). It was an avenue for the participants to join the Pre-COPMOP Southeast Asian meeting, meet members of the CBD Secretariat, and experience a mock COPMOP negotiation. They emerged as accomplished communicators with a better understanding of national biosafety frameworks and international legal instruments. Their new skills and knowledge are the tools they will use to voice out their concerns about biosafety and biodiversity. ASCA5 taught the participants that opinions, especially from the scientific community, are valid and must be heard.

International Workshop on Regulatory Approaches for Animal Biotech

An international workshop led by the US Department of Agriculture, in partnership with ISAAA Inc., ISAAA AfriCenter, Inter-American Institute for Cooperation on Agriculture, VirginiaTech, Agriculture & Food Systems Institute, and Universidade de São Paulo was held in São Paulo, Brazil, to discuss animal breeding, animal biotechnologies in the pipeline, biosafety and regulatory approaches, and risk assessment. ISAAA assisted in the preparations by soliciting speakers and participants and served as speakers, facilitators, and rapporteurs during the event. The workshop concluded that there's a need for implementation of risk-proportionate, enabling regulatory approaches and policies for animal biotech.



New Publications Reach More People, Including Young Minds

In September, ISAAA Inc. launched *Double Helix*, the first and only magazine supplement on agricultural biotechnology for senior high school students taking the Science, Technology, Engineering, and Mathematics (STEM) strand in the Philippines. The eight-page magazine contains illustrated stories, infographics, and activities to engage the young mind. The maiden issue of the Double Helix presents the process of developing a biotech crop, the countries where biotech crops are grown, biotech crops in the Philippines, Filipino biotech corn farmers, news briefs, and some cool and fun science activities and exercises for senior high school students and their teachers to enjoy.

In partnership with the Philippine Agriculture and Fisheries Biotechnology Program and the Southeast Asian Regional Center for Graduate Study and Research in Agriculture, ISAAA Inc. published two Policy Briefs to be distributed to the Philippine Congress. The first Policy Brief discussed the recent changes in the country's regulatory guidelines for GM crops. The second Policy Brief presents the Philippines' policy on plant breeding innovations or new breeding techniques.

Together with the Outreach Network for Gene Drive Research, ISAAA Inc. also published the first Policy Brief in a series that presents the proposed policy options that address issues about gene drives. The first Policy Brief tackles the importance of science-based and case-by-case risk assessment for gene drives and includes key concepts and steps of risk assessment, international guidelines, and policy recommendations.



ISAAA Website Caters to Over 538k Users, Mostly from Biotech Mega-countries

Over 538,083 individuals visited the ISAAA website to get updated information on biotechnology. These clicks resulted in over 1.7 million pageviews in just one year. The top countries with the most number of visitors were the USA (22% of the users), followed by India (15%), the Philippines (15%), China (8%), and Pakistan (3%). Interestingly, these countries are also among the biotech mega-countries growing at least 50,000 hectares of biotech crops. This information may indicate that interest in accessing biotech information could be linked to adopting biotech products.

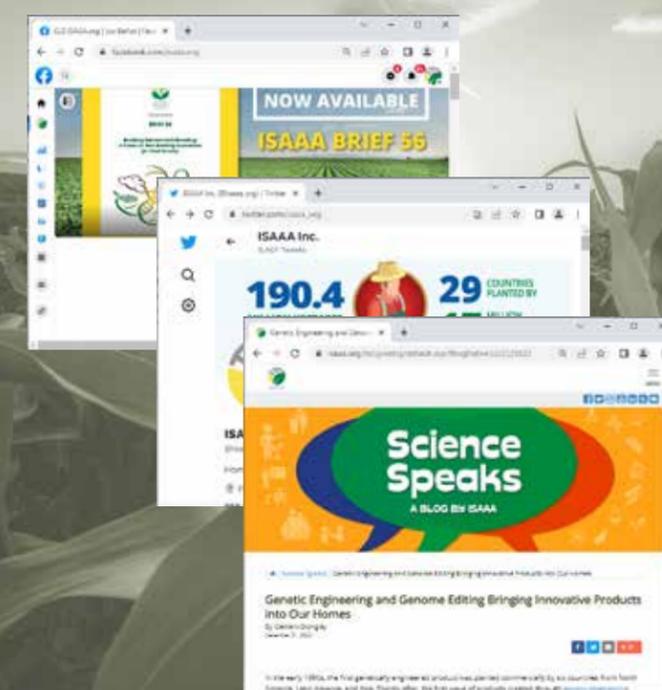
Most of the website traffic was via organic search (60%), which illustrates that the ISAAA website remained a one-stop shop for valuable information relating to biotech. The top pages were the GM Approval Database with 737k pageviews, Crop Biotech Update (335k pageviews), and the Pocket Ks (328k pageviews). *Breaking Barriers with Breeding: A Primer on New Breeding Innovations for Food Security* (ISAAA Brief 56) was the most downloaded resource material on the website (3,465 downloads), which shows the high interest of the visitors in genome editing.



Biotech Knowledge Reaching More People on Social Media

ISAAA Inc. and the Biotechnology Information Centers continue to harness social media's power to share knowledge and disseminate information on biotechnology. Facebook, Instagram, and Twitter were used for social media campaigns on genome editing, gene drive, science communication, food security, and empowering women in science. The ISAAA Inc. network's social media accounts reach 184,640, 3.21% more than the previous year's reach. Followers worldwide shared ISAAA's social media posts on biotech crop adoption, new breeding technologies, new resource materials, webinar announcements, and new biotech crop approvals.

Science Speaks, ISAAA Inc.'s official blog, complements the website and social media accounts in knowledge-sharing activities. The weekly blog articles are authored by ISAAA writers and shared on the social media accounts of Science Speaks. In 2022, 52 blog articles on biotech crops, animal biotechnology, genome editing, gene drives, country regulations, and climate change were published in Science Speaks. Some pieces were republished on other sites, such as the Genetic Literacy Project and Business Mirror.

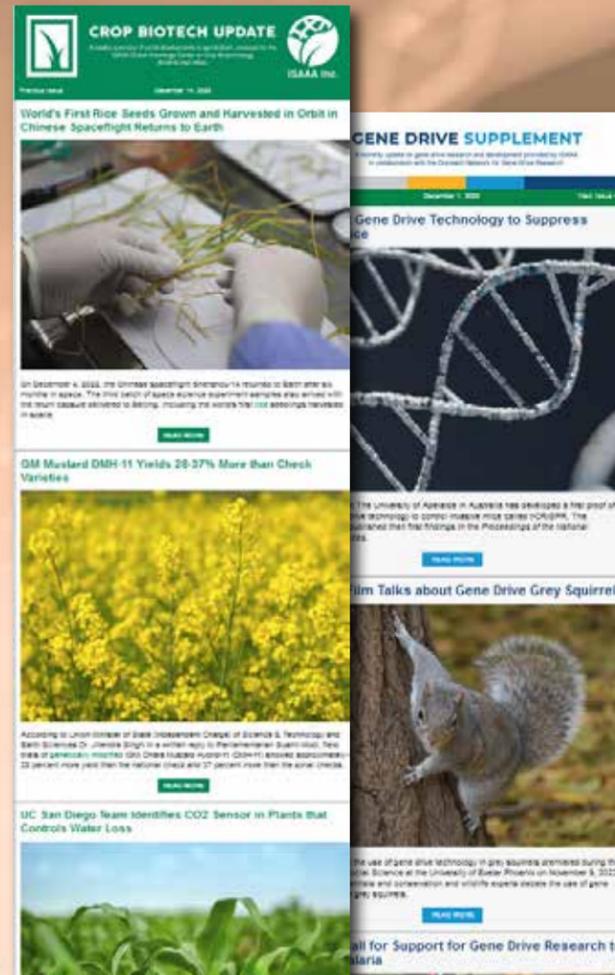


E-newsletter on Crop Biotech Receive High Ratings from Subscribers

Over 22,240 subscribers from 172 countries continued to receive the weekly issue of the Crop Biotech Update, which also came with supplements on genome editing (bimonthly) and gene drive (monthly). Most subscribers were academics and researchers who opted to get regular updates on agricultural biotechnology. The news articles were translated into Bahasa Indonesia, Chinese (Simplified and Traditional), Japanese, Thai, Urdu, and Vietnamese. These translations were distributed through the Biotechnology Information Centers.

When asked for feedback, 96% of the subscribers who responded said that the weekly e-newsletter has been helpful for them. Over 94% gave positive feedback regarding the clarity and coverage of the newsletter. Over half (61%) of the readers said they regularly use the CBU weekly.

The Gene Drive Supplement, produced in collaboration with Outreach Network for Gene Drive Research, had over 4,663 page views since its launch, indicating a growing interest in the technology among the CBU subscribers and website visitors.



"As a farmer, the CBU helps to keep me abreast of the kinds of technology that might be out there to help address some of my most urgent issues," said one of the subscribers. Researchers and academics mentioned that the CBU had helped them get the latest biotechnology updates. A biosafety regulator noted that the CBU provides supporting data for risk assessment.

GMAD Users and Contributors Affirm Its Value and Ease of Use

ISAAA presents an easy-to-use biotech/GM crop approvals database for public use. It features the biotech/GM crop events approved for commercialization/planting and importation (food and feed). Feedback and suggestions were also solicited from the regular users and contributors of the database, who are primarily scientists/academics (61%). Other GMAD users are administrators, regulators, and media practitioners. Almost all of the respondents (99%) said that the database was helpful for them, especially for getting approval updates, instruction, risk assessment/regulatory decisions, and planning control measures. High ratings were also given for its user-friendly interface (85%), the accuracy of information (89%), and content (90%).



"The database provides the big picture of GM crop approvals in one place. It is also easy to use."
- GMAD user from France



Message

FROM THE DIRECTOR, ISAAA AFRICENTER

Africa recorded tremendous success in agricultural biotechnology over the last year. It was a crowning moment as our efforts hugely contributed towards lifting a decade-long ban on the importation of genetically (GM) crops in Kenya, a milestone in crop biotechnology development on the continent. This significant development highlighted the significance of our intentional, consistent, and concerted efforts toward overcoming policy hurdles.

The lifting of the ban was a culmination of our indefatigable resolve to champion an enabling environment for biotechnology development in Africa. Our policy advocacy resulted in a policy shift in Kenya that saw the Government banks on biotechnology to address the country's feed shortage that was declared a national emergency in 2021. *AfriCenter* intensified policy outreach after lifting the ban, a move that proved crucial in battling misinformation and addressing concerns about genetically modified organisms (GMOs).

In our core knowledge-sharing program, the Center unceasingly served the information needs of different stakeholders with credible scientific information on global trends and the socio-economic impacts of agri-biotech. We developed and updated several easier-to-understand knowledge products, such as a second edition of our popular Genome Editing in Africa's Agriculture booklet.

At *AfriCenter*, media engagement forms part of our core mandate. We conducted more than 20 media events reaching over 200 journalists.

AfriCenter's positioning as a bioscience communication enabler has come with a new niche and more partnerships. The Center is leading the implementation of the 'Feed the Future Striga Smart Sorghum for Africa' project, a new public-private partnership project launched in December 2022. Through the One Health project, we continue to contribute towards effectively implementing the One Health approach on the continent.

I remain inspired by Africa's spirit of Ubuntu - the belief in a universal bond that connects all humanity - and calls on all our friends and partners to continue working stronger together. The progress this far has been made possible by many valued partners whose trust, dedication, and commitment continue to motivate us. We look forward to continued support and collaboration in the years ahead. The successes of ISAAA *AfriCenter* are rooted in the outstanding leadership modeled by our Governing Board - we are because you are - we thank you!

Dr. Margaret Karembu, MBS
Director, ISAAA *AfriCenter*
Chair, Africa Science Dialogue



Ban on Genetically Modified Foods Lifted in Kenya

The ban on genetically modified organisms (GMOs) in Kenya, which had lasted for a decade, was finally lifted in October 2022, marking a historic moment in Africa's agri-biotech development. The ban was a culmination of our intentional, consistent, and concerted efforts toward overcoming policy hurdles. *AfriCenter* has long championed an enabling environment for biotechnology development on the continent. Over the last year, we worked towards ensuring that policy and decision makers are active contributors to local and global progress on agri-biotech and biosafety through various platforms, including policy roundtables, national dialogues, and through our pioneer seeing-is-believing biotech study tours.



Policy Shift towards Importation of GM Animal Feeds

In collaboration with the private sector, our efforts resulted in a favorable policy shift in Kenya to address the country's feed shortage that was declared a national emergency in 2021. We partnered with the Association of Kenya Feed Manufacturers (AKEFEMA) and the Kenya Private Sector Alliance to sensitize the public and engage policymakers on the prospects for optimizing the utilization of agri-biotech innovations in addressing the worsening animal feed crisis in the country. We held four media visits to different livestock farms in the country. The visits aimed to highlight the plight of livestock farmers and feed manufacturers in the country and intensify the need for a policy shift towards the importation of GM feeds, which are readily available on the global market. A national dialogue was also held as part of a public and policy outreach on animal feeds. Our efforts saw the Government grant approval for the importation of duty-free GM cottonseed cake for the manufacture of animal feeds.



Increased Reach and More Subscriptions for Our Knowledge Products

In our core knowledge-sharing program, the Center unceasingly served the information needs of different stakeholders with credible scientific information on global trends and the socio-economic impacts of agri-biotech. We developed and updated several easier-to-understand knowledge products, such as a second edition of our popular Genome Editing in Africa's Agriculture booklet. These were disseminated through various channels, including our website, which has approximately 5,000 views per month. Our monthly e-newsletter, the DrumBeat, continued to highlight bioscience expertise in the region and popularize the OH approach to over 6,000 active subscribers. Over 20 short videos were also developed and disseminated through social media as well as screened in various stakeholder workshops, reaching over 100,000 viewers.



5,000 views per month

Knowledge products on AfriCenter website

6,000 subscribers

DrumBeat e-newsletter

100k viewers reached

20 short videos disseminated

200 One Health (OH) Stakeholders from Four (4) African Countries Engaged

To promote national and regional One Health collaboration and governance, AfriCenter mapped out OH influencers in four African countries (Kenya, Ethiopia, Zimbabwe, and Mozambique) and identified their linkages and levels of influence towards operationalizing OH goals. These efforts will contribute to the effective implementation of the OH approach. This engagement was organized under the auspices of Capacitating OH in Eastern and Southern Africa (COHESA) project implemented by AfriCenter and partners. The project aims to generate an inclusive research and innovation ecosystem that facilitates the uptake, adaptation, and adoption of solutions to issues that an OH approach can address.



2000+ Farmers Sensitized on Biotech Crops

AfriCenter and key partners held various impactful awareness creation and outreach activities. We supported the establishment of four Bt cotton demonstration plots in eastern and western Kenya, which were used for peer-to-peer experiential learning, exposing the technology to approximately 2,000 farmers. These study visits are expected to improve farmers' agronomic practices, leading to successful and sustained commercial planting of Bt cotton in Kenya. The Center also facilitated a gender-responsive farmers' participatory varietal selection (FPVS) event for GM cassava and several seeing-is-believing study tours to the GM cassava field trial site for various stakeholder categories. These engagements have created a demand for GM cassava, while data from FPVS will guide the selection of varieties to advance to National Performance Trials.

20+ Media Events Conducted with over 200 Journalists Reached

At ISAAA AfriCenter, media engagement forms part of our core mandate. We conducted over 20 media events reaching over 200 journalists via five media science cafes on various topical issues, several study tours to Bt cotton farmer demonstration plots, GM cassava field trials, and feed millers. We continued to celebrate our journalists' efforts and excellence through the annual Open Forum on Agricultural Biotechnology (OFAB) media awards. From our efforts, 2022 recorded the highest number of accurate media stories (200+) on GMOs, garnering over 100 million media impressions. A critical mass of journalists and editors armed with factual knowledge of agri-biotech and biosafety has been built, thanks to our media engagement program.

Over 300 Experts Capacitated of Science Communication

In our continued quest to build the capacity of those who shape public opinion on agricultural technology, we held eight (8) science communication training workshops targeting over 300 experts from 30 African countries. The workshops held included science communication and leadership training for One Health experts, pre-COP-MOP workshops for regulators and early career scientists, and science communication training for OFAB nodes. Other workshops were organized in Kenya, Ethiopia, and Nigeria under the Africa Coalition for Communicating about Genome Editing. A key output was during the Annual Meeting of African Science Academies (AMASA), where close to 100 scientists from 25 National Science Academies had gathered to discuss issues on sustainable agriculture and food systems in Africa. Following our session that challenged them to engage the public on the protracted GMO debate, experts felt the need to hold a press briefing and set the record straight.

Launch of New Genome Editing Project – Striga Smart Sorghum for Africa Project

The African Coalition for Communicating about Genome Editing expanded its scope beyond Kenya to Ethiopia and Nigeria. The Coalition expansions opened up new partnerships for AfriCenter. Under the Coalition, AfriCenter and her partners in Kenya and Ethiopia put together a winning proposal that has paved the way for the recently launched Striga Smart Sorghum for Africa project. The project utilizes genome-editing technology to develop new sorghum varieties resistant to Striga, a parasitic weed responsible for up to 100 percent yield loss in Africa's staple cereals. It is supported through the U.S. Government's global hunger and food security initiative – Feed the Future – led by the U.S. Agency for International Development (USAID).

Regulators and Animal Biotech Practitioners from 12 Countries Engaged

Our convening ability also enabled us to bring together regulators and animal biotechnology practitioners from 12 countries, in collaboration with Acceligen and Agriculture & Food Systems Institute. The platform presented a unique opportunity for peer-to-peer learning that will assist in developing necessary technical and regulatory frameworks to allow for commercialization and trade in animal biotechnology products.



Network OF BIOTECHNOLOGY INFORMATION CENTERS

The ISAAA network of Biotechnology Information Centers serves as crucial sources of science-based information on biotechnology in the countries they represent. Each BIC supports its national biotech agenda and reaches out to various stakeholders through different communication channels.



Regional gene editing workshop

MABIC developed and co-organized a regional gene editing workshop to facilitate the development and implementation of robust policies on gene editing in the Asia Pacific region. Over 60 participants from Thailand, Indonesia, Taiwan, Singapore, Philippines, India, and Australia shared their experiences regulating gene-edited crops and the way forward in science-based policies.

The Malaysian Biotechnology Information Centre (MABIC)

MABIC continued to be a highly sought-after advocate for science in 2022 among industry players, government agencies, international not-for-profit organizations, and even a UN agency. The Petri Dish became a high-impact and credible tool for these organizations to disseminate their information to critical stakeholders. MABIC also played a vital role in developing national and state policies in biotechnology and bioeconomy in 2022. A board member from the industry was also appointed in 2022 to accelerate further MABIC's role in supporting bioeconomy developments in Malaysia.

The revival of The Petri Dish

The Petri Dish, which was distributed online during the pandemic due to a lack of sponsors, was revived with funding received from a 501.3.c organization in the USA, Environmental Defense Fund. It was turned into a bimonthly print newspaper, with increased circulation to 20,000, and made it available nationwide. Shopping malls, Starbucks outlets, airports, private hospitals, car service centers, hotels, ministries, government agencies, and universities are now receiving the newspaper.



Campaign on methane emissions awareness

MABIC launched a methane emission awareness social media campaign for Environmental Defense Fund named "Methane Matters." The campaign focused on basic info on methane, sources of emissions, and the need for methane mitigations and approaches. A database of climate experts was also created, containing their published inputs supporting climate action. As a science advocate, this campaign expanded MABIC and The Petri Dish's scope beyond biotechnology.



OTHER initiatives



STRIVING FOR

Sustainability

In 2015, the United Nations adopted the Sustainable Development Goals to end poverty, protect the planet, and ensure a better world by 2030. What have we achieved, and how far are we in attaining the global goals?

According to The Sustainable Development Goals Report 2022, the cascading and interlinked crises have placed global goals in grave danger, along with humanity's survival. These crises were dominated by the COVID-19 pandemic, climate change, and conflicts, generating a whirlwind of impacts on food and nutrition, health, education, the environment, peace, and security. With these current hurdles, nations have experienced a reversal of years of progress in attaining their targets. Nevertheless, a collective effort and targeted actions can still deliver meaningful advancement toward the global goals.

ISAAA has been a strong supporter of sustainability, even before the SDGs have been in place. By sharing the benefits of bioscience technologies with key stakeholders, ISAAA strives to contribute to attaining the global goals. Experts have hailed biotechnology as one of the vital tools to feed the world. Over 30 crops have been improved through genetic engineering, and most were enhanced to yield more food and feed. Healthier food crops have also been developed, and some are in the pipeline to embody the Zero Hunger (SDG Goal 2) target, which aims to alleviate hunger and end all forms of malnutrition. In 2021, the Philippine government approved the vitamin A-enriched rice known as Golden Rice, and in 2022, critical provinces with high incidences of vitamin A deficiency started planting it. With the long road from development to

commercialization, Golden Rice is a model and inspiration for other food crops in the pipeline targeted toward sustainability. Emerging technologies such as gene editing are also overtaking the pace of developing GM crops as they face lesser regulatory hurdles in some countries. In the US, high oleic soybean oil developed through gene editing has been on the market since 2019. The successful introduction of the new soybean oil into the U.S. food industry may signify that food manufacturers and consumers now welcome scientific innovation, particularly gene editing, to access healthier foods.

Aside from ensuring food availability and nutrition, biotechnology has been extensively used to develop crops and animals that can withstand the impact of climate change (SDG Goal 13). Using CRISPR technology, researchers copied a naturally occurring mutation in cattle exhibiting slick hair and can adapt to warmer climates. This innovation led to animal body temperatures that are 1 degree lower than conventionally bred cattle. Drought tolerance has been successfully improved in maize, soybean, sugarcane, and wheat.

According to PG Economics, millions of farmers in developing countries earned an extra income of \$3.76 for each additional dollar invested in GM crop seeds. From the start of biotech crop adoption in 1996 until 2020, the net global farm income benefit of GM crops was \$261.3 billion, equivalent to an average increase in income of \$112/ hectare. This increase in revenue addresses SDG Goal 1, No Poverty.

Recognizing the relevance of biotechnology and other biosciences in attaining the SDGs, ISAAA continued to place extreme efforts and contributed toward sustainability through various modalities. Various learning and engagement opportunities online and face-to-face have reached over 95,000 individuals to discuss biotechnology and related topics. Policy briefs on biosafety, gene editing, and gene drive have been published and distributed to assist policymakers in forming science-based and agile regulations. Over 28,000 consumers, researchers, farmers, and other stakeholders continued receiving the latest biosciences developments to guide them in their decisions about adopting and applying new technologies.

ISAAA representatives and partners joined the negotiations to protect the Earth's land and water areas through the 2023 UN Biodiversity Conference (SDG Goal 15). A Biodiversity Innovation Coalition was formed to ensure a robust and uniform voice during the negotiations.

As we move closer to 2030, ISAAA continues to join hands with the world towards striving to attain a safe and sustainable planet for humanity and all living beings.



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