



## Ebikulu ebifa ku Mbeera y'Ebirime Ebyembala mu Busuubuzi Bwensi Yonna: 2009

Bya Clive James, Omutandisi era Ssentebe w'Ekitongole kya ISAAA

Kijjukizo ky'Omugenzi Norman Borlaug Omuwanguzi w'Omudaali gwa Nobel Peace

=====

Ekiwandiiko kino ISAAA Nnamba 41, kya 14 mu biwandiiko ebyomudiringanwa ebya buli mwaaka ebiwandiikibwa omuwandiisi kumbeera ye birime ebyembala munsu yonna okutandika ne lwebyateebwa kuttunzi mu 1996. Ekiwandiiko Nnamba 14, kijjukizo eri omugenzi Norman Borlaug, omuwanguzi wo mudaali gwa Nobel Peace.

**Oluvanyuma lw'emigaso egyomudiringanwa egiwerako mu makungula , mubyenfuna, obutonde bwensi nomutindo gw'embeera za Bantu, likoda ya balimi obukadde 14 abedaala erya wansi naabo abedaala eddene munsu 25, baliima enimiro za hekiteya obukadde 134 ( ze yiika obukadde 330) mu 2009, kuno kwaali kulinya kwabitundu musanvu ku buli kikumi oba obukadde mwenda obwenimiro za hekiteya ( ze yiika obukadde 22) mumwaaka 2008 gwona; okulinya kuno kwakwatagana no' kulinya kwa hekitaya zenimiro eze kika kya "trait oba virtual" okwaali ebitundu 8 kubuli kikumi oba obukadde 14 mu hekiteya ze nimiro za "trait "ku bukadde 180 obwe nimiro ze kimera kino (trait ) zona awamu, ngogerageranya ku bukadde 166 mu 2008 obwa hekiteya ze nimiro ze kimera kyekimu mu 2008 . Okulinya kuno okwe mirundi 80 okwe nimiro zebimera ebyembala wakatiw myaaka 1996 ne 2009 tekubangawo, kino kifudde ebimera ebyembala okubeera tekinologiya webimera eyettanirwa enyo mu byafaayo byo bulimi bwe biro bino; kino kyoleeka obwesigwa obukadde nobukkade bwa balimi mu nsi yona bwe balina nga beyongera okusiga ebimera ebyembala buli mwaaka oguddiringana okuva mu 1996, olw'emigaso emingi egya namadala egivaamu.**

**Hekitaya z'enimiro ze bimera ebyembala zeyongera obungi era Likoda nezimenyebwa mu bika byonna ebina ebye bimera ebyembala ebyalimwa . Ku mulundi ogusookera ddala, ekirime kya soybean ekyembala kyazingako ebitundu bisatu bya kuna ebyenimiro eziweza obukadde 90 obwa hekitya za soybean munsu yona. Ate Pamba owembala natwaala kumpi kimu kyakubiri ekye nimiro obukadde 33 obwa Pamba yena alimwa munsu yona, Kasooli owembala natwaala kimu kya kuna ku bukadde 158 obwa hekitya ze nimiro za Kasooli yena alimwa munsu yona ne Canola owembala natwaala kimu kya kuttaano ku hekitya zenimiro obukadde 31 eze kimera kya Canola. Enimiro ze bimera ebyembala zeyongera okulinya mu 2009 newankubadde ngo kwettanirwa kwebimera ebyembala ebikulu kwaali wagulu mu 2008 mu mawanga amakulu, okugeza, okukozesa Pamba owekika kya Bt mu Buyindi kwalinya okuva ku bitundu 80 ku buli kikumi mu 2008 okutuuka ku bitundu 87 ku buli kikumi mu 2009. Ne Canola owembala mu Canada yalinya okuva ku bitundu 87 mu 2008 okutuuka ku bitundu 93 ku buli kikumi mu 2009. Soya bean owembala kyekimera ekyembala ekyeyongera okwaala ngakizingizza ebitundu 52 ku buli kikumi ebya hekitya ze nimiro obukadde 134. Ebimera nabyo byeyongera okwoleeka embeera eggumira eddagala eritta omuddo (ebitundu 62 ku buli kikumi). Ekika kyolulyo olugatte (stacked genes) kigenda kirinya mu bukulu nga kitwaala ebitundu 21 ku buli kikumi obwe birime byona ebyembala munsu yona era nekisasanyizibwa ensi 11, nga 8 kuzo zikya kula.**

Ku mawanga 25 agakozesa ebirime ebyembala (Girimaani ya koma mu 2008 ate Costa Rica netandika okubikozesa mu 2009), 16 gaali mu kiti kya gakyakula ate omwenda gegakula edda. Buli limu kugano omunaana agokuntikko, galima enimiro ezisukka mu kakadde : USA (obukadde 64) ,Brazil (obukadde 21.4 ) Argentina (obukadde 21.3 ), Buyindi (obukadde 8.4) Canada (obukadde 8.2) ,China (obukadde 3.7),Paraguay(obukadde 2.2) ne South Africa (obukadde 2.10). Hekitya endala obukadde 2.7 zasimbwa amawanga 17, agalambikibwa okuva wagulu okudda wansi okusenziira kubungi bwa hekitya ze nimiro zaago; Uruguay, Bolivia, Phillipines, Australia, Burkina faso, Spain, Mexico, Chile, Columbia, Honduras, Czech Republic, Portugal , Romania,

## Ebikulu ebifa ku Mbeera y'Ebirime Ebyembala mu Busuubuzi Bwensi Yonna: 2009

Poland, Costa Rica, Egypt, ne Slovakia. Obungi bwettaka eririmwaako ebimera ebyembala bweyongera mu banga lye myaaka 1996 ne 2009 nebuwera kumpi akawumbi kalamba aka hekiteya (obukadde 949.9 obwa hekitya oba yiika obuwumbi 2.3).

Okusingira ddala kumpi kitundu kyakubiri ekye misiri gyensi yona kyasimbwa mawanga agakyakula agasuubirwa okukira ago agaakula edda nga 2015 tegunatuuka, omwaaka ogusuubirwa okutuukirizibwamu ebigendererwa byenkulakulana y'emyaaka olukumi egisooka, ensi yona weyeyamide okukendeeza ku njala no bwaavu ekitundu kimu ku bibiri. Ebirime ebyembala byatandika dda okuyamba ku kigendererwa kino era ne ssuubi mu maaso lya maanyi.

Ekyo muwendo kiri nti ku bukadde 14 obwa balimi mu nkola eno 90 kubuli kikumi oba obukadde 13 balimi abalina ebyokozesa ebitono. Abalimi bano baatandika dda okuganyulwa mu bimera ebyembala gamba nga Pamba owekika kya Bt ate era balina essuubi lyamaanyi mu bimera nga omuceera ogwembala ogusuubirwa okuteekebwa ku katale kumpi gyebujja.

Ekiwandiiko kya ISAAA ekya 2008 kyalagula nti omugundu gwe bimera ebipya ebyembala guli kumpi kutuuka kino kyatandika okulabika mu 2009. Mu kusalawo okwenkukunala nga 27 Nov 2009 China yagaba satifiketi (certificate) eziwagira omutindo gwo muceere gwaayo ogwe mbala ogwa Bt ne Kasooli owe kika kya phytase ekiyambye kukutandika emisoso gy'okuwandiisa ebimera bino ekijja okutwaala emyaaka 2 oba 3 ngatebinaba kukkirizibwa kutekebwa kukatale. Amakulu gensalawo eno gategeza nti omuceere emmere esinga okuliibwa muni yona erina obusobozi bwo kuddukkirira obukadde 110 obwa maka agalya omuceere (bwe bukadde 440, ngobaze emitwe ena buli maka ) mu Chinayoka, kwaogatta amaka obukadde 250 agalya omuceere mu Asia, ekyenkanakana nakawumbi kamu akabaasubilwa okuganyulwamu. Abalimi bomueere bebamu ku Bantu abasinga obwaavu muni yona nga bayimiridde wo kukitundu kimu kyakusatu kyoka ekeyenimiro yo bugazi bwa hekiteya eyo muceere okutwaalira awamu. Ekika kyo muceere gwa bt kisobola okuyamba ku kwongera (okutumbula) obungi bwo muceere nokutaasa ku bwaavu bwebalimu ate nekyesanga nga kikendeeza ku byetaago bye ddagala eryetaagibwa okufuuyira nga bwe kiyamba no kuuma embeera enungi esoboka mu biseera bino ebyenkyukakyuka yembeera yo budde. Wadde nga Omuceere yemmere esinga obukulu mu nsi yona, ate Kasooli y'emmere ye bisolo esinga. Ekika kyakasooli owembala (phytase) kijja kuyamba embizzi okumiringusa ekiriisa kya fosoforasi (phosphorous) ate nekisanga nga kiyamba nemunkula yaazo nga bwe kikendeeza ku muka ogwonoona ensi (pollution) nga kiva kukukendeeza ku fosofeti (phosphate) afulumira mu kazambi we bisoro. Ngotutte okwongera okulya enyama okuzze mu China olwenkulakulana ya Bantu, Kasooli wa phytase alina obusobozi okuganyula amaka obukadde 100 (be bantu obukadde 400) mu China yokka. Ngotutte obukulu bwo muceere ne Kasooli muni yonna, nobututumufu bwa China obweyongera mu maaso, ensi endala ezikyakula mu Asia nensi yona ziyinza okwaagala okwegwanyiza enkola yomu China. Obusaale bwa China mu kweyambisa ebimera ebyembala kisobola okola ng'ekyokulabirako eri ensi ezikyakula era nekiyamba ku bungi bwe mmere no bulimi obusoboka, obwesigamye kukukendeeza amalagala agafuuyirwa agatta ebiwuka nokutaasa ku njala no bwaavu. Engeri Omuceere ne Kasooli gye biri emmere esinga okuliibwa abantu nokuweebwa ensolo mu nsi yonna, ebimera bino ebyembala ebipya ebiteeketeekeddwa aba China bisuubirwaamu omugaso gwamaanyi mu China, Asia n'ensi yonna.

Ekiwandiiko 41, kirimu eggulire erye njawulo " Omuceere ogwembala- embeera yaagwo kati ne ssuubi ly'omumaaso" ekyawandiikibwa Dr. John Bennett, Polofeesa mu ssomero lya Sayansi ow'ekika kya biological mu Univaasite ye Sydney mu Australia.

## Ebikulu ebifa ku Mbeera y'Ebirime Ebyembala mu Busuubuzi Bwensi Yonna: 2009

Ekyenkukunala mu 2009, Brazil yasingira watono Argentina okutwaala ekifo ekyo kubiri eky'eggwanga erisinga okulima ebimera ebyembala mu nsi yona, okulinya kuno okwo bungi bwa hekitaya ze nimiro obukadde 5.6 obwe bimera ebyembala kwekukyasizze mu nkulakulana eyenkalakalira okwa hekiteya ze nimiro okwe ggwanga lyona muni yonna, ekyenkanakana ne bitundu 35 ku buli kikumi mu kulinya kw'omwaaka omulamba wakati we 2008 ne 2009. Kino kyolekerawo nga Brazil bweli ensi ekulembedde mu kulima ebimera ebyembala muni yona ate nga guno gwe mutima gwenkulakulana ogwe biseera ebijja mu maaso.

Buyindi,ensi esinga okulima Pamba muni yona eganyuddwa mu myaaka 8 ( 2002 okutuuka 2009) egyo buwanguzi obwenjawulo ngekozesa Pamba owekika kya Bt. Enkozesa yekimera kino yatuuka ku bitundu 87 ku buli kikumi mu 2009. Pamba ono owe kika kya Bt akyuusizza kinene mu bulimi bwa Pamba muni eno. Amagoba gona awamu mu byenfuna eri abalimi ba Pamba ono owe kika kya Bt mu Buyindi okuva mu mwaaka gwe 2002 okutuuka ku gwe 2008 gaali obutitimbe bwa dollar za America obuwumbi 5.1. Pamba ono era yasala ku bwetaavu bwe ddagala erifuuyira ebiwuka ekitundu kimukyakubiri, era nayamba ku kuleeta amakungula agaakubISAAAmu emirundi ebiri ku ga bulijjo. Awo Buyindi nekyuuka okuva mu kusuubula Pamba nedda muku musuubuzi. Bt Brinjal (Biringanya), kye kibala ekisuubirwa okufuuka ekimera kya Buyindi ekyembala ekisooka eky'emmere. Kyawagirwa ekitongole kya Buyindi ekirindirizi okukikirizibwa okuteebwa ku katale. Gavumenti ya Buyindi yesigadde okuva olukusa lwaayo. Enkulakulana yeyongera okulabwa muni ssatu ezomu Africa - South Africa yalinyira ddala ebitundu 17 ku buli kikumi mu 2009, Burkina Faso ne Misiri . Hekitaya z'enimiro za Pamba owekika kya Bt mu Burkina Faso zeyongera emirundi 14 okuva ku hekiteya 8,500 mu 2008, okutuuka ku hekiteya 115,000 mu 2009, kwekulinya ebitundu 1,353 ku buli kikumi. Kuno kwe kulinya okukyasizze mu nsi yona ngogerageranyiza wona mu mwaaka gwe 2009. Amawanga mukaaga agomukago gwa Bulaaya gasimba enimiro za hekiteya 94,750 mu 2009, kuno kuddirira ebitundu 9 ku buli kikumi okusiinziira ku 2008. Spain yalima ebitundu 80 ku buli kikumi ebya Kasooli owe kika kya Bt yenna ow'omukago gwa Bulaaya gwona era nesigala ku ddaala Iyerimu mukwettanira ebimera bino nga mu 2008, bye bitundu 22 ku buli kikumi; ekimera kya RR Sugar beet kyaweza ebitundu 95 ku buli kikumi mu kwettanirwa kwaakyo mu USA ne Canada mu 2009 mu mwaaka ogwokusatu gwoka nga kyakatekebwa ku katale. Kino nekikifuula ekimera ekisinga okwettanirwa mu nsi yona nakati.

Mu 2009 waliwo okukyuuka okuva mu mugigi ogwebikozesebwa ebyasooka okudda ku gwokubiri ekyayongera ku makungula ku bwaakyo omulundi ogusooka. Ekimera kya soybean RReady 2 Yield tm, ekyokulabirako kyekika ekipya ekye bimera ebyembala ebiri mukwekenenzebwa abakugu mu tekinologiya ,kyasimbwa abalimi 15,000 kukitundu kyakadde ka hekiteya zenimiro mu United States ne Canada mu 2009.

Engerageranya eya kankano eyensi yona ku migaso gyebimera byembala eraga nti okuva mu 1996 okutuuka 2008 amagoba mubyenfuna agobuwumbi 51.9 gasibuka wabiri; Awasooka emiwendo gyebikozesebwa gyakka ebitundi 50 ku buli kikumi, Awaddako amakungula agomwanguka (ebitundu 50 ku buli kikumi) agaweza tani obukadde 167. Kino kyandibadde kyetagisa okwongera obukadde 62.6 obwa hekiteya ze nimiro singa ebimera ebyembala tebyakozesebwa ekiraga nti ebimera ebyembala tekinologiya ayamba kukukekereza enkozesa ye ttaka. Mu banga Iyerimu, 1996 okutuuka 2008, eddagala erifuuyira ebiwuka Iyakendeera, okutebereza, nga ebitundu 8.4 ku buli kikumi ku ddagala eryaali likozesebwa okufuuyira ebiwuka. Mu gwe 2008 gwokka , omuka gwa carbon dioxide oguva mu bimera ebyembala ogwakendezebwa, mu nkozessa yenkola gye bayita sequestration, gwaali obuwumbi 14.4 obwa Carbon dioxide. Kino gigerageranye nokujja emmotoka obukadde 7 kumakubo (Brookes ne Barfoot, 2010, forthcoming).

## Ebikulu ebifa ku Mbeera y'Ebirime Ebyembala mu Busuubuzi Bwensi Yonna: 2009

Mugwe 2009, ekitundu kimu kyakubiri ekya bantu bensi yona (byebitundu 54 ku buli kikumi oba obuwumbi 3.6) baali batuuze bansi 25 ezaasimba emisiri gye bimera ebyembala obukadde 134 obwa hekiteya, ekyenkanakana ne bitundu 9 ku buli kikumi ekya kawumbi akamu ne kitundu aka hekiteya zenimiro zensi yona.

Omuwendo gw' akatale kensigo ye mbala koka mu nsi yona kabalirirwaamu obuwumbi 10.5 eza dollar ya America mu 2009. Ate omuwendo gwa Kasooli owembala, Soyabean owempeke ne Pamba ebiri mu katale byabalirirwaamu obuwumbi 130 obwa dollar ya America mu 2008, era bisuubirwa okweyongera Okutuuka ebitundu 10 ku 15 ku buli kikumi buli mwaaka.

Wadde ng'ensi 25 zaalima ebimera ebyembala ebyetunzi mu 2009, ensi endala 32, awamu ze 57, zikkirizza ebimera ebyembala okusuubulwa olwe mmere ya Bantu n'ensolo nokuyingizibwa mu butonde okuva mu mwaaka 1996. Awamu ebiwandiiko 762 byebyakayisibwa mu biseera 155 ku bimera 24. Muno mulimu ekimuli kya Rosa ekya bululu ekyembala ekirimwa mu Japan okuva mu 2009.

Essuubi eriri mumigaso gye bimera ebipya bingi okuva mu mwaaka 2010 okutuuka mugwe 2015 liwa amaanyi. Essira lirina okuteekebwa kunkola ennungamu era eyobuvunaanyizibwa ate ngekekereza nokutuukiriza mu budde, ebyetaago ne misoso ebitambulirwaako. Waliwo okweyongera mukwenyumiriza kwe byobufuzi n'obuyambi bw'ebyenfuna ne Sayansi okuwagira enkulakulana nokukkirizisa, nokujjumbira ebimera byembala. Waliwo essuubi eggere nti okwettanira kwe bimera bino ebyembala okusinzira ku ggwanga n'omuwendo gw'abalimi nobungi bwa hekitaya zenimiro ze bimera bino bijja kukubisibwaamu emirundi ebiri mu myaaka ekkumi egyokuteekebwa ku katale wakati we 2006 ne 2015 nga bwe kyalagulwa ISAAA mu 2005 ( ISAAA eragula nti mu mwaaka 2015 ensi 40 zijja kuba zeyambisa ebimera byembala, abalimi obukadde 20 bajja kuba balima ebimera bino, ate nobungi bwa hekiteya ze nimiro obukadde 200, bujja kuba misiri gya bimera byembala) Wajja kweyongera nokugejja kwensibo ye bimera ebyembala ebipya ebISAAAnidde okumala ebyetaago byensi yona nokusingira ddala ensi ezikyaakula mu Asia, Latin America ne Africa.

Ebimera bino ebitono tono ebyembala bisuubidde okulabika Mugwe 2010 okutuuka nga 2015; Kasooli owe kika kya Smart Stax tm ow'omu USA ne Canada mu 2010 alina endyo munaana ezikola mu nkola ssatu, Bt brinjal (biringanya) mu Buyindi mu mwaaka gwe 2010, singa gavumenti yaayo ekkirizza; Omuceere (ogwakazibwaako erya zaabu) mu Fillippino mugwe 2012, Nekuddirira Bangladesh ne Buyindi ate oluvanyuma Indonesia ne Vietnam; Omuceere ogwembala ne Kasooli owekika kya phytase mu China mu myaaka 2 ku 3. Kasooli agumira ekyeeya mu USA mugwe 2012 ne mu 8 Africa eya maserengeta ge dungu Sahara mugwe 2017, Osanga ne kika ekya Nitrogen Use Efficiency (NUE); N'engaano ey'embala mu myaaka ettaano nokusingawo.

Okuva ku bbula lye mmere eryaaliwo mugwe 2008 (eryavaako obutabanguko munsu ezisuka 30 mu mawanga agaakyakula, nokuvunika gavumenti mu nsi biri-Haiti ne Madagascar) waliwo ensi yona okuteegera akabi akali mu bbula ly'emmere nobutebenkevu bwabantu. N'olwekyo wasitusewo okwenyumiriza mu byobufuzi nobuwanguzibwebimera byembala mu mawanga amagabi gobuyambi, bannakyewa, banna sayansi nabakulembeze bensi ezikyaakula.

Okutwaalira awamu wazzeewo endowooza empya nokutegeera omugaso gwo bulimi mu kukuuma obulamu munsu yona. Ekisinga enyo gw'emugaso gwo bulimi mu kuteekawo embeera enessimbu neye mireembe munsu yonna. Naddala wabaddewo omulanga okwongera ku bungi

## Ebikulu ebifa ku Mbeera y'Ebirime Ebyembala mu Busuubuzi Bwensi Yonna: 2009

bwe mmere erimwa mungeri esoboka okusobola okuba ne mmere emmala mu nkola zombi eza tekinologiya we birime, omukadde n'owembala.

Obuwanguzi bwa Norman Borlaug mu nkyuukakyuuka ssinziggu mu nima ye ngano kwesigama ku busobozi bwe, obumalirivu nokunywerera ku kintu ekimu- **ekyokulinyisa ekyengera kye ngano buli hekiteya**, era yatwaala obuvunanyizibwa bwona okusalawo oba awangudde, ob'alemeddwa ng'apima amakungula ku ddaala lye nimiro (so si ku kitebe ky'ebyokunonyereza), namakungula ku ddaala lyensi, nokusingira ddala napima nomugaso gwa kino ku kuleeta eddembe no buntu kusi. Obubaka bweyasoma ngasiima ekirabo ekyamuweebwa ekyo mudaali gwa Nobel peace nga 11 Dec 1970, emyaaka ana egiyisse yakiwa omutwe "Enkyuukakyuuka ye Kyengera ssinziggu, emirembe n'obuntu". Ekyewunyisa Borlaug kyeyalwanirira emyaaka 40 egiyise - **okwongera obungi mu biva mubirime**, kifanana n'ekigendererwa kyaffe kati okujjako nti okusoomooza kweyongedde nokusingawo olwokuba tulina naffe okwongera ebirimwa mu ngeri esoboka ngatukozesa ebintu byetulinawo, naddala amazzi, amafuta n'omukka gwa nitrogen wakati mu kusoomozebwa kwenkyukakyuka z'embeera yo budde empya. Engerisaanidde ate nga ya muwendo eyinza okujjukirwamu obulamu bwa Norman Borlaug obwenjawulo nomuwendo eja kuva ku bannansi abenyigidde mu birime ebyembala okwegatta mu kusoomozebwa okwomwanguka. Amambuka, amaserengeta, obuvanjoba nobugwanjoba nga bukwanagana nebitongole bye ggwanga n'ebyobwannanyini byona okwenyigira awamu mu mulimu ogwa waggulu nomuwendo okutumbula omugaso gwebimera ebyembala mukusitula omuwendo gwe bikungulwa mu birime nga tukozesa ebikozesebwa ebISAAAmussamu. Ekikulu omulamwa gube kukuyamba kukutaasa ku bwaavu, enjala nendya embi ngabwetwasuubiza mu bigendererwa bye myaaka olukumi egisooka (Millenium Development Goals) egituuka nga 2015 ate nekikwatagana ne myaaka kkumi eginaba giyiseewo okuva ebimera ebyembala bwebya sooka okuteekwa ku katale, 2006 okutuusa 2015.

**Ebigambo ebiwunzika bya Norman Borlaug ngamaze okutaasa akawumbi k'abantu enjala, ate nafuuka omuwolereza lukulwe owe bimera ebyembala olwo busobozi bwaabyo mukutumbula ku bungi bwe emmere eva, nokukendeeza ku bwaavu, enjala nendya embi no kuduukirira emirembe no buntu.** Borlaug yalombojja nti *"Mu myaaka kumi egiyise tulabye obuwanguzi bwa tekinologiya we bimera ebyembala. Tekinologiya ono ayamba Abalimi mu nsi yona okwongera ku makungula gaabwe, ng ate bwakendeeza ku nkozesa ye ddaggala erifuuyira ebiwuka nokutaasa ettaka. Emigaso nobulungi bwa biotechnologia byeyolese mu myaaka kkumi egiyise munsizi ezirina abantu abasoba mu kitundu kya bantu b'ensi yonna. Kyetweetaaga bwebuwumu bw'abakulembeze bensizi ezo abalimi gye batalina kyakola wabula okozesa enkola enkadde eze migaso emitono. Enkyuukakyuuka yebimera ssinziggu awamu ne tekinologiya we bimera biyamba okutuukiriza obwetaavu bwokuweza emmere ekungulwa ewera, ng'ate nobutonde bwensi bwebukuumwa kulwa baliddawo."*

Ebingi ku bino bifunika ku kiwandiiko 41 (embeera ye bimera ebyembala munsizi yona: 2009 bya Clive James. Bwooba oyagala amawulire amalala kyaalira omukutu, [http: www.isaaa.org](http://www.isaaa.org) oba tukirira ISAAA SEAsiaCenter, ISAAA AfriCenter ku ssimu + 63 49 53 67 21 6, +254 20 4223618 oba email ku [info@isaaa.org](mailto:info@isaaa.org), [africenter@isaaa.org](mailto:africenter@isaaa.org).