



agriculture, land reform
& rural development

Department:
Agriculture, Land Reform and Rural Development
REPUBLIC OF SOUTH AFRICA

ANGAI EDUHU BWO VE ETONGOTIO AMUGU HINYOMO ONO ELULUNG WATI HATAI

Abuk haromok (angejuk)



ADUHUIO MUGO NYOMO ONO ELULUNG

Ronnie Vernooy, Guy Bessette, Bhuwon Sthapit,
iko Angeline Dibilane, Nkat Lettie Maluleke, Lehlogonolo Abner Matelele,
Mpolokeng Mokoena, George Phora, Precious Sema iko Thabo Tjikana

ABUK

1

ono 3

**ANGAI EDUHU BWO VE ETONGOTIO AMUGU
HINYOMO ONO ELULUNG WATI HATAI
ABUK HAROMOK (ANGEJUK)**

**ABUK 1 ONO 3
ADUHUIO MUGO NYOMO
ONO ELULUNG**

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Bioversity International 2023

Oriahat **Bioversity International** iko **International Center for Tropical Agriculture** (Ehiji **Maji ono Bolo Ahide Romo (CIAT)**) ono atifiok ofyiro huno olwahi aati to arohojita huno oyami fau.

Ehanani Oriahat ongite housi iko osii ihiram romo iko angio ono oyuto. Egiama hohi imishi fau, amiji omoliha Africa ono owon elulungi wati South Sudan, Asia, Latin Amerika, Karibbean. Bwove aati hulo woni amat hosi, iko ebariti, iko elulung wati ene forani Civil Societies, edohuni Oriahat angejuhu herre iko oriahat hosi angide isi onyorani angiria, iko aloti ono won to angida oyami fau oduluo aigi, ete saman bwove ebara to awanan angiria ono oyuto, et etawij arohiji yami fau.

Oriahat aria ehaji ono CGIAR, arrie ahatifiak ofoiro romo ifau ono bolo to iko ilarak hosi omuk hulo iriria to amoi ono aromo ngiria ifau, isiarani egigelita hwetik hosi etawjere elocang wati fau. Atati etagol iko erirari awanan masak fau romo ngiria.

<https://alliancebioiversityciat.org/>

www.cgiar.org

ANGATI ONO AROMO, AMUR YANI IKO AHAM (DAFF) enyi atongotio afau miji Okuma ono South Sudan ono tongotio emanyite huto managat miji (ebarilman). Ati bebe jo emanyet ono angati 27 (1) (b) iko (2) Ekanita Miji ono South Sudan ono joto "...edoho emanyit ono oyoto iko ehuhumita huno owonito angida erumak abisan avwatan ahosire erumoneri angiara ono remek." Ehiji DAFF ara bebeb aromana yeji hwan iko awanan ngiara, inyi angetio DAFF, amaji ono otong to eram hanger, enafato, eisiorio iko enafatio ono etagolio, atunio masak hanger huno aromo ngiria. Ojingak etadejco egama huhumita manyeiti Amangat, bwove ekiota naeffitio, iko eramio here huno anger nyomo ngiria ROMO, esiarak ekoi ono angai etawaj arohojita angida elwuk eram romo ene ekiana Bioversity.

Abuk ana Ministry of Foreign Affairs ono Netherlands, eny alwahani eko **Nuffic**, eserani nyhu, (Orange Knowledge Programe).

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A HUMO

Abuk ana arra inyamani jo Elulung Wati Mugo Nyomo: igigilita iko egimita. Arra abuk ono olahio to, egoroni hunyi Ronnie Vernooy, Bhuwon Sthapit, iko Guy Bessette Hulo (Bioversity International). Abukhi huna hunihoi asari a buk ono igerri angida assa ono ati hulo owon jihosi erruk ono etadejo mugo nyomo iko atongotio amugo nyomo ono elulung wati.

Otto egima ana jo atiffia iko awonan egimita huno etadejio elulung mugo nyomo wati hulo olihieto angati ono aromu, ayyani, ati aham (DAFF) ono okuma ono South Africa. Isio hohio ahumo jo DAFF tihuhumona abuk ana, ani offoni adi aromok egimari ifau dang. Igigilita huno owonito dini arrie huno igoroni.

Hibeng ituhok abuk, ihuhumo hohoi obo igemit ihuna ifau ono Zimbabwe iko iyahani hunye bowve itacinga ati hulo irrohi igiemita iko Elulung Itadejo Ofiro (CTDT) iko igiema elulung wati aboitie imugo nyomo out ana jo Uzumba Maramba Pfungwe bowve Mudzi.

Isiarak hohoi a humo jo angowru iko aliwa haromok osirie huno ihuhumani to elulung mugo nyomo wati ifau. Ikiem hohoi itajingana ofirio iko igigilita igemita hosi, egoliti iko ayjiti angida ilowhiri elulung wati. Eduhiri iko ihuhumeri elulung mugo nyomo wati nya awak awtie onogol, motimoti iko adihan aria. Eyih hohoi a buk ana isarak aromok aria ojingani ilulung wati mugo nyomo.

Isirak hohoi a homu jo Sandra Garland te inyinyahoi a buk ana bowve jo Luca Pierotti te etalamanio buk.

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Bioversity International/R. Vernooy

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Bioversity International/R. Vernooy

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Bioversity International/R. Vernooy

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Bioversity International/R. Vernooy

ANGAI EDUHU BWO VE ETONGOTIO AMUGU HINYOMO ONO ELULUNG WATI HATAI

ASANG HUNO OWONI TO' DINI

- 

1
ABUK
ono 3

Aduhuio mugo nyomo ono elulung
- 

2
ABUK
ono 3

Erre firio huhumita
- 

3
ABUK
ono 3

Atongotio, egياما ilulung, egigilita iko ecungi atifotio hirre waraga

AGAGAR ONO IHUHUMONI ANGIDA ELULUNG WATI IGIEMARI ABUK ANA

1. ITAMIJANA

Abuk ana asarie hunihoi to wyio honyi angida itiyanak igiemarik iko elulung wati mugo nyomo: igigilio iko igiema (Vernooy et al. 2020). Abuhi hunia igironi bowve italamani ingida elulung wati mugo nyomo igiemarik iko hule awahi to saran awati lulung mugo nyomo. Abuk abotie ihanak ahu iko ongite jo aring inei awahi ati lulung mugo nyomo ifau ono Africa, Asia, ati Latin America.

Hibang igiemeri abuk elulungi wati mugo nyomo isiarak hohoi omuk igiemita angida itia idierita igiemary.

Icorit A: Eloyico tie kiana hutuk ono amiji nya iko aramihina imaji ono amiji nya

Angida imijak eloyico kinana iko aramihina imaji lulung koya elulungi huno igimato iko iyeye, angida idas erriam ine kinyye itahutak jo igiemita hunya hosirie jo amisihhi hu ta fau angida idihi isi insioni iko hunosi ofirio gigilita haromok.

Angida iyeye ilowon elemijak jo eloyico owon ilefi ani obo atulo olowon jihony ofirio huna amugo nyomo elulung wati angida iwon ilemijak igigilita iko ofirio huna igigilio eyeye huna hidre ifotuna. Aria omuk huno ogolie tie eloyico iko ikiotia huna atahujirie ikotia igiemarik issie olofaji jo imajitie misihie.

KUYA

Icorit B: Eloyico iko itaramihina ikana iko atangjo irijory (a 100% ibuk miji ono to ihani)

Ihidre bowve eloyit irrie huna igoroni ibuk tie ikana ono ikanarik at miji ono elulung kuya elulungi huno amaji nya, ihidre bowve itarotana etarijota itamijanra abuk aboite aboite iko iyalarita hosi jo elulung mugo nyomo ono owon to imiji hatie.

2. 2. EGEMARI ABUK HAMA KOYA IDUHU ANGATI ONO ETIYANAIO

Ehidre egemari abuk hama, iduhu itiyanio ihuhumio iko atongio mogu nyomo ono elulung wati.

Ile igigilio ihuhumio iko itiyanio atongotio amugo nyomo ono elulung wati, ihidr abuk ono Bioversity International ilowk.

Bo awahi aromok egemari abuk ijara otifitio ejek huna oyieji to huna:

- Itamijak abuk jo elulung wati hebeng iyya isierak abuhi.
- Ati ifuto itaringita hosi omujo abuhi jihosi, ania ofunik omuk errie huna arrie angjuhu ibuk.

3. IHUHUMA IKO IKOPAWONA BUHI

Ati eloyito ikiana iko itawnihino atuhnyi, oyyo bebe jo omuk eulungi angida omiji egirita:

- √ Ayiji girita ijara arrie ihuhuna egemarik ibuhi duri jara obengi asari huhuna negemarik imahatabi.
- √ Ejara ita bolori arjorita ijara ifut imaji waraga.
- √ Egemarie igirita huna bolouri to.
- √ Egemarie awaraga ono ogol to.
- √ Igirok abo arring angida isi icopawoni ibuk hubengi olohini igirio hirrie.

4. IFAHIO ITARANGITA JO BIOVERSITY INTERNATIONAL

Ifahu iyye obo arring kuya igigilita hun owoni to angidi itayjori abuk jo Bioversity International jo address: r.vernooy@cgiar.org

Ifita

Vernooy, R., Sthapit, B. Bessette, G. 2020. Community seed banks: concept and practice. Facilitator hand buk (updated version). Bioversity International, Rome, Italy. Available at: <https://hdl.handle.net/10568/81286>





ABUK 1

ADUHUIO MUGO
NYOMO ONO ELULUNG





OFIORO IGEMITA HUTO FAU AFRICA

Bangai nyi hohoi

Hohoi elululang arie hohoi aromok huna arie to ngowru jo amiji Gumbu imuduria ono Limpopo, onowon to South Africa, igire korie Zimbabwe. Ewon hohi ifau ono oyoho bowve alama jo ati ifahat okuma iko iluhiti hosi, iko ilojan bangan ikiotia huno iyarrito issuk.

Eyahatio bowve atongotio elulung mugo nyomo hohoi. Itunio hohoi inyomo huno idiongu hohi angida egemarie egemita hohoi. Itunio hphi inyomo huna afoul Babara, iko amuduro arie to oviti hosi, cowpeas, afoul, osirie, abatih, peas, asese, ima, iko agimia. Owon jihohoi inyomo ono ayani ono owon to ifau hohoi dini afure honyi Moringa. Elulung mugo nyomo hohoi owon ikko atuhaji ono bolu ina tunirik inyomo bowve atuhaji ono own igire huny ono beng alam bebe ono amiting, iko a fau ine isirak to jihohoi iromok nyomo angide idungo inyomo. Isatai jihohoi alwahio angati ono South Africa ono tungotio amat, amur yani, iko aham huna south Africa, ono itahujo to aromu ono owon to Limpopo, iko Bioversity International.



Ewak hohoi egema eraboite iko itai

Ewak hohoi eramana itai angyi iduk bowve elowak elulung mugo nyomo wati.

Amugo nyomo lulung wati inyi elulung ono amiji, asa egemita hunie eririo, ihuhumio, iko atubio nyomo huna odengoni aramok to mata hosi. Inyi atongotio elulung aramok angowru iko aliwa huna otongotie enyomo gagaga, abarak tolongi ihu elulung ono egema to iromo mat.

Egema egemita huna hunihoi huna:

- Atunana nyomo huno afau miji nya huno abengi to miji.
- Isarana aromok inyomo hun oyyjo, bowve owoni jo hulo awahi to enyanga inyomo ta agorisi huno orimihini.
- Egema huo amaji jo elulung haromok angide isi ikanarik errie huna itadiojorik elulung hosi angida olo ahosirie.

Owoni dini ikiotie angowan hunie ejifitaie angida itadiotori amugo nyomo lulung wati hatie.



Erit 1: Akimio ono mat huna olwji to iko amijana hosi

Osirie koie arie egemita honyi angowan: akimio ono alowji mat, isisyio ikiota hosi, amijio ihalo nyomo adioti huny iko itahutana mijana egemita iko adioti hosi.

AKIMIO MAT HUTO MAJI MANA

Ahiosirie ewak angida imijak arra baya iko ahorio amat imasik hohoi.

Angida egem nya asebu amaji to fau amitir 2x2 egemu apoloti angowan hohuna:

1. Amat huno isorie eromok ifuhir
2. Amat huno aromok ifuhire hu to leir
3. Amat huno ohisyne ihiji hangitek
4. Amat huno eromok imaji ono muta igire hangitek



MANY FARMERS
SMALL AREA

MANY FARMERS
LARGE AREA

LOST
DIVERSITY

Erit 1: Akimio ono mat huna olwji to iko amijana hosi

Egema sisio awie angwan huna (a plot angwon) olwak hohoi angide emijak allowji mat hohoi: kuya olowji amat kuya omotari, isongy imiji aboitie kuya isarahini, kuya owoni huno awahi aomon. A fonik etamytie plot ehiji ploti huna angwan angida imijak amat huna amoy abengi jo elulung miji nya. Itenya isaran essisy itamiyti (5).

Omuk elulungi egemarik apir biodiversity “biodiversity” ono owon to iko abilat angwan huno inowhi angida oyawni a ploti angwan. Diya owoni afaljari hulo omotari ihiji par angida aromok igonyni igoriety amat huno alitohin to lulung ihu inyomoti osiri albeng to.

Edidas egemit inyak jo amat huno owoni to jo elulung angida imijak anani omyi iko nyo omie inye. Angai irumak enyomoti ono moi to.



Sorghum
Polystium
Lebelebele

Mungbean
Lethodi

Flour
Ronde

MAIZE
MMIDI
WHITE

MAIZE
MMIDI
YELLOW

CALABASH
LERAKA

Cowpea
Dinawa

Watermelon
Mooapu o
Sefinawa

Amaranthus
hepe

CHOCOBELLS
THELELE

PUMPKIN
MADHOTS!

BEANS
WA

MELON
LEROTSE

MURINGA

Groundnuts
Matakombane

SWEET
SORGHUM
NTSHE

Bambara
Ditloo

Cleome
gyrandra
Leratho

Melon
Lerawane

Wild cucumber
phare

Phafane
Calabash

Modutwane
Calabash

MINO
CROP

15-20 YEARS AGO

NOW

JERICHO
NORTH-WEST
PROVINCE

Erit 1: Akimio ono mat huna olwji to iko amijana hosi

ATE ETUBAK OVIRO CELL HUNA ANGWAN EFU EKOI ETEFA

Egema ania etahutak hohoi amat iko elulungi mat huna aletohene to angasi berian iko anyo oletohene esi.

Jo omuk amasik biodiversity oto miji eloiet olongetek iko afau maji nya. Owoni ta omuk amat koya elulung mat huno aletohene.

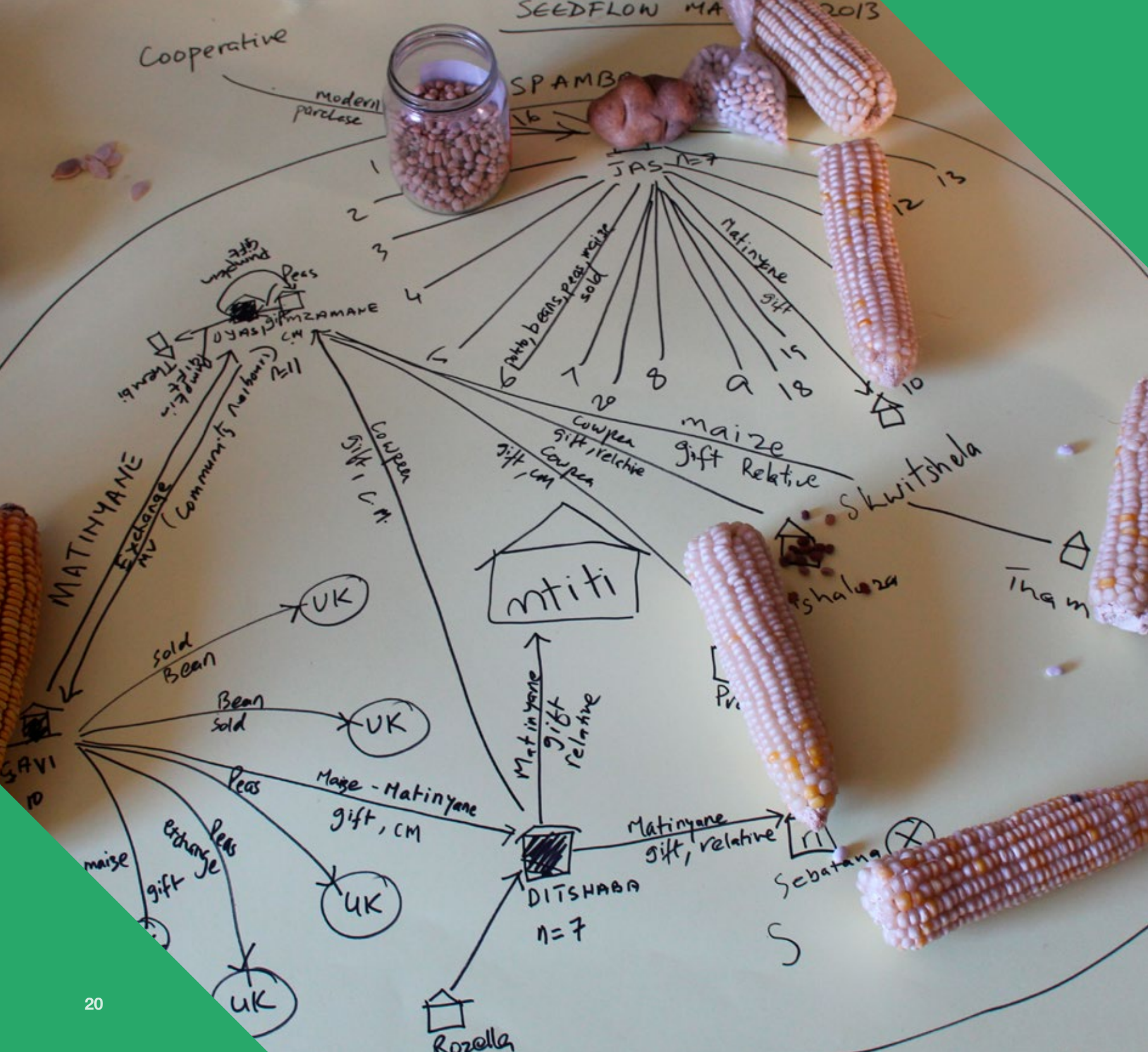
Ehu hohoi eheder emi esor amat elulung wati jo angasi 5 iko huno angasi 10 ete johuno jo angasi 10. Emi angasi hunihoi huna oluk hohoi emejaneri ikoi. Erieti arai ehuna:

- Ahosere ehuhumak amat huno esori to.
- Eromu berian ehua angasi 10 eko 20 ete mejana ikoi obeng eloit, acuhono afua, afutan ahide.
- Etahutak ahode hode egegleta huno emejanari ikoi.

Cooperative

modern
parlese

SPAMBA



Erit 1: Akimio ono mat huna olwji to iko amijana hosi

ATEFUTO AMIJO BEBE IKOI ESOR NYOMU

Ehunia hoh emijak alor egemak emaji nyomu hohoi iko angai enosie jo aromuk, etahutak egemeta hosi, iko awta sore hosi, owtie onoyo, obeng owtie ono roho angida elowak esor nyomu hohoi.

Awhan enyi etahutak angai onyemoni aromuk, avayo, atunio, iko atobu nyomu ta onegetek, iko aja, ikon gai, iko angai egemai esi eko omuk imaji nyomu. Awhan enyi emuhok egoleti huno adahai to iko atonio bo ve egemari nyomu jo ongetek huna anagida esi oyjorik iko atulo oromak ayje huny.



Erit 1: Akimio ono mat huna olwji to iko amijana hosi

AKAFIO MEJANA ELULUNG WATI

Akimio alufajak mat iko atefia kotia etaleyehi ewojeti etungo ono ahana iko eloieti huno amat iko aromu bioversity ono owon to elulung. Atungoteo egemite hunia asa huo esarana angeda elulung wati omijani bebe ayeje ono atunio nyomu iko esorio bioversity ono owon to imiji.

Amijuta aromuk jo amasik omuk angede etiyano jo overio hosi oyo. Amijuta hunia ofunik akafio mejana lulung wati.



Eriet 2: Avatan ehuhumio elulung mugu nyomu

Ate emijak akafeio alor, omuk aromuk elulung wati eheder leten ahosere eserana elulung errok angeda erroka aduhuna mugu nyomu. Ehuo jo Gumbo ehuhumak hohoi a meeteng iko aromuk aria, ebenge hohoi eserak esi efeio ebirio. Aromuk owotai ono ogol erruk neram ono aduhunia elulung mugu nyomu.

Elokoi ehedre nyaranio jo ehuhumak huto liet iko kala huto miji angeda omejia bo ve oluahoi.



Eriet 2: Avatan ehuhumio elulung mugu nyomu

Eriet ono toto enyi avatan jo amaji ono eduhurek elulung mugu nyomu. Owoni erre huno awahi hubeng eju egem:

- Monyi fau iko egema hunyi ehuna
- Awonan hode hode maji angede elulung egemarek
- Awanan atulomere adaharik
- Awanan arrie
- Awanan adukan ono angria to olong gema iko olong egem
- Awanan atlu olu mijak egemeta eromuk.



Eriet 3: Etahuyo bo ve ehuhumio aramok iko eduho elulung mugu nyomu

Tolongi ehuhumita ono oluwk eduhuna elulung mugu enyomu awak aluwchio ono elulung ejara owon. Ejara amuno ono egema owon jo aromuk to ehuhumio on elulung mugu nyomu.

Etua hang Gumbu, elongo hohoi ati emeting angeda etafudie angai ehuhumio ono elulung mugu nyomu, jo ameting nya ejara angoru owni iko aliewa, monyemiji iko honyemiji bo ve amarowk aromuk etongoi angati koya alamarie to maji meting angeda esi etanengni ekeneta iko egegelita bo ve ofnihini hunosi deya jo erram ene erruhi atie egemarik.



Eriet 4: Ehuhumio etahujo tiyenio

Etahuio tiyenio jo anyemo, etalieborio iko aloyo, atounio bo ve egoronia ono enyomu oluwak angeda ekana iko agalatani olo aromuk iko aromu deya angeda oluwak ehuhumio eteyenio ekaiejo.

Omuk elulungi mugu nyomu olahie aromuk asukul elulung angede esarani etahujo tiyenio iko elemu angai ohorio iko afunio nyomu ta ikoi ono oyo.

Tobo ngati oyo ta ameijana elulung huno omutare to amunohosi iko overio aromuk huo olo owon jehusi erruk ono amaji mat iko amat huno olufaji, ahurrio nyomu ta afure omuk ono elulung mugu nyomu, iko afunio hosi.



Esosumana

Jo a buk ana engahei hohoi jeheya erieti angwan huno eduheri elulung mugu nyomu.

Erit 1: Akimio ono mat huna olwji to iko amijana hosi nya on nowon deya egemita angowan:

- Akimio amat miji huno aloufji to angeda omijani angai abolori iko ahorio ono amat anagai biodiversity eloyco to ongetek iko afau ono amaji nya.
- Ahanio ekoi tefiat enyranio emejanarie angai eloico biodiversity ongetek iko afau maiji.
- Ameju jo etongo ono enyomu enye amecana egemak iko etongo hosi ehu atunio iko atabio ono enyomu.
- Akafio mejana ono etasarahina mejana

Eriet 2: Avatan ehuhumio elulung mugu nyomu obeng owon deya ehanio ejai owon deya ekana iko ehuhumio hu to leyat iko gala hu to miji angeda olwahi iko onyomoni amaje.

Eriet 3: Etahuyo bo ve ehuhumio aramok iko eduho elulung mugu nyomu

Eriet 4: Ehuhumio etahujo tiyenio

Enye ara esidi ono buk hohoi osere on etadet bo ve ehuhum elulung mugu nyomu.

Ehunia efu jo abuk arehai ono Erre firio huhumita.

Ehunia efu jo abuk arehai!

Egiorok

Ronnie Vernooy. Bioversity autofau dang, Wageningen, the Netherlands.

Ojing Ronnie Bioversity autofau dan, iyafa Lolong, 2011. Egem efleta huno eyalarie jo ekoi entuniari angide odulorie fur egemarie aromo bioversity angasi huno akalihini 25 emisih ehuo Bhutan, China, Cuba, Honduras, Mongolia, Nepal, Nicaragua, South Africa, iko Vietnam. Egema hunyie obesak nya jo emanyite iko efahita etuhonieri arohjeta to hangir mata iko adulori hosi egemarie, dang ex situ, iko situ.

Guy Bessette. Ara olomijak hire, Jatineau, Quevec, Canada.

Igiana nya Guy itaboriele efolo, iko ettiyenio ono elulung, iko amat fau, iko attogotiere amat fau huto Africa iko angati oto wor iko edwongi holong ono asia. Ihuania oluahio aluajita huno Biodiversity afau dang egemita hun iyalarai to jio ettubit hinyomo.

Bhuwon Sthapit (alabeng buo eyiuna)

Bhuwon inyi etaboroni yani ojingak biodverstiy afau dang jio enga 1997 ihuo attunani hanger ono Situ olo mijak tunio situ, ahosiere itongo nya malaisia, tai india, many oyeri iyafa ono ofilhima 2017, Nepal. Atifia honyi ono bolo to ta awahan jio ekotia igiamari illulung ongida okiem iko igiemiere aromo biodiversity, igiamari illulung itabisiere mat Situ iko ittongotiere afuheri, attongotio elulung ono to biodiversity, iko elulung mugu hinyomo.

Mabjang Angeline Dibilane, Dipl (Animal Science), BTech (Attongotio mata), ahouti olo otongotio to erre sayo ono angiria onotuto tolet iko ono olotto ilet to angati ono ottongotio to aiji mata ayyani iko aham, afau ono omoliha otto wor (Republic of South Africa).

Nkat Lettie Maluleke, BSc (Batony), inyi elettok olo eduduhani yani ingati imiri ono amaji hanger yani, afau hohoi omoliha oto wor (Republic of South Africa) ottongotio inyi egigilo iko eduduhuna anger yanio huno amat huto ngiria iko aromo hun owoni to imasik iromiti dang.

Lehlogonolo Abner Matelele, BSc Agric aromo (soil science), Msc Aromo (Soil Science) Msc Aromo (Crop Science) ara atulo olomijak attongotio ono adiongio jio situ ono etaliborio ingati ono anger mat jio angati ono aromo, ayani iko aham, ifau omoliha oto wor (Republic of South Africa).

Mpolokeng Lydia Mokoena, BSc aromo (Crop Science) Hons. Aromo Msc Aromo (Crop Science). Inyi atulo Olomijak to attongotion amat hanger yani imugu hanger huno amat ingati ono aromok, ayani iko aham afau ono omoliha oto wor (Republic of South Africa).

George Phora, Matric., erra atulo oforo ono anhero ono amat, hire angati ono Arumu, Ayani eko Aham, ono Amiji South Africa.

Ramadimetja Precious Sema, BSc (Botany iko Biochemistry), BSC Hons. (Botany), arra atulo oforo olo tungotu situ conversation ono anger here, Amejani olo angati ono Arumu, Aani, iko Aha mono Amiji South Africa.

Thabo Tjikana, MSc atongotio iko aduloro igiam ono anger yani (conservation iko sustainable), itterio egijama ifau ono omoliho otto wor imugu hanger yani huno ohuruni, ellettok ahuroni inyi ihuania Curator jio angati to.

Abuk ana igorie to Otuho by **Mr. Adam Cholong Ohiri**, Dean of Students Affairs, University of Juba, Juba P. O. Box82 Republic of South Sudan.

Eliot abuk ana to ekana on Otuho ehuhumanio toalowhio ono **Prof. Dr. Salah Khatir Jubarah**, Dean, College of Natural Resources and Environmental Studies, University of Juba, Juba P. O. Box82 Republic of South Sudan.



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