

→ Direction Encadrement & Formation

UBUMENYI-NGANDURAMBAGA

MU

MASHYIRAHAMWE

Byanditswe
na
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Rubengera

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Ijambo ry'ibanze

Nandika iki gitabo, nali mfite igitekerezo cyo gufasha abantu biyemeje cyangwa se baziyezeza gukorera hamwe mu mashyirahamwe.

Nagerageje rero gukora ubushakashatsi, ugenza utorakanya ibitekerezo bitandukanye byashobora kubafasha mu kubungabunga ubuzima bw'amashyirahamwe yabo no kugandura abayagize kugirango bashobore kwita imilimo bashinzwe.

Muri iki gitabo, habonekamo amagambo y'amahungano ataboneka mu rutonde rw'amagambo y'ikinyarwanda; ibyo bikaba byaratweye n'uko bimwe mu byo nandits bafite amagambo y'umwikaiko ataboneka mu urwo rutor. Ikindi kandi nagiyeye ugashyamba amahungano y'imibare kubera ko bifasha cyane umugandurambaga mu gupima ibimufasha mu muryango we.

Amahungano n'amahame byerekanye n'ubudohoke n'umuhati mu ishyirahamwe ni ibihungano byanywe bwite washoboye kugeraho kashize igihe nkora ubushakashatsi mu milimo rusange. Horamutse habaye gukura n'abandi bagize icyo babishakashakaho, byaba ari ibigwiye.

Ibyo nanditse muri ubu bukenyeye ugandurambaga utabwo bihagije kuko inzira ari udende. Byerekanye no kugandurambaga ni byinshi cyane ku buryo kwandikwa ibitabo bitagira ingano. Nanditse rero biko kandi byoroshye abashobora kwifashisha, bikabaho inzira bakulikira babaz ibikorwa byabo kandi bakagandura abanyamuryango.

"Ubumenyi buhanitse cyane birenze urugero bwaba bumaliye iki rubanda mu gihe butumwaka ngo bushe re gukoresha mu gutura amajyambere!...Ubumenyi bushimishije ni ubudakomeye cyane ku buryo bushobora kugirira akamaro ikirwaza muntu kandi utabura bworoshye cyane ku buryo utakamaro bwaba bufite."

Imana ibafashe.

Hubert BIGARUKA.

INTANGILIRO

Twese tuzi ko abantu bakora umulimo kugirango bashobore kubaho. Udatora wese kandi abishoboye ntaba akwiliye no kulya. Hali ubwo rero ubona abantu biyemeje gushyira hamwe ingufu zabo kugirango bagere ku kintu kigaragara mu milimo bakora. Nyamara aliko si ko bose babyitabira, hahiko abahitamo kuba banyamwigendaho, ndetse n'iyi milimo bakora ku giti cyabo ntibayitabire ku bulyo bushimishije.

Ku biyemeje gukorera hamwe, limwe ualimwe, hali igihe usanga badohoka ku ntego yabo, bityo amashyirahamwe bashinze agasenyuka. Ibyo bikaba biterwa ahanini no kutamenya ubulyo bwo kubungabunga ubuzima bw'ayo mashyirahamwe; ndetse n'abayobozi bayo ntibamenye uko bagandura abanyamulyango.

Muli iki gitabo rero hakubiyemo inyigisho umuntu yakwifashisha aboneza ubuzima bw'ishyirahamwe kandi agandura n'ababigize ali byo mise UBUMENYE-NGANDURAMBAGA.

Mbere na mbere, reka tubanze dukugutirwe ku byerekeye ubufatanye.

Ubufatanye ni iki?

Iyo baruze gufatanya umuntu yumva "gukorera hamwe umulimo uyu n'uyu". Ibyo bigatuma imbaraga ziba nyinshi, umulimo ugakorwa neza kandi vuba. Ijamba ubufatanye likaba lyarakomotse kuli icyo nshinga.

Aho igitekerezo cyo gufatanya cyaturutse.

Igitekerezo cy'ubufatanye cyahozeho kuva kera cyane. Baca umugani mu kinyarwanda ngo "nta mugabo umwe". Iyo umuntu yabonyaga hali umulimo umuremeraye, yarebaga uwo yakwisunga, akawumufasha. Na n'ubu rero akaba ari ko bikomeze. Ntawavuye ngo alihagije, buho gihe dukenera abandi. Hitya no hiko ku isi, abantu bose barakenerana.

Iwacu mu Rwanda, ubufatanye ni ikintu kiranga abanyarwanda. Ba sogokuraza bacu bitabiraga gufatanya cyane bakulikije igihe cyabo. Ibyo byabaye akarande, na n'ubu turacyabagenderaho, tugahura imbaraga zacu dushaka kugera ku ntego iyi n'iyi.

Ni banyewe bishyira hamwe?

Abantu abo ari bo bose bashobora kwishyira hamwe, baba bakoze cyangwa se benshi, ibyo biterwa n'imigambi yabo cyangwa se n'umubare w'abiyemeje kubikora. Abishyira hamwe kandi bashobora kuba ari ibitsina byombi, badakomoka hamwe, batali mu kigero kimwe, badakuye ibara, batajijutse kimwe, abakire n'abakehe... Nyamara aliko kandi icyo abashyira hamwe kwibumbira hamwe ari abafite ibyo bahuriyeho byinshi biroroha kurushaho kuko baba bavuye rumwe, baziranye se, ntihagire uwishyira undi n'ibindi...

Kuki abantu bishyira hamwe?

Abantu bishyira hamwe bafite intego bakulikiye. Iyo intego igomba kuba rusange kugirango ubwo bufatanye budahungabana. Intego y'ibanze akaba ari ugushyira hamwe imbaraga n'ibitekerezo kugirango umulimo uyu n'uyu ushobore gutungana.

Hari ubwo rero abiyemeje gufatanya bahitamo icyo bagomba kugera ho bakora imilimo itandukanye, nko gucuruza, guhingira hamwe, kubaza, ubukolikoli, kwubaka amazu n'ibindi n'ibindi.

Ubwo bufatanye bukorwa bute?

Kugirango abantu bashobore kwishyira hamwe ni uko babanza bakajya inama. Iyo bamaze kujya inama yo gufatanya, bagomba gushyiraho amategeto abagenga n'abayobozi babo baboneza ibikorwa n'imikorere by'ishyirahamwe. Akenyshi, amashyira hamwe ahuramira kuzamura abanyamulyango bayo, akaba afite ubuzima gatozi, bayita "koperative".

Ibyo bya za koperative byatangiliye mu Burayi. Hagati ya 1700 na 1800, abacuruzi b'abanyenganda bakandamizaga rubanda nyamwinski, abantu bamerewe nabi kubera ko bahembwaga amafaranga make. Ni bwo rero abatwizi bamwe batangiye kwishyira hamwe, bashinga za koperative. Byatangiliye muri Ecosse muri 1761. Naho mu murwa wa Rochdale mu gihugu cy'Ubwongereza, abatwizi 28 bishyira hamwe ku italiki ya 11.04.1844 bashinga "Koperative". Ibyo byatumye bashobora kulinira hamwe imilimo yabo no kurwanya izamuka y'ibiciro. Twavuye ku icyo "Koperative" ari yo nyina w'ayandi yose yabayeho kugeza ubu.

Iyo koperative yakomeje kugenda neza udetse ishyiraho amategeto n'inzego byayo ari nabyo koperative zose zigenderaho kugeza amagingo aya.

Ayo mategeto ni ayaha?

Ubundi ayo mategeto agaragaramo ibice bibili by'ingenzi. Hari amategeto aya bita rusange kubera yuko akurikwaho na koperative hafi zose; hakaba n'andi atatu bita ay'inyongera.

Amategeto rusange.

1. Urugi rwa koperative rukora rukinguye. Buri wese ashobora kujya mu muryango utagatwe.
2. Abanyamulyango bose bararushya. Buri muntu agira ijwi limwe.
3. Iyo hari amafaranga y'isaga, agomba kugarukira abanyamulyango.
4. Ku mafaranga y'umusanzu, hagomba kubaho inyungu utoya.

Amategeto y'inyongera.

1. Muri koperative, birabujijwe kurobanura abantu bishingiye kuri politiki, ubwoko cyangwa amadini.
2. Nta gutanga imyenda, umuntu agomba kwishyuriraho. (*)
3. Kwigisha abanyamulyango

(*) Ili tegeto ryaje guhinduka. Muri koperative rero bashobora umwenda, umwenda agasezerana italiki azawishyuriraho.

Izo nzeho ni izihe!

Muli rusange Koperative igizwe n'inzego eshatu z'ingenzi.

1. Inama rusange

Inama rusange ni rwo rwego rwo hejuru rutegeta izindi zose. Igizwe n'abanyamulyango bose, akaba ari yo ishingira ubutegetsi, itababura.

2. Inama y'ubutegetsi

Iyo nama igizwe nibura n'abantu batatu. Ni bo bitwaga Abanyama. Batorwa mu ibanga n'abanyamulyango kandi bakava muri bo. Iyo bamaze gutorwa, bitorwamo abagize ibiro by'inama.

3. Abagenzuzi b'imali.

Abagenzuzi b'imali bashyirwaho n'Inama rusange. Bagenzura imali y'umulyango, basuzuma ibitabo byawo, isanduku n'ibindi byose uwo mulyango utunze.

Abiyemeje gufatanya rero bagomba gukora inama mbere na mbere, bakigira hamwe icyo bagamije, bagashyiraho izina ry'umulyango wabo, bagashyiraho amategeko awugenga n'andi bita aya umwihariye, bakagaragaza ikishishikajwe ari na cyo gituma "iteganyacyerekezo" itegurwa neza, bakagaragaza ibyifuzo ku byerekeye ibizatorwa bityo umulimo w'iteganyabikorwa ukazashobora gutorwa. Tumenye kandi ko abategura iteganyabikorwa bagaragaza n'inzira-nyobozi ituma ibikorwa mu ishyirahamwe bitungana. Bagenda neza imiterere n'imikorere by'umulyango.

Iyatonderwa:

Hari amoko abiri y'amashyirahamwe:

- 1) Ishyirahamwe lizanira abanyamulyango inyungu. Iyo lifite ubuzima gatozi, banyita Koperative.
- 2) Ishyirahamwe lidahamwira inyungu. Mwene aya mashyirahamwe akora umulimo itazana inyungu. Ni ukuvuye ko abanyamulyango bashobora gutanga umusanzu ariko ntabwo inyungu baka umulyango. Akunda gushyirwa n'abagira neza bashishikajwe n'imibereho myiza y'abaturage; barwanya ubujiji, ubukene, indwara n'ibindi.

Mu byerekeye kugandura imbaga, turabona umugandurambaga icyo ari cyo, ari nawe ushinze uwo mulimo, turebe ubumenyi bw'ibanze agomba kuba afite, hanyuma aderekana uko biga ubudohote bw'abanyamulyango mu umuhati w'ishyirahamwe, ngaragaze uko hakorwa icyo nise "ubonezamuhati" ituma umuhati w'ishyirahamwe wiyongera bityo likagira icyo ligeraho kuko ingufu ziba zibaye nyinshi; ubu buumenyi na bu bufitiye akamwo cyane umugandurambaga mu gutunganya umulimo we.

Mu mugereka, hariho imbonerahamwe yifashishwa mu byerekeye "akitwagizacyo" n'ibindi bisobanura ku makintetegeto n'amahamwe.

IGIKA CYA MBERE

UKUBUNGABUNGA

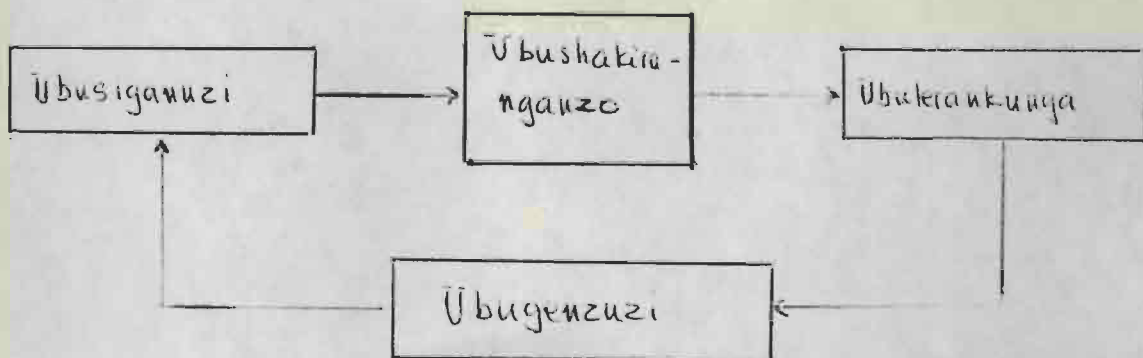
UBUZIMA

BW'

ISHYIRAHAMWE

Ubuzima bw'ishyirahamwe bushobora kuba bwiza cyangwa bubi bitewe n'abanyamuryango. Nyamara mu gihe abantu biyemeje gushyira ishyirahamwe, baba banifuza ko icyatuma litungana, likagira ubuzima buzira umuze.

Hari ibintu bibili by'ingenzi bikorwa kugirango litungane: Iteganyacyerekezo n'iteganyabikorwa. Mu itegura icyo, bifashisha urwungano rukulikira:



Umulimo w'ubusiganuzi ni uwo gukoranya ibitekerezo, ibyifuzo n'ibibazo by'abanyamuryango n'ibindi byose byifashishwa mu kubwira ubuzima bw'ishyirahamwe.

Umulimo w'ubushakiranganzo ni uwo kwiga uburyo bwo kubungabunga ubuzima bw'ishyirahamwe.

Umulimo w'ubutekankunga ni uwo ^{gushyira} ~~gushyira~~ mu bikorwa byagaragajwe n'ubushakiranganzo.

Umulimo w'ubugenzuzi ni uwo kugenzura ako ubuzima bw'ishyirahamwe buteye no gukora raporo ishyikilizwa na umu ubushakiranganzo.

Kugirango imilimo ikorerwa mu ishyirahamwe itungane, hakorwa igenwa by'imilimo n'ihura icyo.

ITEGANYACYEREKEZO

Iyo ishyirahamwe limaze kuruka, abaligize bagomba kuliha "icyerekezo". Icyo gihe, limenya aho icyerekeza ibikorwa byalyo. Hategurwa iteganyacyerekezo, bigakorwa n' itsinda ry'abantu batari benshi (abagize inama y'ubutegetsi n'abakozi bakuru b'ishyirahamwe) bahereye ku byifuzo byatanze n' inama rusange.

Kugirango bashobore kutegurwa neza, bahera ku cyo bita "ishishikaza" y'ishyirahamwe. Icyo kilishishikaje ku cyo kigena ibigomba kulikorerwamo; ni yo mpamvu iteganyacyerekezo libanziriza iteganyabikorwa.

Bahereye mu gihe balimo, bateganya uko ishyirahamwe lishobora kuzaba limeze mu gihe kiki imbere; bakaba bafite imboho nbanza.

Ikiundi tugomba kumenya ni uko ishyirahamwe lishobora guhindura ishishikaza yalyo bitewe nuko ari byo libona byaligilira akamaro. Buri gihe ligira ishishikazimwe gusa kugirango iteganyacyerekezo lishobore gutegurwa ku buryo bufututse.

Iyo imaze gutegurwa, litangalizwa abanyamuryango kandi likewerwa na bo hakurikijwe ubwiganze bw'amajwi. Iyongera kuba iyumvikana, ntilibemo kuzimira mu magambo, ahubwo hagakore-shwa imvugo yoroshye ku buryo abanyamuryango bumva banyibuka buri gihe. Iyo bimeze bityo, ibikorwa byose muri icyo, babikora bubahiriza cyacyerekezo.

Nyamara ariko abayobozi balyo bashobora kugira ingingo zimwe na zimwe zikubiye muri icyo teganyacyerekezo bihahira, ntibazitangaze kubera ko yenda byatuma habaho incitizi zaturuka ku banyamuryango amaze amwe n'amwe).

Mu gihe ishyirahamwe lifite amashuri, buri shuri lishobora kwigilira amaze yalyo ariko mu kuyahitamo litita ku cyerekezo cy'ishyirahamwe icyose.

Iteganyacyerekezo lifitanye isano n'ibikorwa. Imbonerahamwe ikurikira iretana icyo sano n'uko dushobora kuyihahira kugira icyo turugira ku buzima bw'ishyirahamwe. Hafi menshi mu mashyirahamwe yagiye asenyuka cyangwa se acumbagira utagire icyo ageraho kigaragara kubera ko atashoboye kuboneza ibi bintu uko ari bibili. Kimwe na kimwe ugashyiraho abanyamuryango batari icyo berekeza umuryango wabo, bagakora ibyo babonye byose ndetse ntibashobore no gutunganya ibikorwa byabo. Umuryango ukabaho ku izina gusa, utagire aho ugera kandi utagire n'icyo ugeraho.

IGIHE CYASHIYE	ISANO	IGIHE KIZAZA
Ishyirahamwe lyararumbutse.	Iteganyacyerekezo lifututse n'ibikorwa biboneye	Ishyirahamwe lizakomeza lirumbuka.
Ishyirahamwe lyararumbutse.	Iteganyacyerekezo lidafututse n'ibikorwa biboneye	Hali ugushidikanya ko lizakomeza kurumbuka.
Ishyirahamwe lyarumbutse mu gihe gito	Iteganyacyerekezo lifututse n'ibikorwa bitaboneye	Nta byilingiro ko lizarumbuka
Ishyirahamwe utiyigeze lirumbuka	Iteganyacyerekezo lidafututse n'ibikorwa bitaboneye	Ntiliteze no kurumbuka.

Nk'uko bigaragara kuli iyi mbonerahamwe ili haruguru, iteganyacyerekezo lifututse n'ibikorwa biboneye bituma ishyirahamwe lirumbuka haba mu gihe cyashize no mu gihe kizaza. Ubwo rero liba lifite ubuzima buzira umuze. Abashinze kubitegura ni byo bibandaho; bakagerageza kugaragaza ibya ugombwa byose bikenewe mu kwumvikanisha icyerekezo cy'ishyirahamwe n'uko ibikorwa byatungana.

Naho icyo iteganyacyerekezo lidafututse n'ibikorwa ntabwo biboneye, ishyirahamwe ntacyo lishobora kugeraho. Ndetse ligera ubwo lisenyuka.

Mu gihe iteganyacyerekezo lifututse aho ibikorwa byo bitaboneye nta byilingiro ko hali icyo icyo ishyirahamwe lizageraho nubwo lyaba lyaragize icyo ligeraho ku buryo bugufi mu gihe cyashize. Icyo iteganyacyerekezo lidafututse aho ibikorwa byo biboneye, hali ugushidikanya ko lyazagira icyo ligeraho mu gihe kizaza; cyakora lishobora kuba lyararumbutse mu gihe cyashize.

~~Multi make:~~

~~Multi make:~~

Ubuzima bwiza bw'ishyirahamwe = iteganyacyerekezo lifututse n'ibikorwa biboneye.

Mu itegura icyo iteganyacyerekezo, abashinze bagomba kwita cyane ku ushushitaza n'itego mbanza by'ishyirahamwe. Bakerekana amageza yakoresheye kugirango lizagere ku cyo bifuza ko lyaba cyo.

Mu gihe ushushitaza ibaye umusaruro.

Bashobora kugaragaza uburyo umusaruro waziyongera kugirango bashakaze amasoko bagemurira. Ndetse bagashakira n'andi masoko mu gihe wa umusaruro wiyongereye cyane. Nubwo aho bitari byongera umusaruro, ntabwo bagabwira no gutakaza ku bwiza (agashyamba) kugirango bashakira amasoko bagemurira.

Mu gihe ishushikaza ibaye ibintu ukenerwa

Habaho kwerekana uko ishyirahamwe lyazagira ubushobozi bwo gushimisha abaguzi libabonera ibyo bakeneye bigenda bihinduka bitewe n'igihe. Basesengura bu gihe ibintu ukenerwa, bagashaka n'amasoko mashya. Beretana uburyo ishyirahamwe lyazatega imbere ibikorwa byabyo n'uko lyagira ibintu bishyashya kandi byiza bikenerwa n'abaguzi balyo.

Tumenye ko abaguzi bashobora gushyirwa mu byiciro bitandukanye hakurikijwe :- ikigero mu myaka, ubutunzi bafite, igitsina cyabo, umulimo bakora, akanere batuyemo, kuba balize cyangwa se batalize, ukomoko yabo n'ibindi...

Iyo ishushikaza ibaye ubumenyi n'ubukolikoli.

Mu gihe ishushikaza ibaye ubumenyi n'ubukolikoli bitanga ubushobozi bwo gukora ibintu ibi n'ibi bikenerwa n'abaguzi, bagaragaza uburyo ubwo bumenyi n'ubukolikoli byazatera imbere kumushaho. Ubwo rero ibyo bintu bikorwa bigenda bihinduka bitewe n'uko ubwo bumenyi n'ubukolikoli bitera imbere.

Hagaragazwa uburyo hakorwa byinshi biturutsa mu bushakashatsi bw'ishyirahamwe. Lihararira bu gihe guteza imbere ubushakashatsi bukorwa ubumenyi n'ubukolikoli byabyo.

Tumenye kandi ko ibikorwa muri icyo bigenwa n'ubushobozi lifite mu bumenyi n'ubukolikoli, utabwo ibintu ukenerwa ari byo bigenye ubumenyi n'ubukolikoli.

Izi ngero uko ari eshatu zirekane neza ko ari ngombwa guhera ku gishushikaye ishyirahamwe mu gutegura iteganyacyerekezo.

Mu gihe ishyirahamwe lidafite abanyamuryango bafite ku buryo abagize inama y'ubutegetsi n'abakozi balyo batashobora kumutegura, ni byiza kandi ni ngombwa kwifashisha impuguke, zikabyiga ku buryo bumunsoye.

ibishobora gushushikaza ishyirahamwe ni byinshi, inama rusange ni yo ibitamo ishushikaza yabyo.

Iyo abanyamuryango bashatse gutatanyaza ishushikaza byinshi, hafi ubwo ishyirahamwe litagira intego uumwe ligeraho.

Utabwo rero ari byiza kugira akajagali k'ibikorwa kuko bituma utanga na kimwe gitungana.

Mu byukuri rero, turabona ko iteganyacyerekezo ari ngombwa mu kuboneza ubuzima bw'ishyirahamwe. Abanyamuryango batavuye yaho basa n'abasare baki mu bwato utanga ngashya.

Abategura babikorana ubwenge n'ubwitunze kuko icyo bakubute bishobora gutuma umuryango ugwa mu cyobo utaziranyemo. Bibuka kandi guhera ku ishushikaza n'itego ubanza byawo kugirango utazahaba.

Iyo bishobotse, abategura bifashisha impuguke zabizobereyemo n'ubwo na bo ubwabo baba bafite. Baca umugani ngo "utazi ubwenge, ashima ubwe" kandi ngo "uta bwenge bw'umwe". Kugisha abandi inama utabwo ari byiye mu gihe ubizaye, cyane cyane icyo uzi ko hafi ibyo ubateze ko byakugirira akamaro.

ITEGANYABIKORWA

Ukiyako twigeze kubivugaga haruguru, iteganyabikorwa liteganywa likulikiye iteganyacyerekeze kugirango ibizakorwa byose mu ishyirahamwe bitazanyuranywe n'icyerekezo cyabyo. Hateganywa ibishobora guhitwa bishyirwa mu bikorwa ubibikundi bishobora gukorwa hashire igihe (imishinga).

Hakorwa rero inyandiko igaragaza ibyo bikorwa ku bulyo bwumvikana; bikaba bishingiye ku nshishikaza y'ishyirahamwe. Muri icyo teganywa, abashinzwe kulikira bibaza ibibazo bitukirira: Iki? Kuki? Bite? Nde? Ryari? Bingaho? Mu kubisubiza, bakora inyandiko igizwe urubice bine:

1. Isobanura rusange

- Basobanura mu bulyo bwumvikana igikorwa. Bakagaragaza icyo kigamije n'icyaba cyarakoze mbere muri urwo rwego. Ni ngombwa kandi gusobanura uko kiyanywe n'icyerekezo cy'ishyirahamwe n'uburyo kibereye akarene kizakorerwamo.

2. Akamaro k'igikorwa

- Birakwiriye kandi gusobanura neza ingungu kizazamira ishyirahamwe ku bulyo byatera imbere, bityo bitagira icyo bifasha abanyamuryango mu mibereho yabo. Bashobora no kugaragaza akamaro cyagilira akarene kizakorerwamo.

3. Isobanura icy'igikorwa

- Ni ngombwa gusobanura mu bulyo burambuye uko kigomba gukorwa mu rwego rwa tekiniiki.
- Hakagaragazwa abagomba kugikora: abantu ababwaba cyangwa se ishami riracyari...
- Ikindi ni byiza guteganya igihe kigomba kumara gukorwa.

4. Ishora icy'imali mu gikorwa

- Abategura igikorwa bagaragaza kandi imali izakoreshejwe n'uburyo bwo kuyicunga neza.
- Mu gihe ari amafaranga y'umwenda, hateganywa igitabo kigaragaza uko azajya yishyirwa n'igihe agomba kwishyurirwa.

Twibuke ko inyandiko iba ikubiyemo ibi byose igomba kuba yumvikana neza kugirango igikorwa gishobore kugera ku utego. Buri gikorwa rero kigomba kugira inyandiko yacyo. Nyamara aho aho n'ibigomba gukorwa mu ishyirahamwe bitarukije ku bulyo bitagomba inyandiko irambuye; na byo aho bifite uko byandikwa, bikaba biwizwa.

Ku byerekeye ibikorwa biteganywa kugerwaho hashize igihe, hari ikintu cy'ingenzi gikwiliye kwitabwaho byerekanywe u'ishora ly'imali. Tugomba kumenya ko agaciro k'amafaranga kagenda gahinduka mu bihe bitandukanye. Turebe uko biteye twifashishije icyo bita: Akituwalizasiyo.

- Ijanisha ly'akituwalizasiyo.

Mu ishora ly'imali, umubare w'amafaranga ashobora kuboneka ubu utabwo ahwanye n'umubare umwe nk'uw'amafaranga ashobora kuboneka hashize igihe (mu by'agaciro kayo).

Koko rero ifaranga 1 lishobora kuboneka ubu lihwanye n'amafaranga $(1+a_1)$ mu gihe cy'umwaka umwe uri mbere. a_1 bayita ijanisha ly'akituwalizasiyo ly'ubu.

- Agaciro k'ubu k'amafaranga ashobora kuboneka mu gihe iki u'iki.

Niba a_1 ari ijanisha ly'akituwalizasiyo ubu, ifaranga 1 lishobora kuboneka [redacted] ubu lihwanye n'amafaranga $(1+a_1)$ ashobora kuboneka mu mwaka.

Nako niba a_2 ari ijanisha ly'akituwalizasiyo mu gihe cy'umwaka umwe, ifaranga 1 lizaboneka mu mwaka lihwanye n'amafaranga $(1+a_2)$ ashobora kuboneka mu myaka ibili.

Ifaranga 1 lishobora kuboneka ubu rero lihwanye n'amafaranga $(1+a_1)(1+a_2)$ ashobora kuboneka mu myaka ibili.

Nako icyo ijanisha ly'akituwalizasiyo ari a_n mu gihe cy'imyaka n , ifaranga 1 lishobora kuboneka ubu lihwanye n'amafaranga $(1+a_1)(1+a_2) \dots (1+a_n)$ ashobora kuboneka mu gihe cy'imyaka n .

Ifaranga 1 lishobora kuboneka mu gihe cy'imyaka n lihwanye n'amafaranga:

$$\frac{1}{(1+a_1)(1+a_2) \dots (1+a_n)} \text{ ashobora}$$

kuboneka ubu. Ni byo twita agaciro k'ubu kalyo.

Kugirango dukubone kubigayagaza ku buryo bworoshye, dukoreshe ijanisha ly'akituwalizasiyo lidahinduka:

$$a_1 = a_2 = \dots = a_n = a$$

Agaciro k'ubu k'ifaranga 1 lishobora kuboneka mu myaka n gahwanye na:

$$\frac{1}{(1+a)^n}$$

Twifashishije ibi bili haruguru, dukake agaciro k'ubu k'amafaranga ibihumbi ijana ashobora kuboneka mu

Uko bikorwa:

Agaciro k'ubu kayo:

$$\frac{100.000 F}{(1+0,05)^2} = \frac{100.000 F}{1,1025} \approx 90.703 F.-$$

Dushake moneho agaciro k'ubu kayo mu gihe ijamisha ly'akituwalizasiyo ali 15%.

Uko bikorwa:

Agaciro kayo k'ubu:

$$\frac{100.000 F}{(1+0,15)^2} = \frac{100.000 F}{1,3225} \approx 75.614 F$$

Duhereye kuli izi ugero zili haruguru, turabona ko icyo ijamisha ly'akituwalizasiyo ligiye liba linini, ni na ko ikinyuranyo cy'agaciro kigenda kiba kimwe.

Icyitonderwa

Nk'uko twigeze kubibona, tugomba kuzirikana ko ibigomba gukorerwa mu ishyirahamwe biba byanditswe bityo bigafasha abagomba kubikora.

Hari ingandiko ikorwa ku buryo twabonye haruguru; hakaba m'indi iteye m'imbonerahamwe ishyirwa ahantu hagaragara, bityo umuntu yayikubitaho akajisho akamenya ikigomba gukorwa, aho kizakorera, igihe kizakorera, uzagikora nibindi.

IGENWA LY'IMILIMO

Mu mashyirahamwe hafi yose haba haliwo imilimo itandukanye. Iyo milimo ikorwa n'abanyamulyango cyangwa abakozi bayakoreba bahemberwa ukwezi. Kugirango imilimo ishobore gutungana, habaho igenwa lyayo.

Babanza kureba imilimo yose igomba gukorerwa mu ishyirahamwe, bakayicagura bakulitije imiterere yayo ndetse hakaba ubwo bagenda bashyira hamwe hamwe ifitanye isano. Buri mulimo rero ugira abo ushingwa bashobora kuwutunganya; bashobora kuba ari abantu bize bakaba bawuhugukiwe cyangwa se akaba ari abantu batize bashobora kuwumenyerezwa, hakaba iboneza imyifatire yabo, bagahugurwa, bakashobora gukorera mu matsinda.

Imenyereza - mulimo

Buri mulimo uba ufite imiterere yawo n'uburyo ugomba gukorwa. Aba mu mashyirahamwe si ko baba bazi neza uko ukorwa, ngo babe bafutukiwe neza imiterere yawo. Ni yo mpamvu ari ugombwa kuwumenyereza abawushinzwe, bakabanza kumenya uko uweye, ingorane ziwubonetse mu rwego rwa tekiniki, bakawigishwa, bityo bagashobora kuwutunganya.

Iyo menyereza, likomeza kubaho buri gihe kugirango baru sheho kuwuhugukirwa. Iyo hafi ubumenyi bushyashya bushobora gutuma bawutunganya kurushaho mu byiza kuburizaho hakiri kare.

Kubera ko ari ibintu baba bahora bakora, bawumenyera vuba; gusa utabwo ari byiza kuwubakubuzamo ngo ubashyire mu wundi. Iyo gihe abanyamulyango bahora mu imenyerezwa ly'imilimo itandukanye, ishyirahamwe ntigire icyo ligeraho vuba. Ni byiza kandi gushakashaka ibintu byo ari byo byose byatumye abakora uwo mulimo bawutunganya batwibwirira, bakawukora bawukunze, ntihagire inzizi zibabangamira.

Hafi igihe kandi biba ngombwa gukora inyandiko igaragariza uburyo umulimo ukorwa maze igashyikizwa abashinzwe kuwurangiza mu gihe bazi gusoma.

Imbonezamyifatire

Abanyamulyango bose bagomba kugira imyifatire ibaranga. Iyo myifatire ikaba igenwa n'ishyirahamwe baliwo. Bakamenyeye kandi bakubahiriza amategeko aligenga, bakamenyereza imikorere yalyo, bakaba bazi uburyo imilimo ishobora gutungana muri icyo. Bagomba kumenyana, bakagira ibyo baziririra n'ibyo bashobora gukora, bagakosorana n'ibindi. Mbese ugasanga hafi ibintu bazi ku buryo bwikaliy byerekeranye n'ishyirahamwe lyabo; ibyo bigatuma balikunda, bakababwirira muri byose, bakababwirira mu magorwa yalyo kugirango bidasenyuka, mbese ikaba umulyango nyakuri abashya bemerewe kuyinjiramo bagomba kumenyerezwa ibyo byose, bakabitozwa n'abashinzwe umulimo w'imbonezamyifatire.

IGENWA LY'IMILIMO

Mu mashyirahamwe hafi yose haba 'halimo imilimo itandukanye. Iyo milimo ikorwa n'abanyamulyango cyangwa abakozi bayakorerwa bahemberwa ukwezi. Kugirango imilimo ishobore gutungana, habaho igenwa lyayo.

Babanza kureba imilimo yose igomba gukorerwa mu ishyirahamwe, bakayicagura bakulitije imiterere yayo ndetse hakaba ubwo bagenda bashyira hamwe hamwe ifitanye isano. Buli mulimo rero ugira abo ushingwa bashobora kuwutunganya; bashobora kuba ari abantu bize bakaba bawuhugukiye cyangwa se akaba ari abantu batize bashobora kuwumenyerezwa, hakaba iboneza icyifatiye yabo, bagahugurwa, bakashobora gukorera mu matsinda...

Imenyereza - mulimo

Buli mulimo uba ufite imiterere yawo mu bulyo ugomba gukorwa. Aba mu mashyirahamwe si ko baba bazi neza uko ukorwa, ngo babe bafutukiye neza imiterere yawo. Ni yo mpamvu ari ngombwa kuwumenyereza abashinzwe, bakabanza kumenya uko ukeye, ingorane ziwubonetamo mu rwego rwa tekini, bakawigishwa, bityo bagashobora kuwutunganya.

Iyo menyereza likomeza kubaho buli gihe kugirango barushaho kuwuhugukirwa. Iyo hafi ubumenyi bushyashya bushobora gutuma bawutunganya kurushaho ni byiza kububagezaho hakili kare.

Kubera ko ari ibintu baba bakora bakora, bawumenyera vuba; gusa utabwo ari byiza kuwubakubuzamo ngo ubashyire mu wundi. Iyo gihe abanyamulyango bakora mu imenyerezwa ly'imilimo itandukanye, ishyirahamwe ntigire icyo ligeraho vuba. Ni byiza kandi gushakashaka ibintu ibyo ari byo byose byatuma abakora uwo mulimo bawutunganya batwibwirira, bakawukora bawukunze, ntihagire inzitizi zibabangamira.

Hafi igihe kandi biba ngombwa gukora inyandiko igaragaza ubulyo umulimo ukorwa maze igashyikizwa abashinzwe kuwurangiza mu gihe bazi gusoma.

Imbonezamyifatire

Abanyamulyango bese bagomba kugira imyifatire ibaranga. Iyo myifatire ikaba igenwa mu ishyirahamwe baliho. Bakamenya kandi bakubahiriza amategeto aligenga, bakamenyera imikorere yalyo, bakaba bazi ubulyo imilimo ishobora gutungana muri icyo. Bagomba kumenyana, bakagira ibyo bazirukira muri icyo bashobora gukora, bagakosorana n'ibindi. Mbese ugasanga hafi ibintu bazi ku bulyo bwikaliye byerekanywe mu ishyirahamwe lyabo; ibyo bigatuma balikurinda, bakababwirira muri icyo, bakabirawirira mu magorwa yalyo kugirango bidasenyuka, mbese ikaba umulyango nyakuri. Abashya bemerewe kuyinjiramo bagomba kumenyerezwa ibyo byose, bakabitozwa n'abashinzwe umulimo w'imbonezamyifatire.

Ihugata.

Buli shyirakawwe ligomba guleganya umulimo ufite akamaro cyane, ariwo woguhugura abanyamuryango. Bashobora guhugurirwa mu nama zikorwa, mu mahuriro y'ihugura, mu ugera zibakurura bakareba ibikorwa ahandi, bashobora no kureba sinema yerekanywe mu amajyambere bakabona ibikorwa hitya no hino... hahamubundi bulyo bwinshi bashobora gukoreshwa.

Ni byiza guteganya programu ibonye muri urwo rwego, utihabeho gutimiza, bigakorwa kandi muri mwaka.

Ishyirahamwe ryihatira gushaka imfashanyigisho zihagije kugirango amahugura ashobore gutungana. Ikindi, kishobora kwifashisha ibigo by'ihugura kuko byo biba bifite ubushobozi buhagije. Abanyamahanga bashobora guhugurirwa imili-mo bakora cyangwa se imibereho yabo myiza.

Abategura programu yamamagura bagomba kugendana n' igihe bagezemo, bakamenya aho ubumenyi bugeze, uburyo bushya bwo gutora umulimo uyum'uyu n'ibindi.

Kenshi abagize ishyirahamwe bashimishwa mu kumenya amakuru yo hitya mu kino, mu ngombwa rero kubashakira ibinyamakuru bitandukanye byanditswe mu rulimi bumwe.

Kubateganyiliza ahantu ho kwidagadulira, bakungurana ibitekerezo na byo utako bisa kuko bituma bashira ifunwe, abwoba n'umususu, bityo bakitabira kumenya byinshi, ntibabe abanyamusozi batinya kuya muruhame rw'abantu benshi.

Ayo makugura agomba kureba buli wese uri mu ishyamba-
mwe, ntihazemo ubutoni uribundi byose bishobora gutuma
bamwe ari bo bakugurwa, abandi bakaguma mu bujiji.

Buri wese agomba gukugulirwa ~~umuntu~~ umulimo ashinzwe kugirango ubuzima bw'ishyirahamwe butungane, agakugulirwa imibereho ye myiza kugirango ~~umuntu~~ abe umuntu umerewe neza ushobora gutunganya ibyo ashinzwe.

Gukorera mu matsinda.

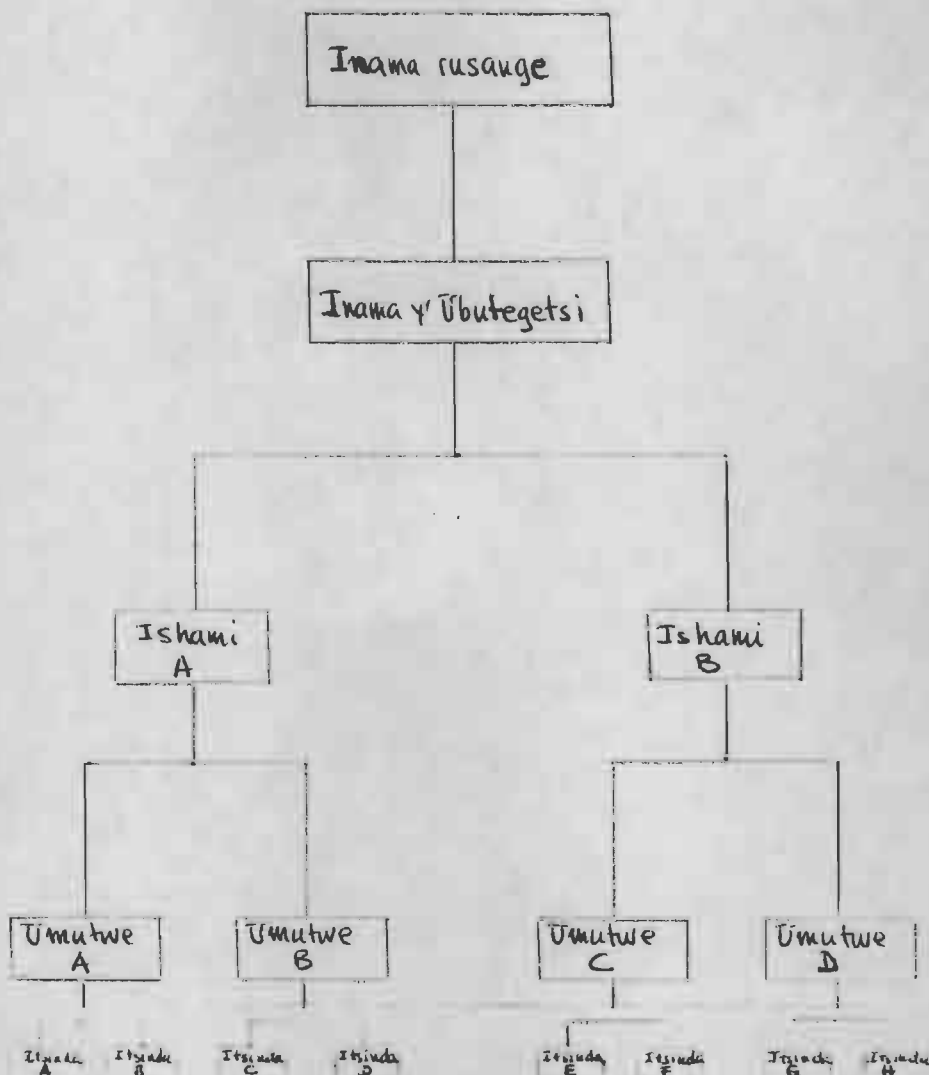
Ikindi gishobora gutuma umuhamya utungana ni ugukorera mu matsinda. Buri tsinda likaba lifite icyo ligomba gukora, gisobanuritse neza ku buryo buri wese uturimo yumva icyo agomba gukora. Ligira ubuyobozi bushobora gushingwa umuntu umwe cyangwa se bakaba ubuyobozi rusange bushinzwe abantu barenze umwe.

Amatsinda akora imilimo ifitanye isako ashobora gushyirwa hamwe akarema urugingo rwisumbuye mawo rufite ubuyobozi bwawo. Ingingo zisumbuye na zo zishobora gushyirwa hamwe zikarema ishami lifite ubuyobozi bwalyo. Amashami yashyirwa hamwe akaba agize ishyirahamwe lyose lifite ubuyobozi bwalyo bushinzwe ibikorwa byose muri lyo.

Iyo ishyirahamwe icyemeje gutora igenwa icy'imilimo liba linaze kugira ibitwaga byinshi byinshi, lishaka uburyo byatari imbere libiboneza.

Igenwa icy'imilimo lizamo uruherekane rw'ubuyobozi n'imilimo.
Dore uko biba biteye imwe na imwe :

Impuzabika - shusho



Urwego rw'ikirenga mu Inama rusange nk'uko twigeze kubibona muatangirira. Ikaba ikorerwa n' Inama y'Ubutegetsi yitoramo na yo ibire bigomba kuyikorerera.

Inama y'ubutegetsi ni yo itanga amabwiza mu mashami, agashyikizwa abayobozi bayo, bakayageza na bo ku bayobozi b'imitwe, na bo bakayaha abayobozi b'amatsinda bashinzwe. Aba ba nyuma na bo bayashyikiza abanyamuryango bakomere mu matsinda.

Ikorerwa mu bukirwaho bigira ingaudiko ishyikizwa urwego rwo hejuru bikurikira. Nako kugenzura ibikorwa bituruka hejuru bigana hasi. Ni ukwaga ko bukirwaho rushobora kugenzura ibikorwa mu rwego ruri hasi. Twibuka kandi ko ibikorwa mu ishyirahamwe byose aba ari ibibura byareweye n'Inama rusange; ni ukwaga ibitanyuranyije n'icyerekezo cyacye. Kubera ko Inama rusange iba igiye n'abanyamuryango bose, buh munyamuryango afiti uburenganzira bwo kumenya ibikorwa muri bukirwaho. Muri cooperative, hagomba kubaho demokarasi ihamye; abanyamuryango bakaba baremya, mbese umuryango akaba ari umuryango w'ubushyamba kugenzura ibikorwa bya

5

IHUZA LY'IMILIMO

Ikindi kigomba kwitabwaho mu gutunganya imilimo ni ihuza lyayo.

Iyo umulimo ukorwa n'umuntu umwe, aba ari uko agomba kuwukora wenyine kugirango agere ku utego yiyemeje. Alike iyo babaye babili bagomba kuwukora, hah' ibyo bagenda bumvikanaho, bagashyikirana kugirango bashobore kugera ku utego, ubwo haba habaye umushyikirano ntagenda mu ukuranga ko bashyikirana ku bushake bwabo alike bafite umugambi wo gutunganya umulimo bashinzwe. Ubwo rero haba habaye IHUZA LY'IMILIMO. Uwo mushyikirano ntukoresheya gusa iyo ari abantu babili bakora umulimo; ukenerwa mu mulimo uwaliwo wose, waba ukorwa na bako cyangwa se benshi kubera ko utuma habaho umwuka mwiza, ukanatera akanyamuneza abakozi gutuma bakora neza. Cyakora rero mwene uwo mushyikirano ukunda gutokeshwa cyane cyane mu gikorwa cyocheje, kitalimo uruherekane rw'ubutegetsi. Kenshi na kenshi, usanga muri icyo gikorwa hahimo umuyobozi utanga amabwiza mu bakozu bitewe n'ibyo ashaka ko bakora; aho bakozu bakubwiza ibyo babwize, bakagenda babwizanya ubwabo kugirango batunganye umulimo wabo. Wa umuyobozi ni we ugenzura ibyakozwe akareba ko byatunganye. Ndetse abakozi ubwabo bagenda bagenzurana. Mu by'ukuri alike uwo mushyikirano urubona no kuboneka mu ruhererekane rw'ubutegetsi kuko utuma habaho umwuka mwiza mu gikorwa ukuko twigere kubona. Alike rero muri urwo ruhererekane hagaragaranye cyane cyane umushyikirano agengwa. Ni ukuranga ko aha amabwiza yanditswe agomba gutungwa kugirango imilimo ishobore kugenda neza. Aturuka hejuru aya hasi muri urwo ruhererekane. Hatorwa tandi raporo y'ibyakozwe. Ituruka hasi igana hejuru. Buri mushyikirano rero ufite inzira ugomba kunyura. Haba n'ubwo rero mu ishyirahamwe buri muntu aba ari icyo agomba gukora, akaba agisobanukiye ku buho bukuriye. Ndetse ishyirahamwe listibona guhamya ikigomba gukorwa, ubundi ligahamya ubushobozi bw'ugomba gukora umulimo uyu mu yu.

Mu bitorwa mu ishyirahamwe dusobora kubona icyo bita insangizamulimo iteye ugutatu:

insangizamulimo - hereza, insangizamulimo - mugarura n'insangizamulimo - butwanyi.

Mu by'ukuli rero ihuza ly'imilimo lili ugutane :
ihuza - magiliane, ihuza - bugenzuzi n' ihuza - ruhamya
ligizwe n' ihanyamukorene, ihanyabikorwa n' ihanyabushobozi.

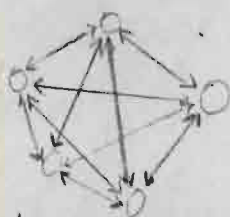
Ihuza - magiliane

Nkuko twigeze kubibona ihuza - magiliane, ari lya likore-shwamo "umushyikirano ntagengwa" likunda gukoresheka mu bitorwa bidakomeye cyane, mu bakozi bakoresha kwumvikana neza mu ihuza ly'ibyo bakora. Alike twanabonye ko inashoboka mu gikorwa kiremereye tuko lizana umwuka mwiza mu bakozi.

Umushyikirano ntagengwa ufite akamashyamba cyane mu milimo yose tuko utuma igenda neza. Nta mulimo n'umwe dusobora kubona utalimo na gato uwo umushyikirano. Kuruga ko umuntu agomba gukora ibyo ashinzwe ntagire umushyikirano n'abo bakorana ntabwo byoroshye. Abantu si imashini. Abakorana bashobora kugenda babazanya utuntu tumwe na tumwe twerekeranye n'umulimo wabo. Ndetse haba n'ubwo bashyikirana kubera impapuro zabo bwite. Ibyo na byo akaba ari ngombwa kuko buho wese akeneye inkunga y'abandi.

Ikindi kandi hali ubwo uwo umushyikirano ufasha cyane abayobozi kumenya uko ibintu byifashe mu gikorwa iki n'iki kurusha uko babimenyera mu mpapuro za raporo kuko muri zo haba hahamwe na hahamwe ibidakuye n' ukuli.

Tuzi neza ko mu mashyirahamwe, abanyamulyango batagombye gufukikanwa mu bitekerezo, buho wese akaba afite uburenganzira bwo kuruga icyo atekereza, ahisha abagize inama y'ubutegetsi cyangwa abandi banyamulyango, uretse ko atemerewe gusebanya. Buho wese rero ashobora gukuyirana n'undi.



Abanyamulyango bashobora kwungurana ibitekerezo bashakasha-ka icyatuma umulyango wabo utera imbere.

Nubwo twavuze ko ihuza - magiliane ari ngombwa mu bitorwa byose, hali aho usanga icyo ihuza lidahagije, cyane cyane icyo abakozi ari benshi, bakora ibintu bitandukanye. icyo gihe hazamo :

Ihuza - bugenzuzi

Mu ihuza - bugenzuzi hahamwe urukererekanwe n'ubutegetsi. Igika kili lepusu ni cyo rwego rw'ikirenga, naho ahagana hasi hali igika ntangamushyamba ari cyo ahamini kigize igikorwa kuko ari cyo kilitunga. Kigamba rero kwitabwaho cyane kugirango kidahungabana. Hako bakoreshe icyo bita umushyikirano ngengwa mu mulimo. Ni ukuvuye ko hali ibyo urwego uru n'uru rushinzwe gutuma

Nk'uko twigeze kubibona, mu ihuza-bugenzezi, igenzura likorwa lituruka hejuru ligana hasi. Naho raporo z'ibikorwa zikava hasi zigana hejuru.

Ihuzá-ruhanya.

Ubwu ni bwu hashobera gukoreshwa insangizamulimo twabonye:

- Kugira ngo bafate icyemezo cyo gukoresha insangizamulimo iyi iyi biturwa n'ibigomba gukorwa n'uko biturwa ndetse n'ubushobee bw'abagomba kubikora.

Thunbergia terrestris

Iyo turuze ihanyamukerere, tugomba kwumva ko ari uguhamya
inikorere y'umulimo uyu u'uyu. Ibiwukorerwamo bitaba bizi, naza
kandi biteganyijwe ku buryo bubonye. Uburyo uwo mulimo ugomba
gukorwa bushobora kuba bwanditswe kuva kuri A kugeza kuri Z
kugirango ushinze kwukora awuhugutiye ku buryo atagira icyo
yibagirwa. Twafata umugero rw'umuntu ugusa igikoreshe mu mungazini
kibateranyije; akaba ari we ugomba kutiteranyiriza. Buri giho muene
ibyo bikoreshe biba bihererekijwe n'inyandiko yesekana naza uko babiteranyije.

Ihamyabikorwa

Uretse ibyo guhamya ubulyo bwo gukora umulimo, hashobora no kubaho ihamyabikorwa. Ni ukuvuga ko bashobora guhamya ingero z'ibintu kigomba gukorwa cyangwa se umubare w'ibintu bigomba kugerwaho. Iyo haliho intego y'umubare w'ibintu bigomba gukorwa, ababishinze mu bo bagomba gushaka ubulyo bwose icyo intego yagerwaho. Dufate urugero rw'umuntu upatanira gutunda amatafali ayageza aho imilimo y'ubwubatsi izakorerwa; akaba aza neza umubare agomba kuhageza mu gihe cyangombwa asazezanywe n'abo akoreye. Umukoresha si we umutegetse kuyatunda ku bulyo ubu u'ubu cyangwa se ayo agomba gutwara mu muni... Uwayapatinirye ni we uri ubulyo agomba kubifataho kugira ngo yuzuze amasezerano.

Ihamyabushobozi

Ihamyabushobozi libaho icyo bahamye ku bulyo bukoze ubushobozi n'ubumenyi bw'umuntu ugomba gukora umulimo uyu n'uyu. Mu bikorwa bimwe na bimwe hafatwa umugambi wo kwigisha abakobwa bazashobora gutwanya imilimo bashinze cyangwa se kagashakwa abantu bize ku bulyo buhagije ibirebana n'icyo milimo. Ugera duhobora gufata ni umuhamya. Iyo abage umuntu, aba aza neza uko agomba kubikora kuko aba yarabyize. Atawe umujya hejuru, agenzura ibyo akora. Ababa baramuhaye akazi ko kumara baba bamwizere ku bulyo batamwishisha kubera impamyabushobozi aba abifiteho.

Mu ihuza ry'imilimo hafi ibintu by'ingenzi bitagomba kwibagurira: kumenya gufata ibyemezo no gukoresha inama. Gufata icyemezo ntabwo ari ibintu byoroshye, bifite inzira itwikizwa. Itari ubwo uhobora gufata icyemezo nabi bigatuma imilimo yose ihagarara.

Ubandi icyemezo gituruka ku mutima nana bitewe n'igikenewe kugerwaho. Hakabaho kwemeza kugikora cyangwa se kutireka bitewe nuko babonye kitari ugombwa. Dore n'izira ikulikizwa:

- Kwiyumvisha impamvu hagomba gufatwa icyemezo no kureba ko bishoboka
- Gushakashaka no guhamya ibintu (ibitekerezo) byinshi byatuma icyo cyemezo gifatwa.
- Gucagurira ibyangombwa bitwiliye bishobora gutanga igisubizo mu ifata ry'icyemezo.
- Kwemerwa kw'icyo gisubizo n'abandi bantu batatoye umuhamya wo gufata icyemezo.

Mu gihe icyo nzira yubahirijwe, hafatwa ibyemezo bihamye bituma ihuza ry'imilimo ribikorwa ligenda neza. Twibuke kandi ko abashinze kwongera umusaruro bagomba kugira icyo bavuye mu ifata ry'ibyemezo.

Itundi ni byiza guteganya buho gihe inama zirebana no gukora imilimo kuko na byo ari ingirakamari.

Ubu bulyo butanu bw'ihuza ry'imilimo twaze kubona byagenda bwuzuye bitewe n'ibyo bataganyije gukora.

IGIKA CYA KABILI

UBUGANDURAMBAGA

MU MULIMO

RUSANGE

Bara umugani mu kinyarwanda ngo "uta mugabo umwe".
Koko reho abantu icyo bashyize hamwe ingufu zabo, bagakoreye
hamwe, bagera kuri byinshi.

Nyamara aho abantu bose si ko bitabira imilimo rusange.
Ubundi ugasanga abiyemeje kuyikora bagenda badohoka.

Muri iki gice rero turabona ibyerekeye umugandurambaga
kuko abantu bifuzaga gutorera hamwe bamukeneye, iby'uko
abashyize hamwe badohoka n'uko umuntu yabaga-
nchura bakagira umuhati ku mulimo rusange.

UMUGANDURAMBAGA

Ijambo umugandurambaga lyitirirwa umuntu ufite ubushobozi bwo kugira icyo ahindura ku mugilire n' imiterere y'amatsinda y'abantu akoresheje inama n'ubundi bulyo bwose yabona bwabimufashamo. Ni umuntu ugira inama abandi, abahugura kandi akanabafasha guhagurukira umulimo. Ashobora gusura abantu ashinzwe kugandura, akareba ako bifashe mu ngo zabo, ibyo bagezeho, ibibazo bafite bakabimugezaho anareba ako byifashe n'ibiindi. Habaho abagandurambaga bahemberwa umulimo bakora u'abandi batawuhemberwa.

Imyifatire ye

Umugandurambaga mwiza agomba kwimenya mu byerekeye ubuzima bwe, imico ye ndetse n'ubumenyi bwe. Ibyo bituma akora akazi ke meza. Nko kumenya ko ari umunyambaraga cyangwa se atari we bifite icyo byamufasha mu gutegura umulimo we... Agomba kuba afite ibitekerezo bihamye bidahindagurika kandi bifite intego igaragara. Akaba umuntu ukomeza umurego. Kugirango ashobore gutunganya umulimo ashinzwe, agomba kuba intangarugero, inyungamugayo, akagira ubwitwizi n'umwete kandi agasohoka amazezerako. Ntabwo akandamiza abo ashinzwe kugandura, abakoresha ibyo bashoboye bitarenze ubushobozi bwabo. Ntabwo ari byiza kandi ko avanga ibibazo bye bwite n'iby'umulimo we.

Umugandurambaga mwiza ni usubiza amaso inyuma akareba imyengerere ye, akamenya ibyo yitwayemo nabi bityo atabikoresheje. Ni umunyamama ukomeye, utega amatwi abo ashinzwe kwigishye, akababera umurezi umweye, akabafasha kubona umuti w'ibibazo byabo, kenshi na kenshi akaba ari kumwe nabo...

Muri make, umugandurambaga mwiza agomba kwegera abandi, akabana nabo meza yuma ibitekerezo byabo kandi na we akabagezaho ibye; ahorana umuhati mu mulimo we akamenya kwihangana ntahutazwe n'ingorane ahura na zo, ahubwo akazishakira umuti. Ntabwo yigizayo abamugana ahubwo agerageza kubakurura no kwumira kuko bimufasha gutunganya umulimo we. Akwiriye kugilira buho wese urukundo rwa kivandimwe, akaba urumuna w'abandi kandi akaba atekereza meza ku bulyo agobora abo ashinzwe mu uzira uzira. Agomba kumenya gutunganya umulimo we, akaba azi ku bulyo bufututse intego agomba kugeraho n'uko yayihamye.

Ahitamo abamufasha adahubutse, akareba ab'ingenzi n'abanyamuraba bawuko ubutwaho n'urukundo kandi akabagisha inama buho gihe. Mu gutemura impaka, aharamira ubutabera, agafata ibyemezo amaze turaba ukuri akuri kuri.

Ubumenyi bwe

Umulimo w'umugandurambaga ntabwo woroshye kuko umusaba kumenya byinshi no guhanga ibishobora kumufasha. Mbere na mbere, yihatira kumenya kwitegereza no gusesengura. Ibyo bituma ashobora kugira ibyo ashima n'ibyo anenga, bityo akamenya aho yakera mu kugandura imbaga.

Yihatira kandi kumenya gukomeza kumwira hamwe ibiliho abona n'ibivugwa akavanamo ukuri kugaragara yifashisha ateganya ibyo azakora.

Agaragaza icyo atekereza byaba mu magambo cyangwa mu myandiko. Iyo avugira kandi mu ruhame, yilinda kugira umususu; akaba azi neza ingingo avugaho.

Amenya kuvubura inama neza no gukora inyandiko - mvugo zazo.

Buli gihe, akora raporo y'ibikorwa bye kugirango abifuze kumenya ibyo akora bayifashishe.

Amenya gutegura amabara neza yerekanye n'umulimo akora, akamenya ko imitegurire yayo itandukanye n'iyi amabara asanzwe abantu bandikira ku giti cyabo.

Umugandurambaga mwiza yitabira buli gihe amahugura ndetse agashushikariza ubwe kwihugura, asoma ibitabo, ibinyamakuru n'ibindi. Ibyo bimufasha kubona ibisubizo by'ibibazo ahura na byo mu mulimo we.

Kumenya kuvugira mu ruhame

Kumenya kuvugira mu ruhame ntabwo bishobokera buli wese. Abakunda kubishobora ni abasanzwe bashyamba, batagira isoni, bazi gusetsa cyangwa se kubara inkuru kubera ko buri mu kamere yabo. Nyamara ariko kandi biligwa kandi umuntu akabyimye neza kugirango abikore neza.

Mu gihe umuntu ashaka kugira icyo abwira abandi mu ruhame, agomba kwibaza ibi bibazo: Ngiye kuvugira iki? Nkibwira banyuze? Naabyifatamo ute?

Ni byiza ko amenya neza icyo agiye kuvugaho, utapimye ngo nibamubaza aya iminwa. Akirinda kumwongera avugira ibidafite akamara. Bimukwiriye kandi gutegura ibivugwaho, ingingo zikubiyemo zikaba zikurikira neza kandi zimurikira. Ufite icyo ashaka kubwira abandi, aba afite intego ashaka kugira; akora uko ashoboye kugirango igereho, icyo bidashobotse, ibyo aba yaraze byose biba bibaye imfabusa. Kumenya kandi kuvugira ibyateguwe mu gihe gito ntako bisa kuko bitaramburana bityo bigarungira mu babyumva.

Ibivugwaho ntabwo bishoboka kuba birenze abo bigenewe.

Umugandurambaga amenya ntabwo abwira mu gihe cy'ama.

Ateranya amagambo yumwira, utakoreshe urulimi batumira ahubwo agakoresha iyi yumwira, agashyikira uko abwira aho kubirataho abereka ko ari ibintu byinshi. Ashobora kugenda ababaza utubazo kugirango arebe ko bakurikira neza. Iyo bakurikira neza, baba bishimiye ibivugwa. Kenshi na kenshi ibyo bakira neza n'ibyo baba bakeneye ndetse akaba ari bo basabye ko babihugurwamo. Kugirango umuntu agire icyo abwira abandi neza ni byiza ko abanza kuvugira ibyo ababazwe biturikira.

Iyo gihe batira neza ibivugwa kuko umugandurambaga aba abahaye agaciro, aberetse ko na bo bafite ibyo bazi. Ntabwo agomba kwibwira ko ahugura abatagira icyo bazi. Ni byiza guhera ku biwizi ugana ku bitazwi kuko ibitekerezo bishya byakirwa nuba kandi neza.

Umugandurambaga agenda aganira n'abo abwira, uwo mushyikira no umufasha kagera ku utego.

Ikiganiro kiba gikubiyemo ubutumwa. Kugirango bugere ku bo bugenewe neza, hali ibigomba kwitabwaho: gutokeshya amagambo akwiliye, ibitekerezo by'ingenzi bikaba byanditswe; kuvugira ku bulyo buli wese yumva, bitari uba vuba, ingingo zose zikaba zifututse. Ni byiza kandi gutandagira ku ingingo z'ingenzi zikwiliye kwitabwaho. Si byiza kurambirana. Umugandurambaga ashobora guteganya umwanya wo kuruhuka mu gihe abona ko ari ngombwa. Iyo abona hali abasinzira arugira, ashobora kubara uduturu duta dutatsa dutuma batanguka bagashobora gukubikira nabo. Ntibikwiliye rwose gusubiramo ibyavuzwe kuko bishobora gutuma abantu barambirwa, ntibababwira neza ibivugwa.

Iyo bishoboka, yafashisha amashusho atuma ibivugwa byumvikana neza.

Uvugira mu ruhamwe wese, agomba kumenya gushimisha abo abwira, akabegera, akaganira na bo yumva ibibazo byabo. Arugana atanyamunyeza, agasubiza ibibazo ashyikirana neza n'ababibajije muvwo byaba bidafashije. Mu gihe adashobora gusubiza ikibazo iki n'iki, arugisha ukuli arugira ko azagisubiza ubutaha aho gutanga igisubizo kitari cyo byo kwiyemera.

Kubabwira inama

Kugirango inama ishobore gutungana, hali ibyo umugandurambaga azilikana mbere y'inama, mu gihe cy'inama na nyuma yayo.

Mbere y'inama

Mbere y'inama, ateganya aho izabera hahagije, hali umuho uhagije kandi hatuma ijwi ry'uvugaga lyumvikana. Ategura ibizakoreshwa byose: inkebe, ameza, ikibaho... kandi akabishyira mu mwanya wabyo.

Mu gutera inkebe, abikora ku bulyo bwiza bufasha abali mu nama kwumvikana.

Ategura ibigomba kwigwaho akubikira igihe kizakoreshwa.

Mu gihe bishobotse, yanditsira buli wese uzayizamo mbere y'igihe, amumenyesha itariki, isaha n'aho izabera n'ibizigwaho. Ibyo bituma babona igihe cyo kubitekerako, bakaba bahagira ibyo bongera ku biko mu muryango w'ibyigwa.

Mu gihe cy'inama

Umugandurambaga mwiza yubahiriza isaha inama izatangirako, akaba yageze aho igomba kubera. Ubwo aho atanze urugero rwiza, abandi na bo ntibajye bakorerwa.

Agomba kumenya gutungira inama neza, asukura abayigamo kandi ashimira abakageze kare ku gihe. Yibutsa impamvu inama yateranywe nibili ku muryango w'ibyigwa kugirango bagire ibyo bongeraho mu gihe ari ngombwa.

Mu nama, ni byiza ko haba umutuzo n'umwuka mwiza. Hateganywa igihe gihagije, kitari gito cyane kandi kitarambiranye.

Nkuko twavuye kubikira, ni byiza gutera ibyigwa.

Kwicaza bushuli utabwo ari byiza, keretse icyo ari abantu benshi cyane cyangwa hafi amashuriho baba kwerebana. Hafi uburyo bw'ubushyamba n'ubwo kwicaza abantu mu nama, reka tuvugemo bubili gusa: uburyo bw'uruziga cyangwa ubuteye nk'ibinyuguti U.

Umugandurambaga umyihahira ijamba, arareka buri wese uri mu nama akagira icyo avuye; udetse umubabwira akababwirira bakavuye. Ntawe ugomba kunigamba ijamba ariko icyo abonye bagaye gutya ingingo bafite aho agasaba kuba yabwo mu bwoye ayibasubizaho.

Abafite mu nama kandi bashobora kubaza ibibazo byinshi. Hafi ibyo umugandurambaga yibabwirira ubwo cyangwa se ibyo bamubaza. Akoresha ubushyamba bwe kugirango ntabwo urusaku, buri wese ushaka kugira icyo abaza, akagira umwanya we. Ku ingingo zimwe na zimwe abantu batavuye ho zimwe, ni byiza ko umugandurambaga agenda abaza icyo bayitekerereye. Hafi ubwo asubiza ibibazo bamubabwirira cyangwa agafasha ubabwirira kuba yikisubirira ubwo ubundi akaba yasaba undi muntu mu bafite aho kuba yagisubiza cyangwa se agasaba abafite aho bese kugira icyo bakivugaho.

Amenya gusubira vubabwirira mu ingingo z'ingenzi azibutsa.

Inama y'igira ibice bitatu

- Gutangura buri wese ku buryo ari igitekerereye atanga mu nama: ibizwi, ibibazo, ingorane n'ibindi.
- Kuganira ku ingingo-shingiro y'inama, gushakira hamwe ibisubizo by'ibibazo n'ingorane.
- Imigambi, gushyira mu bikorwa ibyavuzweho mu mwanzuro.

Nyuma y'inama.

Iyo inama itangirye, hakorwa inyandiko-urwego yayo. Haba kandi kureba uko inama yageze.

Umugandurambaga ashobora gutanga ibibazo byanditse ku mpapuro, bigasubirwa n'ababwirira mu nama. Aba ashakira kureba ko byavuzweho byumvikanye, uko byakurikira, niba byabashimishije cyangwa bitabashimishije. Iyo batari gusoma no kwandika, ibyo bashobora gutorwa mu mutwe.

Ikindi mu bikorwa ni ko ahamu hagaragarira ko intego yageze.

Ni byiza n'ubwo kubasira, no kureba ko hafi icyakozwe mu byo bakurikira. Iyo utagayeho muri urwo rwego, ni ugombwa ko ingingo-shingiro isubirwamo. Iyo ari umugandurambaga ahindura uburyo bwe bwo gutangira cyangwa se akabafasha kugandukira ibyo bagomba gutorwa. Zimwe na zimwe hafi ubwo icyo ingingo ibyavuzweho ariko bakabura ubwayihagurukira.

Gukora inyandiko-mvugo.

Inyandiko-mvugo ni inyandiko ikubiyemo imigendekere y'umama cyangwa se ikindi kintu cyose cyabaye. Igomba kuba yumvikana, hagakoreshwa amagambo abonyeye. Ingingo zihungu zigomba kuba zitulikiranye neza. Ukoze icyo nyandiko agaragaza ko ari we ubwe wabyiyumviye cyangwa wabyibonyeye cyangwa se niba abikomora ku wundi muntu. Mu kuyitira, ni byiza gukoresha interuro ngufi zitalimo amagambo adafite umumaro.

Keushi na keushi, inyandiko-mvugo y'umama igaragaraho ibi bikurikira:

- Iyo nama icyo ari icyo;
- Igihe ibereye (italiki);
- Isaha itangiriye;
- Abayikuramo (amazina);
- Abataye bafite impamvu;
- Abataye badafite impamvu;
- Ibili ku murongo w'ibyigwira;
- Uko umama yagenze n'ibyemejwe;
- Igihe umama itangiriye;
- Amazina n'umukono by'umwanditsi, n'umuyobozwa baze.

Gukora raporo

Raporo ni inyandiko igaragaza ibintu byakurikira. Umugandurambaga ashobora kuyitira amaze kwiga akarere azakomeye. Iyo akigira, agenda abaza ibibazo abagatuyemo kandi atamirebera ibibazo.

Ashobora kandi ko gukora raporo y'ibyo yakoreye ashyikiza abashushikariye n'umwami we.

Buri gihe rero, uyitira asobanura neza icyo ari icyo kwandikaho. Mu ndamburangingo, akagaragaza ibyango mbwira byose bituma yumvikana; akazirikana abazayisoma. Ingingo zikubiyemo zigomba kuba zitulikiranye neza kandi hagakoreshwa interuro ngufi zifututse. Kumenya gukoresha utwatumye ntako bisa kuko bifasha uyisoma. Mu gutanga umwanzuro, uwayikoreye agira icyo avuye ku byo yanditse, agatanga ibitekerezo bya byite ndebe akagerageza gutanga ibisubizo ku bibazo byagaragaye, abisobanura neza kandi akagaragazemo ingingo zihamye zumvisha uwo izashyikizwa ko yakubakiriza ibyifuzo bya.

Dore ibindi bigomba kwitabwaho:

- Guteganya igifuriko gikomeye.
- Urupapuro rubanza rwandikaho ingingo-shingiro ya raporo, izina ry'umuyitira, italiki yakoreweho n'umwami zayo.
- Urupapuro rukurikira ruyaho amashakiro.
- Ubuho buho hakaza intangiriro cyangwa igamba ry'ibanze.
- Hakurikira indamburangingo.
- Hagataho umwanzuro.
- Habaho n'ubwo hazamo umugereka uturimo imbonerakomwe,

Kwandikarwa

Umugandurambaga mwiza ni uwahatira kumenya uko yandikira-
na n'abandi. Atandukanya amabaruwa yanditsana n'
abantu ^{ku giti cye} ~~bashyamba~~ n'ayerekeranye n'akazi ke.

Iyo agiye kwandika ibaruwa y'akazi, akitawo buki gihe
urupapuro rwera rwagenewe amabaruwa. Iyo bishobotse
akoresha imashini yandika.

Akoresha kandi inyandiko yumvikana; utarondogora, ahubwo
ahita agaragaza igitekerezo cye mu kinyabupfura, akume-
nya uburyo bwiza bwo gutangira no kurangiza ibaruwa
ye. Yitunda gukora amatosa... Azitwaga uwo yandika
(umutegetse, uwo ayobora ubwe, uwo bareshya mu kazi...).

Urugero rw'ibaruwa y'akazi.

Ishyirahamwe

"ABADATENGUHA"

B.P. 16 RUBENGERA -

Rubengera, taliki ya 20 Nyakanga 1985

N°

Impamvu: Gushyira uburenganzira
bwo gutwara mu kazi.

Bwana Prefe wa Prefegitura
K I B U Y E -

Binyujijwe kuri Bwana Burumunsi
wa Komini MABAMBA -

Bwana Prefe,

Muri iyi baruwa mbandikije
mufu kubamenyesha ko dufite umukino witwa "Ntibagira ibamba"
wanditswe na MURAHIMANA Virginia dushyiraye mu kazi
mu muryidagaduro y' Ishuri ry' Inderabarezi ry' i Rubengera,
kuwa gatanatwe taliki ya 3 Kamukama 1985, gukomeza saa kumi
na ebyiri n'igice kugeza saa tatu z'ijoro.
Ku bazashyiraye mu kazi, bazatangira amashyamba ipanga ku bakuru
na munguwitwako ku banyarwanda. Ayo mashyamba azadufasha
cyane mu buhozi bw'amahe twatunguye.

Mu izina ry'abo dufatanyije,
mbasabye uburenganzira bwo twerekana uwo umukino ukubye
muri aka gatabo mbabwiraye mufuza ko muzashyiraye mu kazi
kugashyiraye. Nkaba kandi twese ko igisubizo cyanyu
kizadushimisha twese bitwe mu kazi twatunguye.

Mugire amakoro.

Bimeneshejwe:

- Bwana Dirigitari w' Ishuri
ry' Inderabarezi
RUBENGERA -

Prezida w' Ishyirahamwe
SHYIRAMBERE Bonifasi

(umukomeza we aya hanze)

Yanditswe

Ni byiza ko izina bwite ry'ya mpanga yanditswe mu
nyuguti nkuru; aho izina ry'ya ^{umukomeza} ~~umukomeza~~ yanditswe mu nyuguti nkuru
- SHYIRAMBERE Bonifasi.

Dukubwirako rero urugero ruri haruguru mu kazi twandikije
amabaruwa yerekeranye n'akazi. Cyakomeza utabwo aho umukomeza twa
banyarwanda ku muntu, ngo bagire ubwo babimenyesha; ibyo bitwaga n'ingirakuru.

Buli ghe basiga umwanya uhagije munsi ya "Binyujijwe . -"
kuko ari ho hajya umukono w'umwo binyujijweho ndetse na kashe .
Basiga kandi umwanya ibumoso uhagati ya cm 4 na cm 5 . Hali
nubwo basiga undi umwanya ibulyo wa cm 2 .

Birakwiliye rwose gutondetanya ingingo neza kuko bifasha
usoma . Ni ngombwa kandi gutanga ibibobanuro bikagije ku cyo
umuntu ashaka kumenyekanisha .

Ntabwo ari byiza kurundanya ibice bigize ibaruwa ; hagati yabyo
hasigara umwanya ubonye . kandi bikajya ~~mu~~ myanya yabyo neza .

"Bimenyeshejwe . -" yandikwa ibumoso hasi , yigiyeye ibumoso na none
gato .

Umuyobozi w'igikorwa iki uki ni we ubwe ushyira umukono ku
baruwa munni y'izina lye . Iyo bidashobotse , abishyira undi
muntu ushobora kumusimbura . Icyo gihe umukono w'umusimbura
ubanzirizwa n'umulimo akora ; abanza kwandika inguguti " P.O ."
zigaragara ko abikoze kubw'undi muntu .

Ni byiza kwitondera kwandika ku ibahasha . Bandika adiresi
yuzuye y'uwandikiwe^{hagati} , ikaba igaragara neza . Ntibashyira
tembure aho babonye hose ; ahubwo iya hejuru ibulyo .

Tembure

Bwana Prefe wa Prefogitura
K I B U Y E . -

Hateganywa igitabo bandikamo amabaruwa yoherezwa n'ayekirwa .
Ndetse ayo mabarurwa akagira aho abikwa ku bulyo bayato-
ndetanya uko akulikirana .

UBUDOHOKA

Nkuko twigeze kubibona, hali ubwo abantu biyemeza gukora umulimo rusange, bamwe muri bo ntibakomeze umurego batangiranye maze bakadchoka. Impamvu UBUDOHOKA rero likaba lyaraturutse kuri icyo ushinga "Kudohoka". Ubwo ntibababakiribira umulimo ku buryo bukwiriye, bakagenda basiba uko bishakirye. Ndetse imwe na imwe bakivana mu muryango. Impamvu zibitera utabwo ari zimwe. Hali ubwo ishyirahamwe liwuka aho lidafite icyerekezo gihamye; ~~ubwo~~ gihe rero hirapandajanda maze bigaca intege bamwe mu baturage. Hali n'ubwo ibikorwa biba bitaboneye, nabwo rero haboneka abaturage intege bigatuma badohoka. Gane cyane icyo abanyamuryango babona nta nyungu bakoreye ku ishyirahamwe ryabo bakunda kugabanya umurego ndetse bakaba baturage. Icyo mu muryango hapamo amashuri n' amashuri bituma bamwe badohoka. Haba n'ubwo abaturage batamurimo bacye intege abanyamuryango bitye ubwo bakadchoka. Hali impamvu nyinshi rero.

Akarangabudohoka

Akarangabudohoka ni ikigabanyo cy'umubare w'iminsi umuntu yasibyeho nta mpamvu n'umubare w'iminsi igomba gukorwaho mu kwezi.

Bituma bashobora kumenya ubudohoka bw'umuntu. Ikindi bashobora kukifashisha bamukata ku gishamba cy' umuntu cyangwa cy'igihe iki n'iki.

Uko bagashakira

Niba a ihagaraliye umubare w'iminsi umuntu yasibyeho na m igahagaraliye iminsi itorwaho mu kwezi, bashakira akarangabudohoka d ku buryo bukwiriye:

$$d = \frac{a}{m}$$

Turage ko umuntu asibye nta mpamvu iminsi 3 kuri 24 yagombaga gukorwaho mu kwezi. Dushobora gushakira d dutya:

$$d = \frac{3}{24}$$

$$d = 0,125.$$

Inzira za "d".

Mu gihe $a = 0$, nta budohoka buba bukurikira. Ubwo rero $d = 0$.

Mu gihe $a = m$, haba harabaye Ubudohoka bukurikira. Icyo habaye d harabaye iminsi 1.

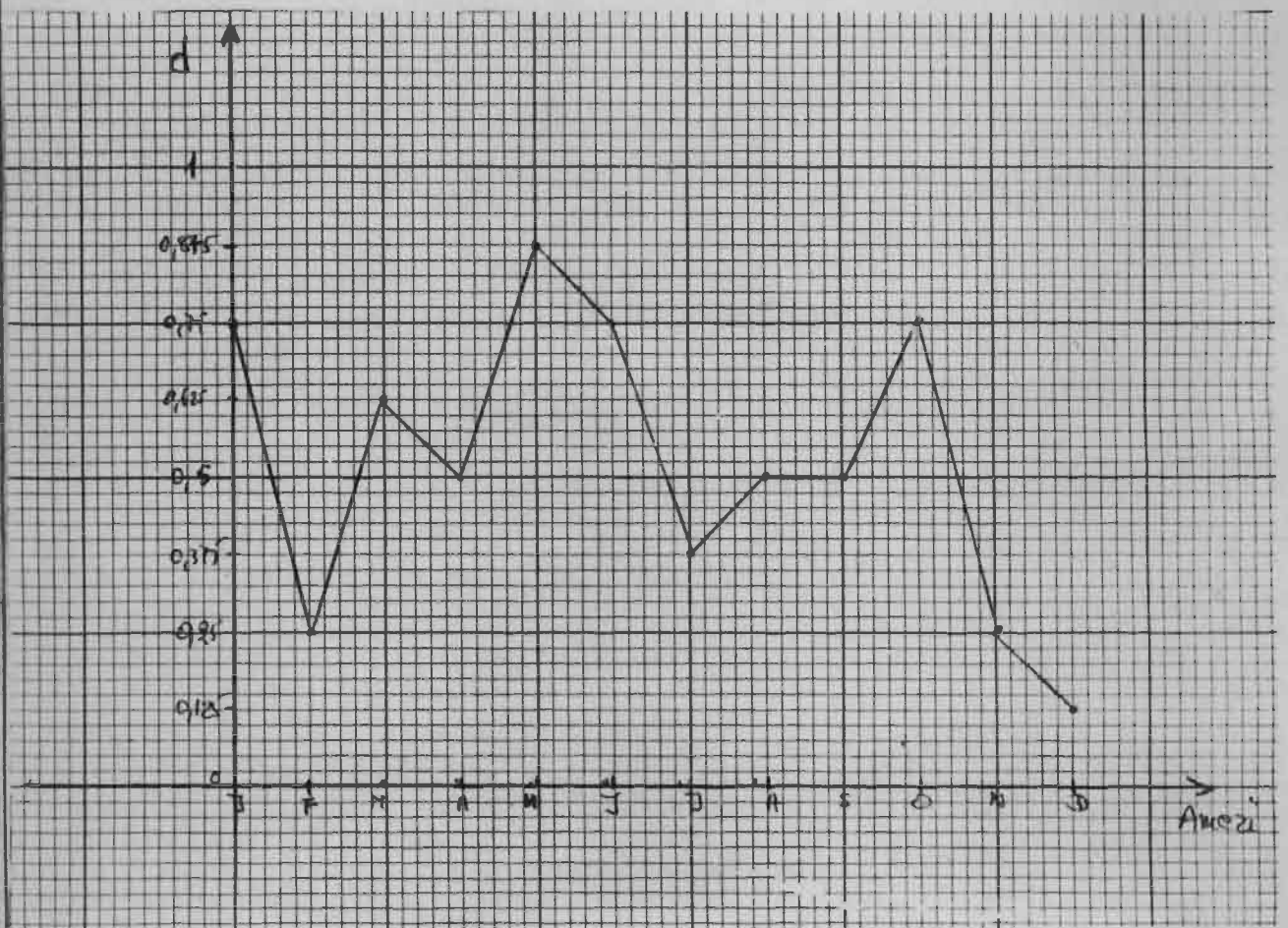
July 1, 1904

Igishushanyo uduyumutse aya d gikorwa bahereye ku gashyamba kacya buri kwezi.

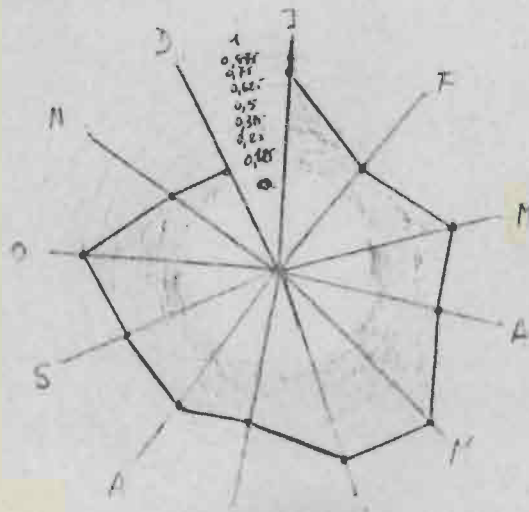
Urugero: Dukore icyo gishushanyo nuba mu mwaka wa 1984 akarangabudokoke kaligaragaye buho kwezi ku buho bukurikira:

Ukwezi	J	F	M	A	M	J	J	A	S	O	N	D
d	0,7	0,25	0,625	0,5	0,875	0,75	0,375	0,5	0,5	0,75	0,25	0,125

A. Ubulyo bwa ubere



B. Ubulyo bwa kabili.



Ibisabanuro n'akamaro kiubu bulyo.

ubu bulyo buteye uk'inzu y'igitagangulirwa kandi bukoreshwa kenshi icyo m idahinduka.

Uko igishushanyo giteye.

Icyo gishushanyo ndangamiterere kigizwe n'inziga zikubikiranye. Buli inziga ruhwaye n'urwego uru m'uru rw'ubudohoke. Nko kuli iki gishushanyo cyo haruguru hafi inzego umuhari urwego rwa ubere ruhwaye na 0,25; urwa kabiri ruhwaye na 0,125; urwa gatatu ruhwaye na 0,25 bityo bityo.

Intera ili hagati y'inziga zikubikiranye igenda ingana.

Kigizwe n'inkingi-fatizo cumi n'ebiyili zihagaraliye amezi cumu n'abiri y'umwaka. Inkingi ya ubere ihagaraliye ukwezi kwa Mutarama bityo bityo.

Aho inkingi-fatizo ihurira na buli inziga hitwa: akadomo-rwego.

Buli kadomo-rwego baheraho bara umurongo ndangamiterere kitwa: akadomo-rwego fatizo.

Igice kili hagati y'urwego rwa ubere n'umurongo ndangamiterere cyitwa: igice ndangabudohoke.

iki d ikoresheje

Akarangabudohoke gakoreshwa cyane mu kugaragaza uko umuntu yagiye adohoka.

Kugirango kandi buli wese abonye igikembo gihuye n'uko yakoreye, birumvikana ko ari ugombwa gutata uwagiye asiba utari mpamvu. Bifashisha d muri icyo kataro.

Uko babara ayakaswe

Bafata igikembo fatizo S_b , bakagikuba n'akarangabudohoke d bakabona ayakaswe R .

$$R = d S_b$$

Uko babara igikembo nyacyo S_n

Bafata igikembo fatizo, bagakuramo akatwa.

$$S_n = S_b - R \quad (1)$$

Duhereye ku munganyo (1), tubona ibi bikubikira:

$$S_n = S_b - R; \text{ nyamara } R = d S_b.$$

Dusubuze R agaciro kayo, turabona:

$$S_n = S_b - d S_b$$

Iyu munganyo dushobora kumwandika ku bundi bulyo:

$$S_n = S_b(1-d)$$

Kugirango reho babare igikembo nyacyo, bafata d bakavuramo " d ", hanyuma bagakuba icyo kinururanyo n'igikembo fatizo.

Ugererwa

Niba $S_b = 75000$ naho $d = 0,25$, dushobora gushakira R na S_n .

$$1^\circ \quad R = 75000 \times 0,25$$

$$R = 18.750.$$

$$2^\circ \quad S_n = 75000(1-0,25)$$

$$S_n = 75000 \times 0,75$$

$$S_n = 56.250.$$

Akarangabudohoke mpuzandengo

Akarangabudohoke mpuzandengo D_m bakabona bafashe igiteranyo cy'uturanga budohoke Σd bakagabanya n' umubare w'amezi M .

$$D_m = \frac{\Sigma d}{M}$$

Aha D_m ikoresheya.

Akarangabudohoke mpuzandengo bakifashisha bareba uko umuntu yadohotse nyuma y'amezi aya u'aya. Bagakoresha tundi babara amafaranga akutwa nyuma y'ayo mezi.

uko babara ayakawe

$$R = D_m \times S_b$$

Uko babara igihembo nyacyo.

$$S_n = S_b - R \quad \text{nyamara} \quad R = D_m \times S_b.$$

Dusimbuze R agaciro kuyo :

$$S_n = S_b - D_m \cdot S_b$$

Dushobora kubandikira ku butundi bulyo :

$$S_n = S_b(1 - D_m)$$

Urugero :

Niba igihembo fatizwe nyuma y'amezi abiri ari F12.000 kandi d yagigaragaye itya : 0,125 ; 0,5 ; dushobora gushakira R na S_n .

$$1^o \quad D_m = \frac{0,125 + 0,5}{2}$$

$$D_m = 0,3125.$$

$$R = 0,3125 \times F12.000$$

$$R = F3.750.$$

$$2^o \quad S_n = F12.000(1 - 0,3125)$$

$$S_n = F12.000 \times 0,6875$$

$$S_n = F8.250.$$

Icyitonderwa

Mu gihe umuntu asibye afite impamvu, nk'uburwayi n'ibindi, babara d ku bulyo bwihariye.

Kuri we umubare w'iminsi igomba gutorwaho uramanuka kubera ko bakuramo iminsi yasibyeho afite impamvu.

Turage ko iminsi yagombaga gutorwaho mu kwezi ari umunani; niba asibye kabiri afite impamvu, ubwo bazakore- sha kuri we $m=6$ mu ibara lya d . Noneho mu gihe asibye iminsi itatu nta mpamvu, bashobora gushakira d ku bulyo bukubikira :

$$d = \frac{3}{6} = 0,5.$$

Iyo nta muni n'umwe umuntu yakozeho mu kwezi kubera uburwayi cyangwa indi mpamvu igaragara umugabazi yamenyeshyeje ubwo yariyeho, nibwo bitwaga bamubabwirako d (m=0). Biza

IBICE BY'UBUDOHOKO

Ubudohoke bushobora gushyirwa mu bice bine. Hali igice cy'ihindagulika (V), igice cy'ubudahinduka (I), igice cy'ubwiyongere (P) n'igice cy'ubugabanuke (D).

Igice cy'ihindagulika.

Mu gihe umuntu yitabira umulimo rusange, ubundi akawudohokaho, bikagenda bisimburana, baruka ko ari mu gice cy'ihindagulika. Umuntu uweze atyo, aba ahindagulika no mu bindi byose akora. Haba aho mubwo icyo hindagulika literwa n'uko afite utulimo twashyirahamwe ibimuranga byinshi. Ukuhyemeza kwe akaba ari ko guturuka.

Iyo biteye bitya, ntabwo aba ari byiza kuko no kumugorera biruhanya.

Igishushanyo ndangamiterere kiyanye n'iki gice kili ku rapapuro rwaz.

Igice cy'ubudahinduka

Iyo umuntu adohoka ku bulyo bumwe kumara igihe icy'ite, baruka ko ari mu gice cy'ubudahinduka. Mu gihe biteye bitya, haba hafi impamvu ituma ababoneka iminsi yose igomba gukorwaho mu kwezi, akuyemeza gukora iminsi y'igiye mu kwezi ku bulyo budahinduka. Haba n'ubwo aba muri icyo gice bitewe n'uko byizanye, yajya kubona, akabona yaragiye asiba iminsi ingana buho kwezi kandi bitari mu mugambi ye.

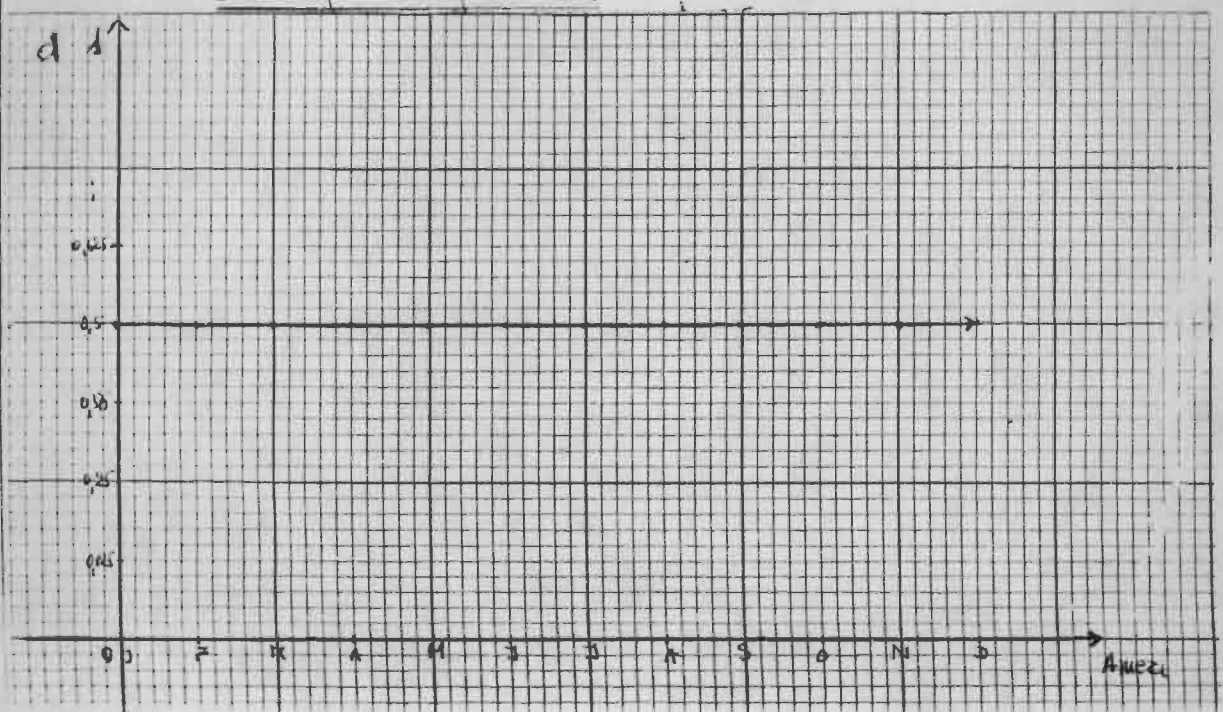
Gukosora umuntu uri muri iki gice ntabwo biruhije cyane mu gihe kukibamo ariwe byaturutseho (kuba yarabonyemeye).

Umugandurambaga aramwegera, amusanze ku mulimo, iwe cyangwa iwabo, akageragera kumugira inama yamwemeza ko akwiriye kwubahiriza iminsi yo gukorera mu ishyamba hamwe. Ntabwo amushyiraho agakato akubwo umwumvisha n'uko yabyifatamo.

Mu gihe kukibamo ari ibigwiziraho, impamvu yo gushyiraho iminsi idahinduka buho kwezi ntabwo ihita yumukana. Bushobora no guterwa n'impamvu byinshi. Cyakora hano no ho bagagera kumwumvisha ko akwiriye kwuzura iminsi yashyirahamwe mu gukorera ishyamba hamwe.

Umurongo ndangamiterere

$$d = 0.5$$



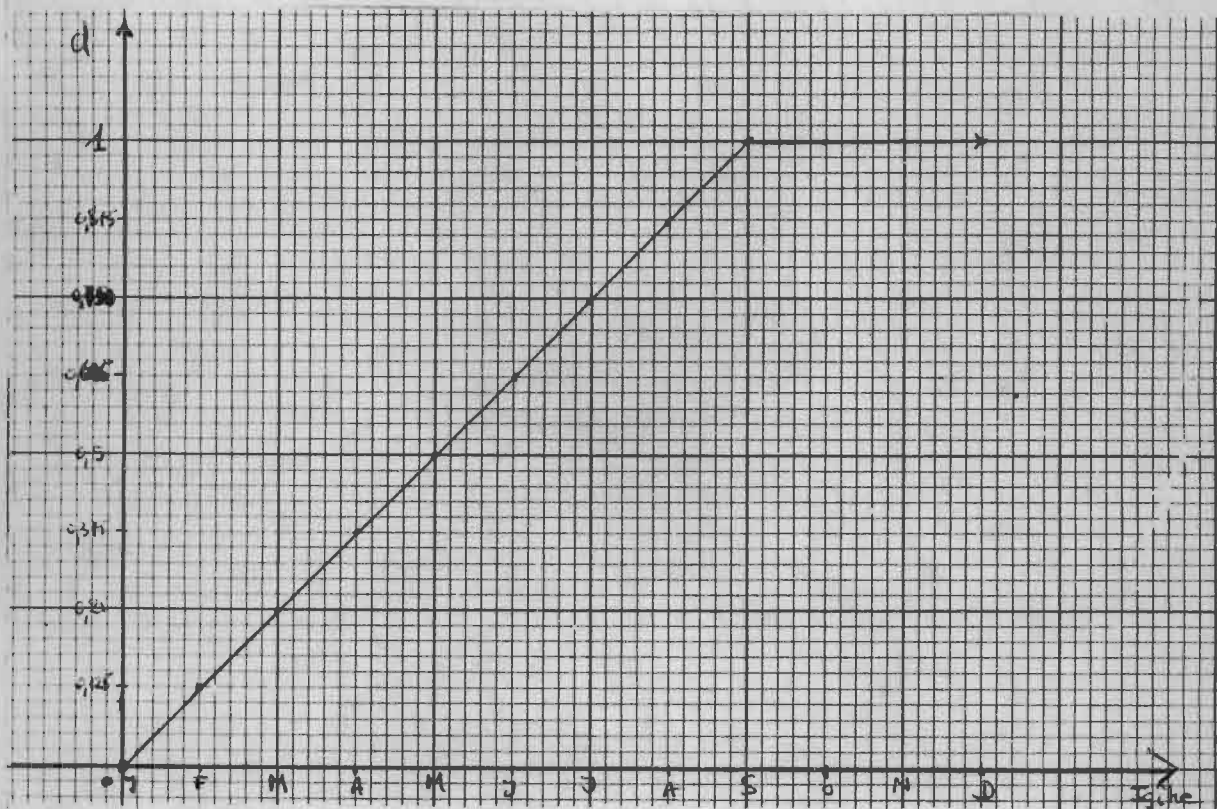
Igice cy'ubwiyongere,

Noneho iyo umuntu adohoka ku bulyo bigenda byiyongera, bavuye ko ari mu gice cy'ubwiyongere umuntu umaze atya aba yaragiye mu muryango by'ihururu; akaba atarumaze intego, imiterere n' imikorere byawo. Yabona ibyo yariwutezeho atabibonye, akagenda adohoka ku bulyo bigenda byiyongera kugeza ubwo ndetse awuramo. Ibyo bikunda kugaragalisa mu mashyamba hamwe y' uruburako rukorera hamwe imimo imwe n'imwe. Iyo adahura abazamira inyungu, akenye bamwe muri bo bagenda badohoka buhoro buhoro. Haba ubwo bitwira n'amabwirye yo kuzze y' ababashuka cyangwa bigatwira n'ubujiji. Haba ubwo bitwira n' imigendekere mibi y' umuryango cyangwa n'ingorane agenda akurana. Mu kugorora umuntu uteye atya, utabwo byoroshye. Umuganduramba agomba kubifataho gihanga, agashaka ingingo nyishi kandi zibonye zamuwusha akamwira ko gutorera hamwe. Ashobora kubikorera mu nama ihuza abanyamuryango bese bali muri iki gice. Akabateganyiriza amashyamba n'ibikorwa byamufasha kubagandura.

Umuganduramba abanza gutora aketi kugirango amenye icyabateye kudohoka kuri ubwo bulyo.

Igisubiranyo utangamiterere

Ukwezi	J	F	M	A	M	J	J	A	S	O	N	D
d	0	0,125	0,25	0,375	0,5	0,625	0,75	0,875	1	1	1	1



Igice cy'ubugabanyuka.

Haba ubwo umuntu adohoka ku bulyo bigenda bigabanyuka, icyo gihe barugako ari mu gice cy'ubugabanyuka.

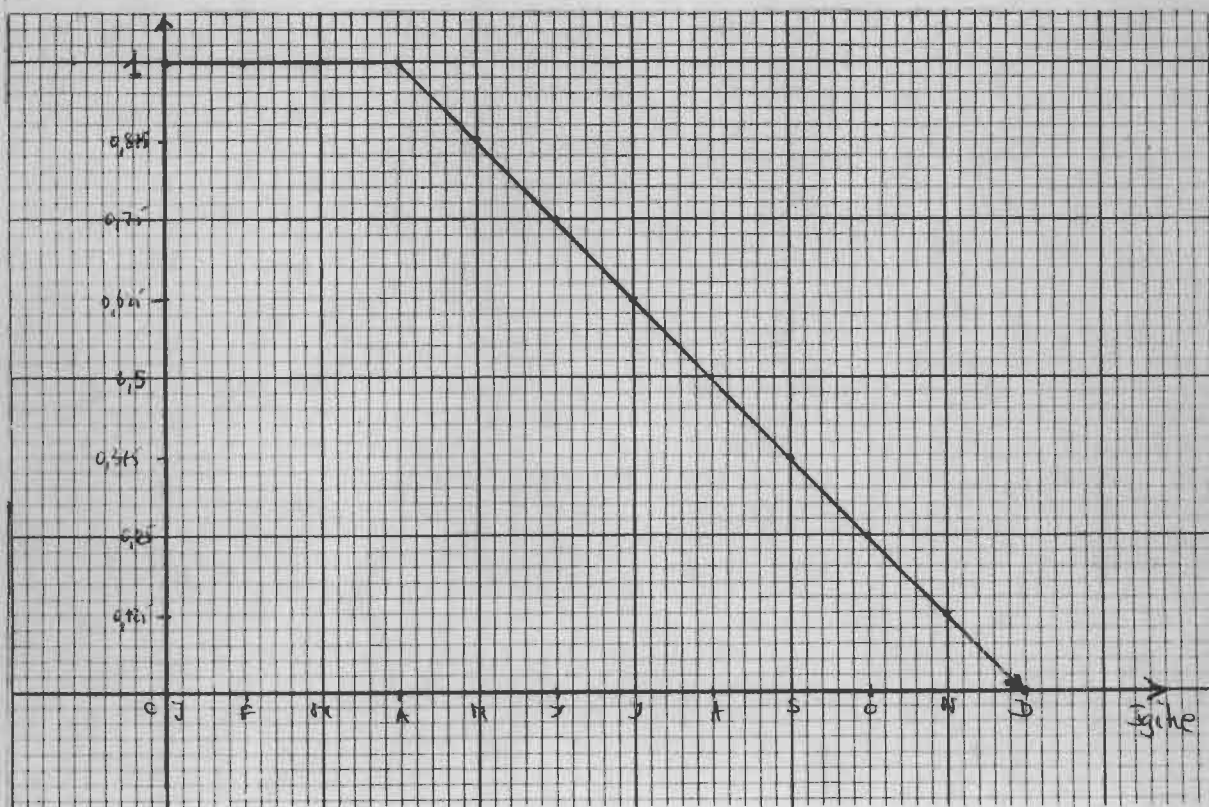
Umunyamuryango umaze utyo aba yaragiye mu ishyirahamwe yenda utumva neza icyo lizamumalira aiko akagenda abyumva buhoro buhoro, bityo akagenda yongera umurego. Haba nibwo aba yarahuye n'ingorane agitangira aiko akagenda zigabanyuka. Hashobora kuboneka uruzindi mpamvu.

Mu byerekeye kugorora abali muri iki gice ubwo bikomeye rwose kubera ko bisa no kubutsa uwabyukaga.

Umugandurambaga abateganyiliza imama yo kubatera inkunga, akabumvisha ko bakwiliye gukomeza umurego bafite, bitabira byimazeyo imilimo rusange. Akabereka inzira banyura yo gutsinda burundu ubudohoke. Akora ku bulyo aha n'umwe mu bali muri iki gice usubira inyuma, uretse ko hashobora kubamo ugira ingorane ziturutse ku buwayi... icyo aiko aba ari impamvu igaragara.

Igishushanyo ndakuramutere.

Vkwezi	J	F	M	A	M	J	J	A	S	O	N	D
d	1	1	1	1	0,85	0,75	0,625	0,5	0,375	0,25	0,125	0



Icyitonderwa

Hari icyo kigera n'abantu batigeze badohoka ($d=0$). Aho akaba ari Intwari ku muryango. Aho bandi bagenerwa ishimo n'icyubakiro mu ishyirahamwe ku bulyo bishobora gutera umurego abandi bamunyamuryango.

INZEGO Z'UBUDOHOKO

Uretse ibice tumaze kubona, ubudohoke bugizwe kandi n'inzego eshatu zigaragazwa mu mugano yakarangabudohoke. Kugirango bashobore kubona urwego kanaka alimo ni ukubanza kubara akarangabudohoke mpuzandengo nyuma y'amezi aya n'aya.

- Urwego rwa mbere: $0 \leq Dm \leq 0,4$
- Urwego rwa kabili: $Dm = 0,5$
- Urwego rwa gatatu: $0,6 \leq Dm \leq 1$.

0 - 0,4 0,5 0,6 - 1



Urwego rwa mbere

Umuntu iyo ari mu rwego rwa mbere aba yaradohotse aliko ku bulyo budakabije, bikaba byakwihanganirwa. Habaho kumukosora kugirango ashobore kugira umuhati ku mulimo.

Urwego rwa kabili

Umu mu rwego rwa kabili we aba yaradohotse ku bulyo ubudohoke bwe buba buhagati. Umu mu rwego bawwigako bakareba niba bawwihanganira cyangwa niba baba bawwigijye kugirango akosorwe hanze.

Urwego rwa gatatu

Abali mu rwego rwa gatatu bigizwayo kuko bigaragara ko baba baradohotse cyane. Cyakora utabwo birukanywa burundu, ahubwo bageragezwa ku bundi bulyo, bawura kwikosora bagasubizwa mu muryango, naho abananiyanye akaba ari bo bigizwayo burundu.

ITANGA LY'IMYANYA

Bahemye ku bice n'inzego by'ubudohoke abanyamuryango bafite, bakora amafishi y'itanga ly'imyanya.

Ifishi y'itanga ly'imyanya mu bice.

Iyo fishi igaragaraho bya bice uko ari bine: I, V, P, D.

Mu gisika cya buho gice, handikwamo abanyamuryango bakirimo (Amazina yombi) n'umero za buho muntu.

Ifishi y'itanga ly'imyanya mu nzego.

Iyi fishi yo igaragaraho za nzego uko ari eshatu: urwa mbere, urwa kabili n'urwa gatatu.

Mu gisika cya buho rwego, bandikamo amazina y'abanyamuryango barurimo n'umero zabo.

Ikubitonderwa:

Abataligeze badohoka, bandikwa mu gitabo cy'icyubahiriro.

Mu gihe muri abangaba hahamwe abatangira byumaze umuryango, bawuhagarurira no mu muryango itari iyo gutanga, barabafotora maze amafoto yabo agashyirwa ku GISIKA CY'ICYUBAHIRO. Aho bari ku gisika cy'icyubahiriro niba baba bagize INTERO Y'ICYUBAHIRO. Iyo nteko akaba ari igashyamba n'itangaragajwe. Mu muryango umuryango, bica zwa ahahamwe icyubahiriro hatagurwe. Hahamwe byashyirwa

Akarangabudohoke k'ishyirahamwe.

Akarangabudohoke k'ishyirahamwe ni akabare kerekana uko ishyirahamwe lyadohotse ku ntego liyemeje likorera hamwe ku minsi yagenwe icyi'iyi.

Uko bakabara.

Niba I_d ihagarariye akarangabudohoke k'ishyirahamwe, A akaba ali umubare w'insi yose yasibweho nta mpamvu, naho PP akaba ali umubare w'insi yose yagombaga gukorwaho, ako karangabudohoke bagashaka batya:

$$I_d = \frac{A}{PP(m)}$$

Inzitiro za " I_d "

Iyo $A=0$, nta budohoke buba bwatanyeho. Icyo gihe

$$I_d = 0$$

Naho iyo $A=PP$, haba karabanyeho UBUDOHOKE BWUZUYE. Ubwo icyo babaze I_d babona ingana na 1. Bityo rero dukobora kwandika:

$$0 \leq I_d \leq 1.$$

NB. Iyo I_d ihinduka ingana kuli 1, ubudohoke buba buyangera. Iyo igenda ingana kuli 0, icyo gihe buba bugabanyuka.

IBICE BY'UBUDOHOKE

IBice by'ubudohoke ni P (icyo buzanyuka), D (icyo bukurukira), I (icyo buhindukira) na V (icyo budakurukira). Biteye umbere nk'uko twigeze kubibona ku budohoke bwa buri muntu.

INZEGO Z'UBUDOHOKE

Ubudohoke bw'ishyirahamwe na bwo bugira inzego eshatu. Kuva kuli 0 kugera kuli 0,4 ni urwego rwa mbere; (kuva ku) icyo $I_d = 0,5$ aba ali urwego rwa kabiri, naho icyo I_d ivuye kuli 0,6 kugera kuli 1 aba ali urwego rwa gatatu.

Icyitonderwa

Mu gihe habaye impamvu zigaragara, nk'indwara z'ibyorezo n'ibindi, zituma abanyamuryango bese badashobora gutora ku buryo nta minsi umwe uba warakozweho, ntawo bilitwaga babara I_d . Mu by'ukuri koko abanyamuryango utibabura badakohotse ahubwo baba bagize ingorane zigaragara. Icyo gihe ibikorwa biba byarahagaze aho ishyirahamwe atibabura lyasenyutse kuko icyo ingorane zishize bongera gutora.

(*) Hali uburyo butandukanye bwo gushaka PP .

Urugero:

Niba A ali umubare w'insi yose yasibweho, m ikaba iminsi ikorwaho mu kwezi, p akaba ali umubare w'amezi yakozweho, naho E ikaba umubare w'abagize ishyirahamwe bese, dukobora gushaka PP .

$$PP = m p E \quad \text{ubwo rero} \quad I_d = \frac{A}{m p E}$$

Ibi bishobora gutorwa icyo m na E bidakurukira.

ibindi buri bwo gushaka PP bukorwaho na

mugurukira

UMUHATI

Iyo ishyirahamwe limaze kuvuka, birakwiliye ko abaligize bagira umuhati kugirango lishobore gutera imbere. Iyo hagize abaduhokako muri bo, ni bwo utagira kubona ishyirahamwe litagifite umurego lyatungiranye.

Umugandurambaga afite uruhare rukomeye mu gufasha ishyirahamwe gukomeza umurego kugirango ibikorwa bitungane. Mu gihe abanyamuryango bamaze kwemeza iminsi yo gukorera hamwe bagomba kububakiriza. Iyo babonye ko hari umunsi utazakorwaho, mu yo bahisemo, kubera kojijizaba yabaye cyangwa se ikiundi kindi, icyo gihe barebana hamwe undi munsi wawusimbura.

Muri iki gice rero turareba uburyo umuntu ashobora gusuzuma umuhati w'ishyirahamwe n'uko yagerageza kuwuboneza mu gihe utameze meza.

Akarangamuhati k'ishyirahamwe

Akarangamuhati k'ishyirahamwe ni akabare kerekana uko ishyirahamwe lyagize umuhati wo kwitabira intego lyiyemeje likorera hamwe ku munsi yagenwe.

Uko bakabara.

Niba m ari umubare w'iminsi yakozweho mu kwezi, p ikaba umubare w'amezi, E umubare w'abanyamuryango, A umubare w'iminsi yasibweho, dushobora kwandika ibi bikurikira:

$$I_a = \frac{mpE - A}{mpE}$$

I_a : akarangamuhati
 mpE ni igikubo gihwanye n'umubare w'iminsi yose yagombaga gukorwaho.

Hano rero turabona ko: $mpE - A$ bihwanye n'iminsi yakozweho mu by'ukuri.

a) Iyo A ingana na 0, iminsi yose yagombaga gukorwaho iba yuzuye.

Icyo gihe:
$$I_a = \frac{mpE}{mpE} = 1$$

b) Iyo A iruta 0, iminsi yose yagombaga gukorwaho iragabanyuka.

Icyo gihe:
$$I_a = \frac{mpE - A}{mpE}$$

$$I_a = \frac{mpE}{mpE} - \frac{A}{mpE}$$

$$I_a = 1 - \frac{A}{mpE}$$

c) Mu gihe $p=1$, bashobora kwandika:

$$I_a = 1 - \frac{A}{mE}$$

Uruzitiro rwa I_a

- Agaciro ntarengwa ko hejuru ka I_a ni 1.
- Agaciro ntarengwa ko hasi ka I_a ni 0.
- Uruzitiro rwa I_a :

$$0 \leq I_a \leq 1.$$

$$\text{Iyo } A=0: I_a = 1 - \frac{0}{m_p E}$$

$$I_a = 1$$

$$\text{Iyo } A=m_p E: I_a = 1 - \frac{m_p E}{m_p E}$$

$$I_a = 0$$

N.B. - Iyo I_a izamuka igana kuli 1, umuhati ku kazi uba wiyongera; mu gihe ingana na 1, umuhati aba ari wose.

- Iyo I_a imanuka igana kuli 0, umuhati ku mulimo uba ugabanyuka; yaba ingana na 0, hataba hali ubudohoke bwuzuye bw'ishyirahamwe.

Ibice by'umuhati.

Kimwe n'ibice by'ubudohoke twigeze kubona, umuhati nawo ugira ibice byandikwa kimwe, bitavugwa kimwe.

Igice cy'ubwiyongere.

Iyo I_a igenda izamuka barugako hali ubwiyongere bw'umuhati (P). Ubwo biba bigenda maza.

Igice cy'ubugabanyuka.

Iyo I_a igenda imanuka, barugako hali ubugabanyuka bw'umuhati (D). Ntabwo biba ari byiza.

Igice cy'ubudahinduka.

Mu gihe I_a idahinduka, barugako hali ubudahinduka bw'umuhati (I).

Igice cy'ihindagurika.

Iyo I_a ihindagurika, barugako hali ihindagurika ly'umuhati (V). Ntabwo aba ari byiza kuko abagize ishyirahamwe baba bafatanyeho burundu, bityo ibyo bakora ntibishobore gutungana.

Uwirungo ndangamiterere

Dukomeye ku bice tumaze kubona haruguru, dukobora gutora ibishushanyo ndangamiterere.

- Iyo hali ubwiyongere bw'umuhati, umurongo ndangamiterere ugenda uzamuka.

- Iyo hali ubugabanyuka bw'umuhati, umurongo ndangamiterere ugenda umanuka.

- Mu gihe hali ubudahinduka bw'umuhati, umurongo ndangamiterere uba uteganyeho n'umurongo w'ibiko.

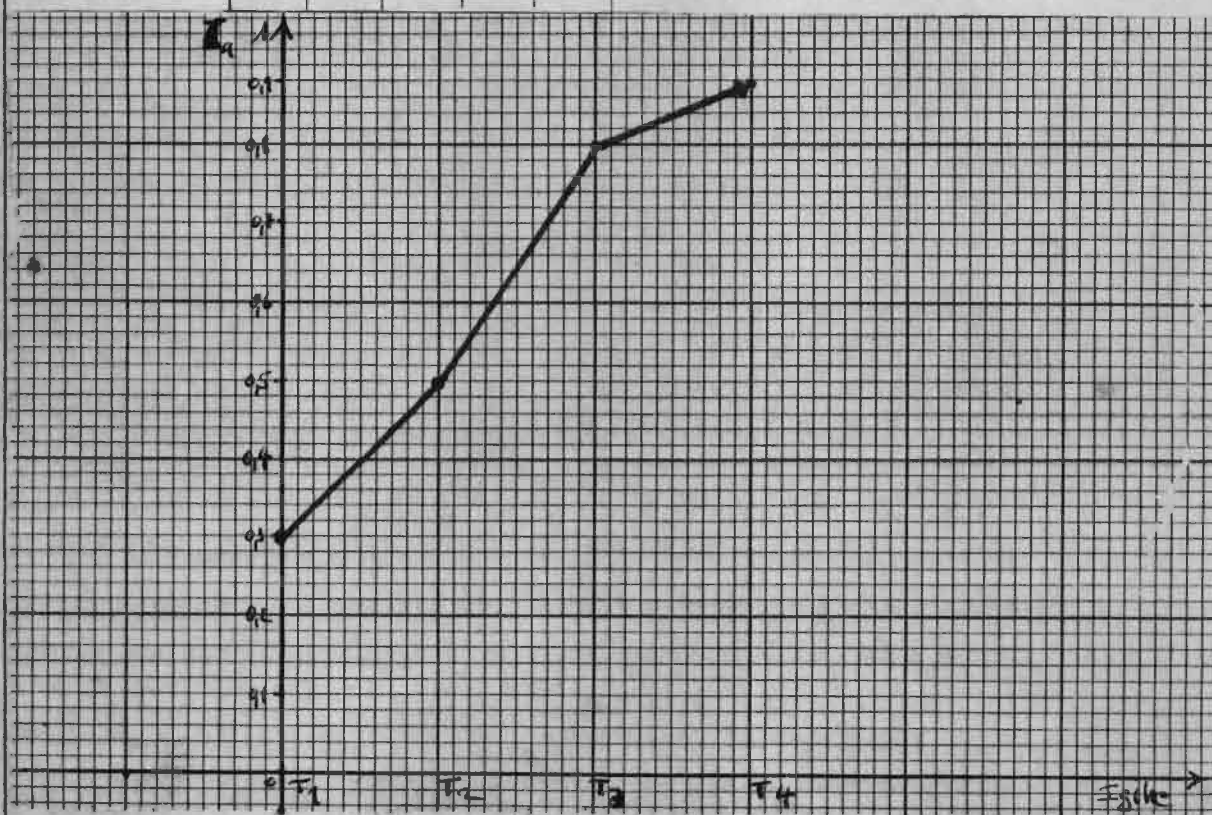
- Mu gihe hali ihindagurika ly'umuhati, umurongo ndangamiterere ugenda umanuka, uzamuka bityo bityo.

Ni byiza rero kwifashisha iyi mirongo kuko ihita yerekana ako umuhati uteye.

Dutore ibishushanyo ndangamiterere mu gihe:

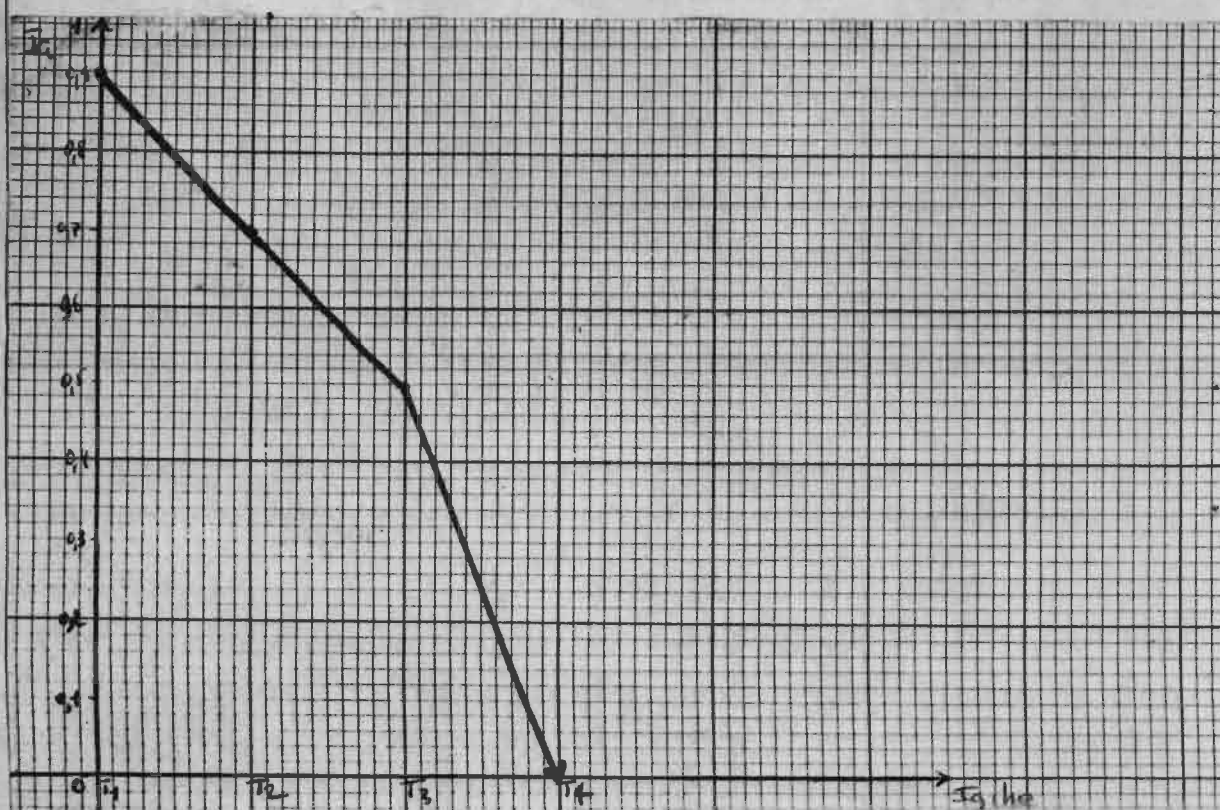
a) Hali ubwiyongere bw'umuhati.

Igihe	T_1	T_2	T_3	T_4
I_a	0,3	0,5	0,8	0,9



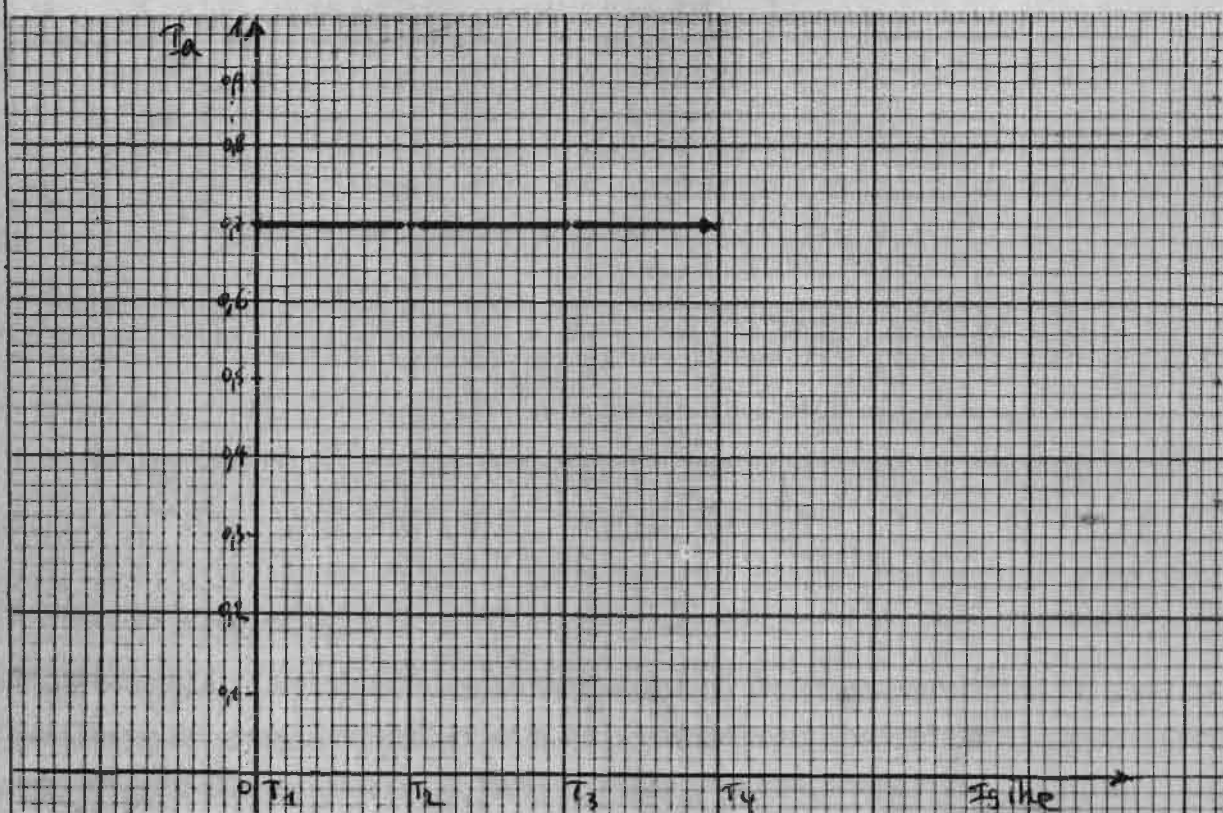
b) Hali ubugabanyuke bw'umuhati.

Igihe	T_1	T_2	T_3	T_4
I_a	0,9	0,7	0,5	0



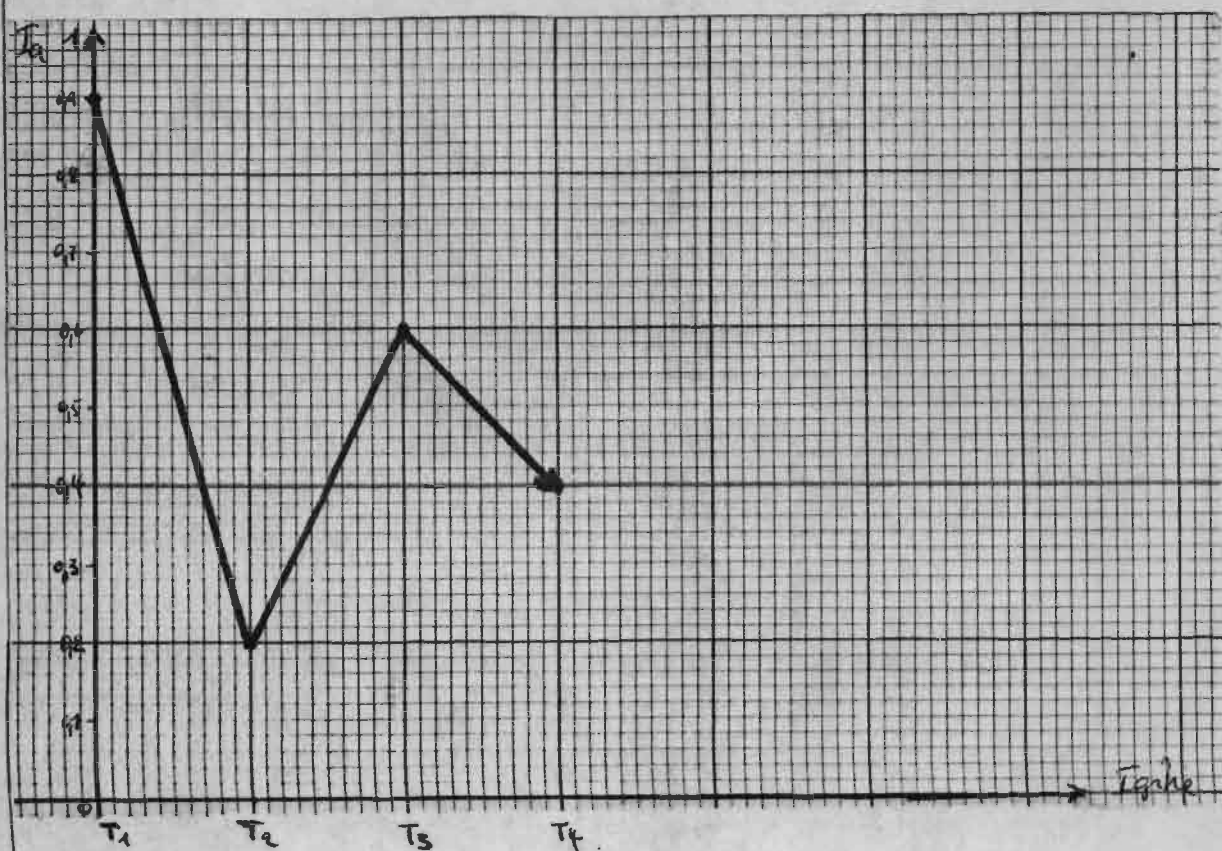
c) Hali ubudakinduka bu'umukati.

$$\bar{I}_a = 0,7$$



d) Hali ihindagulika ly'umukati.

I_{gike}	T_1	T_2	T_3	T_4
I_a	0.9	0.2	0.6	0.4



Inzego z'umuhati

Kugirango bashobore kumenya inzego z'umuhati, bifashisha agaciro ka I_a .

0 - 0,4	0,5	0,6 - 1
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Urwego rwa 1 U. 2 Urwego rwa 3.

Hali inzego eshatu z'umuhati, ari zo z'izi:

Urwego rwa mbere: kuva kuli 0 kugeza kuli 0,4.

Urwego rwa kabili: kururukira $I_a = 0,5$

Urwego rwa gatatu: kuva kuli 0,6 kugeza kuli 1

Iyo ishyirahamwe lili mu rwego rwa mbere, utabwo umuhati uba umeze neza.

Iyo lili mu rwego rwa kabili, umuhati uba uri hagati.

Iyo lili mu rwego rwa gatatu, ligenda ligana kuli $I_a = 1$, ubwo umuhati uba ugenda umera neza.

Ibishushanyo ndangamiterere by'igereranya.

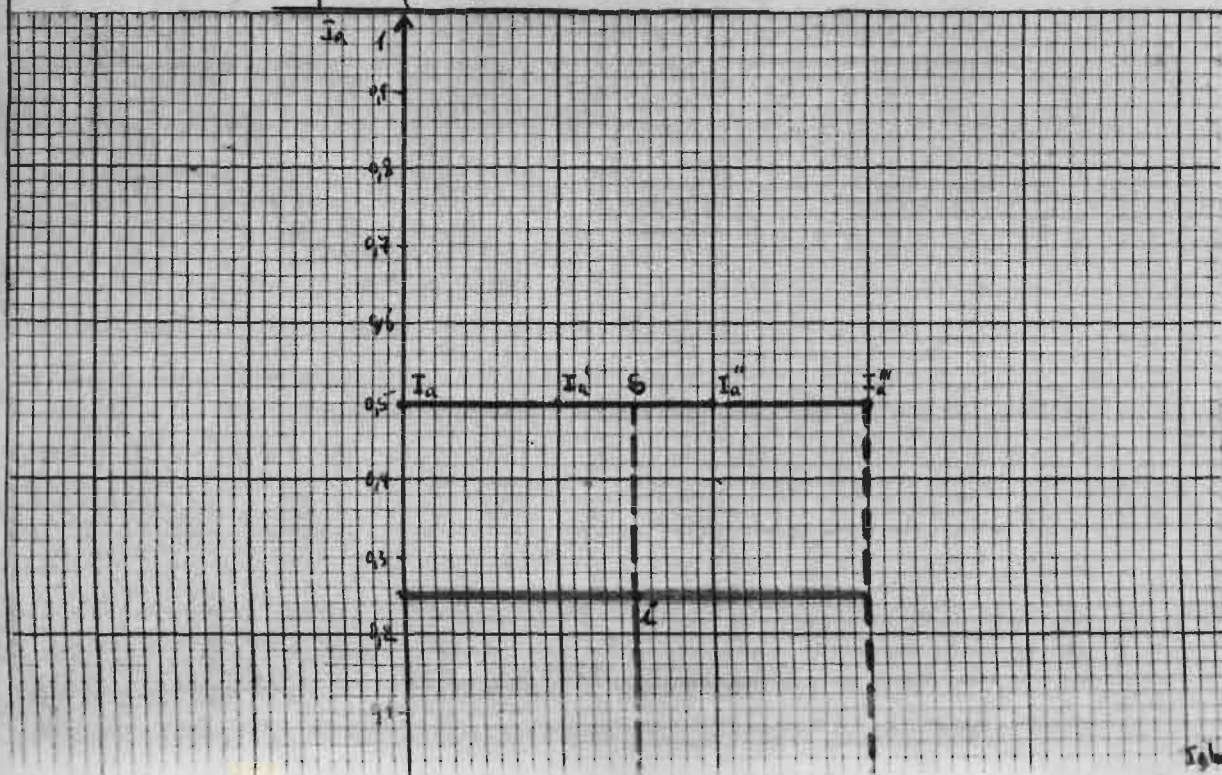
Mu gihe basuzuma umuhati, bashobora gukora ibishushanyo ndangamiterere bigereranya I_a ubwo cyane na I_a mimi cyane.

Ndetse bashobora no kugereranya I_a ya mbere n'iya nyuma cyangwa iza nyuma zikurikira. Ibyo na byo byerekana neza uko umuhati uteye.

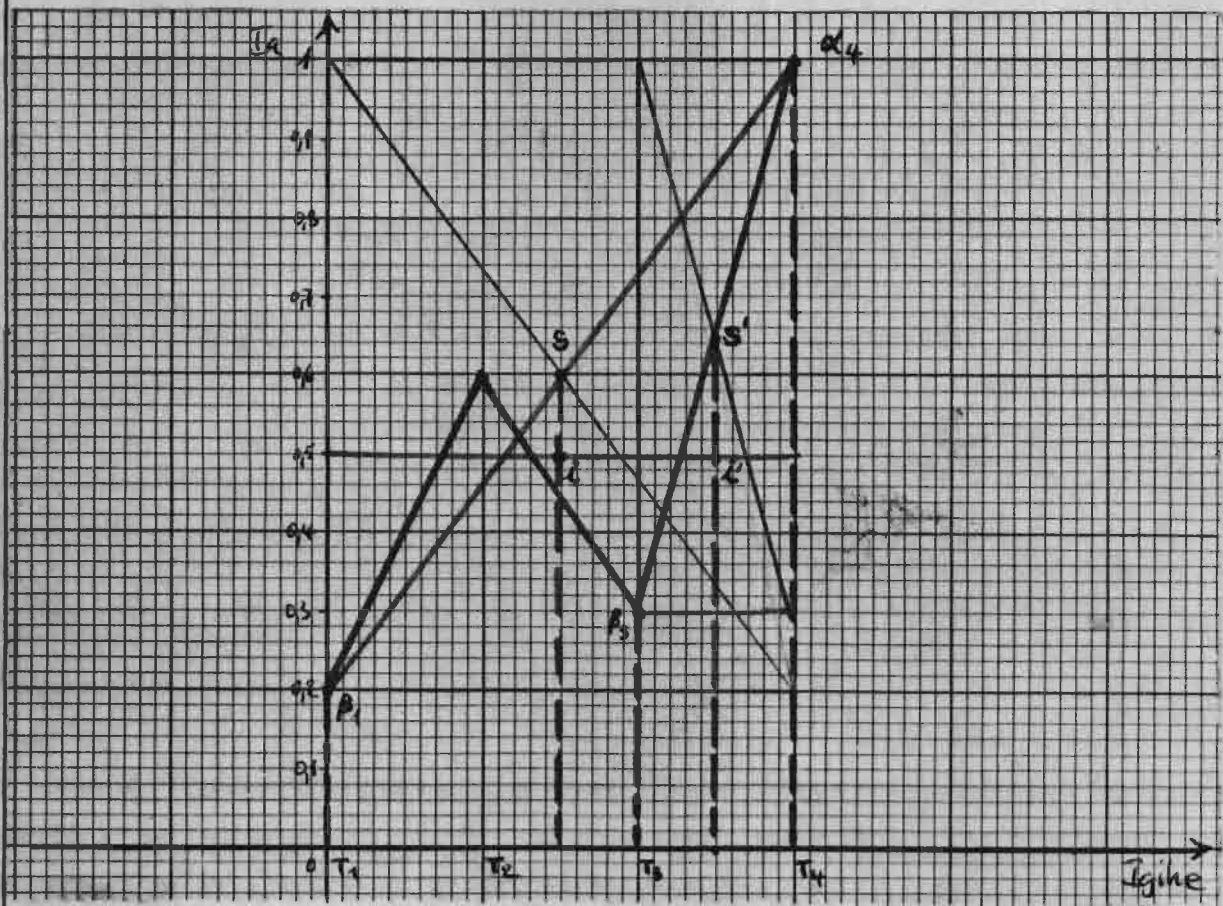
Dukore ibyo bishushanyo duherereye ku mbonerakhamwe ikurikira:

N°	ISHYIRAHAMWE	T_1	T_2	T_3	T_4
1	GIRISUKA	0,5	0,5	0,5	0,5
2	COCOMU	0,2	0,6	0,3	1
3	ABIYEMEJE	0,5	0,3	1	0,4

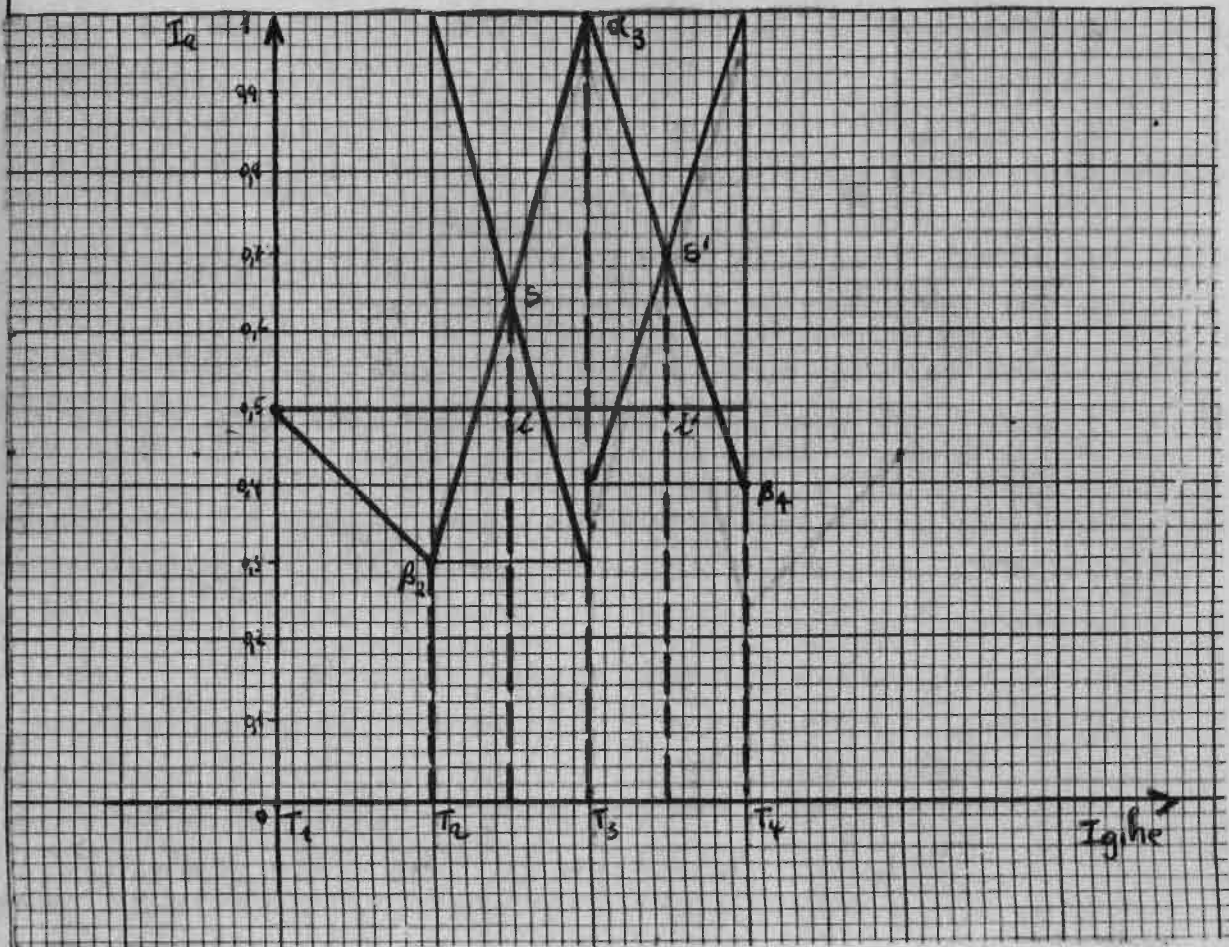
a) Icy'ishyirahamwe GIRISUKA.



b) Icy'ishyirahamwe Cocomü



c) Icy'ishyirahamwe "ABIYEMEJE"



Ibisobanura by'ibyo bishushanyo.

Bara urukirameye rufite umurongo ugororotse uhiza
Ia moya (β) na Ia muni (α) ho impuzampembe. Hanyuma
bagaca indi mpuzampembe ihurira n'iya mbere mu kadoho S.
Bashaka akadoho - rwagati i k'umurongo ugororotse uturuta
kuri α ugakora inguni n'umurongo w'ibihwe.

Iyo hali ubwiyongere

Intera ili hagati ya S na i yerekana uko ubuganduke buteye. Iyo
ali nto, ubuganduke buba ari bwiza, naho iyo ali muni, utabwo
buba bushamaye.

Iyo hali ubugabanyuka

Na none intera ili hagati ya S na i ni yo yerekana uko
ubugande buteye. Iyo ali moya, haba harabaye ubugande cyane.
Ndetse iyo S na i bihuye, haba harabayeho ubugande bwuzuye,
nta m'umwe wigeze akora. Iyo ali muni, ubugande buba bworokaye.

Iyo hali ubudakurikira

Icyo gihe S iba iteganyeho na i, ni ukuranga ko iba ili ku murongo
ugororotse uhiza za Ia zihanyeho, ukaba iteganyeho n'undi ugororotse
unyura muri i ukora inguni n'umurongo w'uturanga muhaha.
Bakira babona ko umuhaha wakomeye uko wari uri mbere.

Icyitonderwa

Nkuko twabibonye, iyo biga umuhaha w'ishyirahamwe, bakora
igishushanyo ndangamiterere cyawo. Hali ubwo usanga umurongo
ndangamiterere warazamutse ukagera ubwo uhamuka. Nubwo
umuhaha uba uhamutse, uba waligeze kuzamuka; ibyo biga-
tanga ibyiringiro ko wakongera ukazamuka haramutse
harabayeho inama z'ubugandurambaga zihanyeho. Iyo uwo
murongo warazamutse ukagera ukahamuka babirira:

Iromba - mizero.

Haba kandi n'ubwo usanga umurongo ndangamiterere waram-
utse aho ukagera ubwo uzamuka. Icyo gihe haboneka
ishusho ry'irumba riramba hasi. Nubwo umuhaha uba uzamutse,
uba warabanyije kumamuka, akaba ari ikimenyetso kibi
kigaragaza ko baramutse badakurikiranye kafi iby'umuhaha
wakongera ukahamuka. Mu buganduke rero
haraboneka kubonekamo "Iromba - muze".

Isesengura iyigiruma umuhati ugabanyuka.

Nkuko twigeze kubona ko umuhati w'ishyirahamwe ushobora kugabanyuka, ni ukuri kandi hafi impamvu zibitera. Hakaba hafi ~~amashyamba~~ amashyamba agendana na byo, akabisobanura.

Ihamwe Iya mbere (*)

Mu ishyirahamwe lifite umubare w'abanyamulyango udahinduka, icyo umubare w'iminsi yasibweho wiyongereye, akarangamuhati k'ishyirahamwe lyose karagabanyuka.

Uko babona icyagabanutseho (φ): Niba a ari umubare w'iminsi yiyongereyeho, igikubo mpE kiba ari umubare w'iminsi yagombaga gukorwaho, dushobora kwandika uyu munganyo:

$$\varphi = \frac{a}{mpE}$$

$$I_a - I'_a = \varphi$$

$$I_a - \varphi = I'_a$$

$$I'_a + \varphi = I_a$$

Ihamwe Iya kabiri

Mu ishyirahamwe, icyo umubare w'abanyamulyango ugabanyuka, umubare w'iminsi yasibweho wo ukazamuka, icyo gihe akarangamuhati karagabanyuka.

Uko bashakira icyagabanutseho (φ): E_1 ihagaraliye umubare w'abanyamulyango mu gihembwe cya mbere, E_2 ni abo mu cya kabiri, a' iminsi yiyongereyeho, A_1 iminsi yasibweho mu gihembwe cya mbere na e ikaba umubare w'abanyamulyango baruyemo.

$$\varphi = \frac{E_1 a' + A_1 e}{mpE_1 E_2}$$

Kwefisiya z'ubugabanuke bwa E (**)

Kwefisiya z'ubugabanuke bwa E mu gihe A izamuka mu utubare bakuba na E bakabona uko yagabanyutse, bityo bikaba byaratumye I_a imanyuka ku buryo ubu n'ubu.

Uko bazishakira:

a)

$$\sigma = \frac{a - a'}{N}$$

σ ni kwefisiya ituma bahita babona e .

$$N = A_1 + a$$

b)

$$\lambda = \frac{A_2}{N}$$

λ ni kwefisiya ituma bahita babona E_2

$$A_2 = A_1 + a'$$

M.B. Iyo barebye utwo tubare bahita bamenya imiterere y'igabanuka Iya E .

(*) Uko amashyamba yose yerekanywe bigaragaliye mu mugereka.

(**) Isesengura iy'uko babona σ na λ na byo bigaragaliye mu mugereka. Ndetse n'isesengura iy'uko babona izindi kwefisiya na byo biboneka mu mugereka.

Ihame Iya gatanu.

Mu ishyirahamwe, icyo umubare w'abanyamulyango uga-banyutse, umubare w'iminsi yasibweho wo udahinduka, icyo gihe akarangamuhati karamanuka.

Uko bashaka icyagabanutseho φ .

$$\varphi = \frac{A_1 E}{m p E_1 E_2}$$

Kowefisiya z'ubugabanuke bwa E

Kowefisiya z'ubugabanuke bwa E mu gihe A idahinduka ni utubare bakuba na E bakabona uko yagabanutse, bityo bitaba byaratumye I a imanuka ku buryo ubu n'ubu.

Uko bazibara

a)
$$\rho = \frac{\varphi}{1 - \beta}$$

ρ ni kowefisiya ituma babona
 β ni akarangamuhati gato.

b)
$$\theta = \frac{1 - \alpha}{1 - \beta}$$

θ ni kowefisiya ituma bahita
babona E_2
 α ni akarangamuhati kanini.

Isesengura Iy'ibituma umuhati wiyongera.

Iyo umuhati w'ishyirahamwe wiyongera hafi impamvu zibitera. Hafi nro amahame agendana na byo, abisobanura.

Ihame Iya kane

Mu ishyirahamwe, icyo umubare w'abanyamulyango wiyongera, umubare w'iminsi yasibweho wo udahinduka, icyo gihe akarangamuhati kaliyongera.

Uko bashaka icyiyongereyeho φ

$$\varphi = \frac{A_1 E}{m p E_1 E_2}$$

E ni umubare w'abanyamulyango biyongereyeho.

Kowefisiya z'ubwiyongere bwa E.

Kowefisiya z'ubwiyongere bwa abanyamulyango mu gihe umubare w'iminsi yasibweho udahinduka ni utubare bakuba na E bakabona uko biyongereye kugirango akarangamuhati aha n'aka kabe karagezweho.

Uko bazishaka.

a)
$$\eta = \frac{\varphi}{1 - \alpha}$$

η ni kowefisiya ituma babona E

b)

$$\omega = \frac{1 - \beta}{1 - \alpha}$$

ω ni kowefisiya ituma bahita babona E_2 .

Ihame Iya gatanu

Mu ishyirahamwe, iyo umubare w'abanyamulyango udahinduka umubare w'iminsi yasibweho wo ukagabanyuka, icyo gihe akarangamuhati kaliyongera.

Uko bashaka icyiyongeraho:

$$\varphi = \frac{a}{mp E_1}$$

Ihame Iya gatanu

Mu ishyirahamwe, iyo umubare w'abanyamulyango wiyongera, umubare w'iminsi yasibweho wo ukagabanyuka, icyo gihe akarangamuhati kaliyongera.

Uko bashaka icyiyongereyeho

$$\varphi = \frac{A_1 e + E_1 a'}{mp E_1 E_2}$$

e ni umubare w'abanyamulyango biyongereyeho.

a' ni umubare w'iminsi yagabanyutse ku yasibweho.

Kowefisiya z'ubwiyongere bwa E

Kowefisiya z'ubwiyongere bwa E mu gihe A imakuka ni utubare bakuba na E bakabona uko yiyongereye kugirango akarangamuhati ake n'aka kebe karagerweho.

Uko bazishaka

a)

$$\delta = \frac{a - a'}{A_1 - a}$$

• Twibuke ko a' ari umubare w'iminsi yagabanyutse ku yasibweho.

• Ikiyuranyo $A_1 - a$ gishobora gusimburwa n'inyuguti N' .

• δ ni kowefisiya ituma babona e (umubare w'abiyongereyeho).

b)

$$\gamma = \frac{A_2}{N'}$$

• γ ni kowefisiya ituma bahita babona E_2

$$A_2 = A_1 - a'$$

Isesengura Iy'igituma umuhati utiyongera cyangwa ngo ugabanyuke.

Iyo umuhati w'ishyirahamwe udahinduka hah impamvu ibitera. Ibyo bigaragazwa n'ihame litulitira.

Ihame Iya kalindwi.

Mu ishyirahamwe, iyo umubare w'abanyamulyango w'iminsi yasibweho bidahinduka, akarangamuhati na ko ntigahinduka.

Ubwoba rero

$$\varphi = 0$$

Iseengura iy'igituma umuhati ushobora kuyongera, ukagabanyuka.
Cyangwa utuhinduke.

Hari ubwo umuhati w'ishyirahamwe umanuka, ukuyongera cyangwa se utuhinduke, ibyo bikaba biterwa n'impawu twabonye zigaragaye muri ya mahame. Nyamara ariko hari aho mahame ahari tugiye kubona agaragaza ibindagurika bya Ia bitewe n'uko E na A byamanutse cyangwa byiyongereye.

Ihame rya Munani.

Mu ishyirahamwe, icyo umubare w'abanyamulyango w'iminsi yasibweho bigabanyutse, akarangamuhari gashobora kuzamuka cyangwa se ntigahinduke, ubundi kagashobora kumanuka.

Uko bashakira ikinyuranyo cyatwo (φ).

$$\varphi = \frac{A_1 e - E_1 a'}{m_p E_1 E_2}$$

e ni umubare w'abanyamulyango baruyemo
 a' ni umubare w'iminsi igabanyuka ku yasibweho.

a) Ukwiyongera bwa Ia.

Iyo $A_1 e < E_1 a'$ nibwo Ia yiyongera.

Jore uko umukuru uteye:

$$\frac{e}{a'} < \frac{E_1}{A_1}$$

Niba $\frac{e}{a'} = r$, $\frac{E_1}{A_1} = R$ dushobora kwandika:

$$r < R$$

b) Ukudahinduka bwa Ia

Iyo $A_1 e = E_1 a'$ nibwo Ia idahinduka.

Umukuru ukaba uteye utya:

$$\frac{e}{a'} = \frac{E_1}{A_1}$$

$$r = R$$

$$e = a' R$$

$$a' = \frac{e}{R}$$

c) Ubugabanyuka bwa Ia.

Iyo $A_1 e > E_1 a'$ nibwo Ia imanuka.

Uko umukuru uteye:

$$\frac{e}{a'} > \frac{E_1}{A_1}$$

$$r > R$$

Igereranya rya r na R ni icyo byerekana ko akarangamuhari kuyongera, kudahinduka cyangwa kagabanyuka.

Ihame Iya cyenda.

Mu ishyirahamwe, iyo umubare w'abanyamulyango w'iminsi yasibweho byiyongereye, akarangamuhati karazamuka, cyangwa se ntigahinduke, ubundi kakamanuka.

Uko bashaka ikinyuranyo cyatwo (φ)

$$\varphi = \frac{E_1 a' - A_1 e}{m p E_1 E_2}$$

e ni umubare w'abanyamulyango biyongereye ho.

a' ni umubare w'iminsi yiyongera ku yasibweho.

a) Ubwiyongere bwa I_a .

Iyo $E_1 a' < A_1 e$ ni bwo I_a yiyongera.

Umuhuro utaba uteye utya:

$$\frac{a'}{e} < \frac{A_1}{E_1}$$

Niba $\frac{a'}{e} = r'$, $\frac{A_1}{E_1} = R'$ dukobora kwandika:

$$r' < R'$$

b) Ubudahinduka bwa I_a .

Iyo $E_1 a' = A_1 e$ ni bwo I_a idahinduka.

Uko umuhuro uteye:

$$\frac{a'}{e} = \frac{A_1}{E_1}$$

$$r' = R'$$

$$e = \frac{R'}{a'} \quad a' = e \cdot R'$$

c) Ubugabanyuke bwa I_a .

Iyo $E_1 a' > A_1 e$ ni bwo I_a imanuka.

Umuhuro ukye ku bulyo butulikira:

$$\frac{a'}{e} > \frac{A_1}{E_1}$$

$$r' > R'$$

Mu gihe bagereanyije r' na R' bahita bamenya uko akarangamuhati kiyongereye, katahindutse cyangwa se kagabanyutse.

Icyitonderwa

- Mu mahame yose, twagaragaje uko bashaka φ mu gihe batari I_a zombi. Iyo baramutse bazizi, gushaka φ biba byoroshye cyane; bafata imini bakavakamo intoya.
- Aya mahame afite atamara cyane mu isuzumamuhati n'imbonezamuhati.

Isuzumamuhati

Mu ishyirahamwe ni byiza gukulikira hafi umuhati w' abanyamulyango. Iyo ugiye kugwa hasi, umugandurambaga agera gusha abanyamulyango mu kuzamura. Ni byiza rero kwiga ku bulyo bukoze iby'uho muhati buli kwezi cyangwa buli gihembwe kugeza igihe umwata ushuliye. Uko kwiga umuhati w' ishyirahamwe ni byo bita:

"Isuzumamuhati".

Mu isuzumamuhati, iyo babonye umuhati waragiye wiyongera, bavuga ko hali ubuganduke. Nako niba waragiye umanuka, bavuga ko hali ubugande.

Bakora igishushanyo ndangamiterere baheraho bareba imiterere y'umuhati. Iyo babonyemo irumba-muze bagerageza mu buganduke, bamenya ko ishyirahamwe lyagize umuze mubwo lyali lyagerageje kuzamura. Ia. Nibura rero kwitondera umuhati walyo kuko habayeho kurangira, watongera kumanuka.

Iyo mu bugande babonyemo irumba-mizero, bamenya ko abanyamulyango bigeze kwikubita agashyi bakazamura. Ia y'ishyirahamwe lyabo. Nubwo umuhati walyo uba waramutse, habaho ibyiringiro by'uko wakongera kuzamura haramutse habaye ubugandurambaga bubonye.

Iyo umurungu ndangamiterere uzamuka gusa, icyo gihe ubuganduke buba bugenda neza; ni byiza rero ko umugandurambaga afasha abagize ishyirahamwe gukomeza kwo murego.

Mu gihe uwo murungu umanuka gusa, biba bimeze nabi, hahiko ubugande bugaragara. Icyo gihe umugandurambaga yiga ubulyo bwiza bwo kubonye umuhati.

Iyo wa murungu uteganyye n'umurungu w'ibike, icyo gihe umuhati uba utarahindutse. Iyo wali waratangiye ari mwiza, bikomeza kuba byiza. Nako icyo wali waratangiye ari mubi, bikomeza kuba bibi.

Uko likorwa

Hakorwa ingandiko igaragaza uko umuhati uteye. Dore ibyo babanza kugaragaza:

Izina ry'ishyirahamwe, icyo likorwa, aho likorera, aho utebe yalyo aho, igihe lyatangiye n'abagize, amazina y'abayobuzi, adresi yuzuye... Ku bagize, bashobora kugaragaza imashya lyabo bakomeye ku bitsina no ku myaka.

Mu gusuzuma umuhati bifashisha imbonerakamwe y'uko bagize baze maze bakabara uturangamuhati tw'ibihembwe (haba mubwo babara Ia ya buli kwezi). Bakora noneho igishushanyo ndangamiterere. Babara Ia y'umwata wose, bakagaragaza igice n'urwego lilimo. Hakorwa ariko isobanura imiterere y'umuhati, ni ukuvuye ko hali ibibazo bitegurwa bibazwa abanyamulyango n'abandi batalilimo aho balizi kugira ngo bamenye impamvu umuhati walyo uteye ku bulyo ubu n'ubu.

Ababonye batanga umwanzuro, bakagaragaza ibitererwa byabo bwite ku muhati walyo.

Hagaragazwa igihe likorwe, umwero w'ubushyamba...

Kugirango inyandiko y'isuzumamuhati itorwe neza, ni byiza kwifashisha ubulyo twabonye bwo gutora raporo. Muli icyo nyandiko bashobora no gushyiramo (mu nyongerera) imbomerakamwe igaragaza ibyangombwa byose byerekana uko umuhati uteye.

Imbomeramuhati.

Iyo bamaze gutora isuzumamuhati, bakabona neza uko umuhati wari uteye, bakora icyo bita "Imbomeramuhati" mu gihe basanze halimo ubudokoke. Iyo imbomeramuhati ikorwa ku bulyo butandukanye.

Ubulyo uterashyaka.

Ubulyo uterashyaka bufite inzira-nyobozi yabwo.

• Ubwa mbere na mbere, batanga ishimo kubatigeze badokoka na limwe; bese baba baradokotse, bagafata abarushije abandi umuhati, akabacali bo bahabwa ishimo. Mu batagizeze badokoka cyangwa mu barushije abandi umuhati, batoranyamo babili bukimwata bitangirye umulyango byimazeyo, bagafatirwa maze amafoto yabo agashyirwa ku "gisika cy'icyubakiro". Izo ntware ku mulimwari zigira icyo bita "Iuteko y'Icyubakiro" nk'uko twigeze kubikora. Abagize icyo uteko babona byinshi byiza mu mulyango. Iyo habaye nk'ibiriho by'ishyirahamwe, bicazwa mu mwanya w'icyubakiro uteganyijwe icyo uteko. Bashobora guhabwa amashimo arebana n'imizamukire y'ingo zabo, bagaserukira umulyango icyo bishobotse... Ni abagishwanama, bakaba n'itanga rugero mu by'umuhati...

• Ku badokotse bali mu rwego rwa mbere, hateganywa inama nyandurambaga kugirango babafashe kugira umuhati, bityo na by'ishyirahamwe igashobora kuzamuka.

• Ku badokotse bali mu rwego rwa gatatu, bigizwayo bagakosorwa hanze ku bulyo buhaliye. Ni ukuvuye ko bagira ibikorwa byabo byo kubagandera. Hagakorwa inama nyinshi zo kubumvisha isano "UMUNTU-UMUNSI". Bakabageragera uko bishobotse kwose maze abikosoye bagasubira mu ishyirahamwe, abakurikira bakigizwayo burundu.

Abigijweyo bese babita ibigwari ku mulimo. Ni bo baba bagize "Iuteko y'ibigwari". Nubwo bababa ibikorwa byabo byo kubageragera, utibababacyanditswe mu gitabo cy'abanyamulyango; bawidukwa ukwabo. Bongerera kwandukwa igihe kigeze cyo gusubizamo abikosoye.

Ubulyo mpamyanego

Ubundi bulyo ni ubuzamo intego bagomba guhamya kugirango umuhati uzamuke ku bulyo ubu n'ubu, bakaba babwita Ubulyo mpamyanego.

Bifashisha amakame amwe yerekanywe n'umuhati alimo ubwiyongere bwa Ia. Bitorwa rero ku bulyo butandukanye: bashobora kwihatira kumanura umubare w'iminsi yasibweho, bashobora kwifashisha kwifashisha kowefisiya ebyiri z'ubwiyongere bw'abanyamulyango na y.

Iyo bakoresheje izo kowefisiya baba bashakira kugera ku kashyamba k'ubuzamuka aha n'aka.

Abashinzwe ubugandurambaga bakora uko bashoboye kugirango abanyamuryango bakorane umuhati, bityo icyo Ia z'intego zigashobora kugerwaho.

M'uko twabibonye, bakoresha γ icyo A igize icyo imanyukako, E yo ikagira icyo izamukako. Hali ubwo rero A yamanuka ikageza ubwo yatuma Ia y'intego igerwaho, E itiliwe ihinduka (ubwo biba biteye uk'uko ikame lya mbere libivuye). Hakaba m'ubwo A imanyuka ku buryo ubun'ubu, E yo ikazamuka bityo Ia y'intego bihwaye ikagerwaho. Ubwo rero biramurikama ko hali uburyo bubili buteganywe bwo kugera kuri Ia y'intego imwe icyo bakoresheje γ ari byo bitoya:

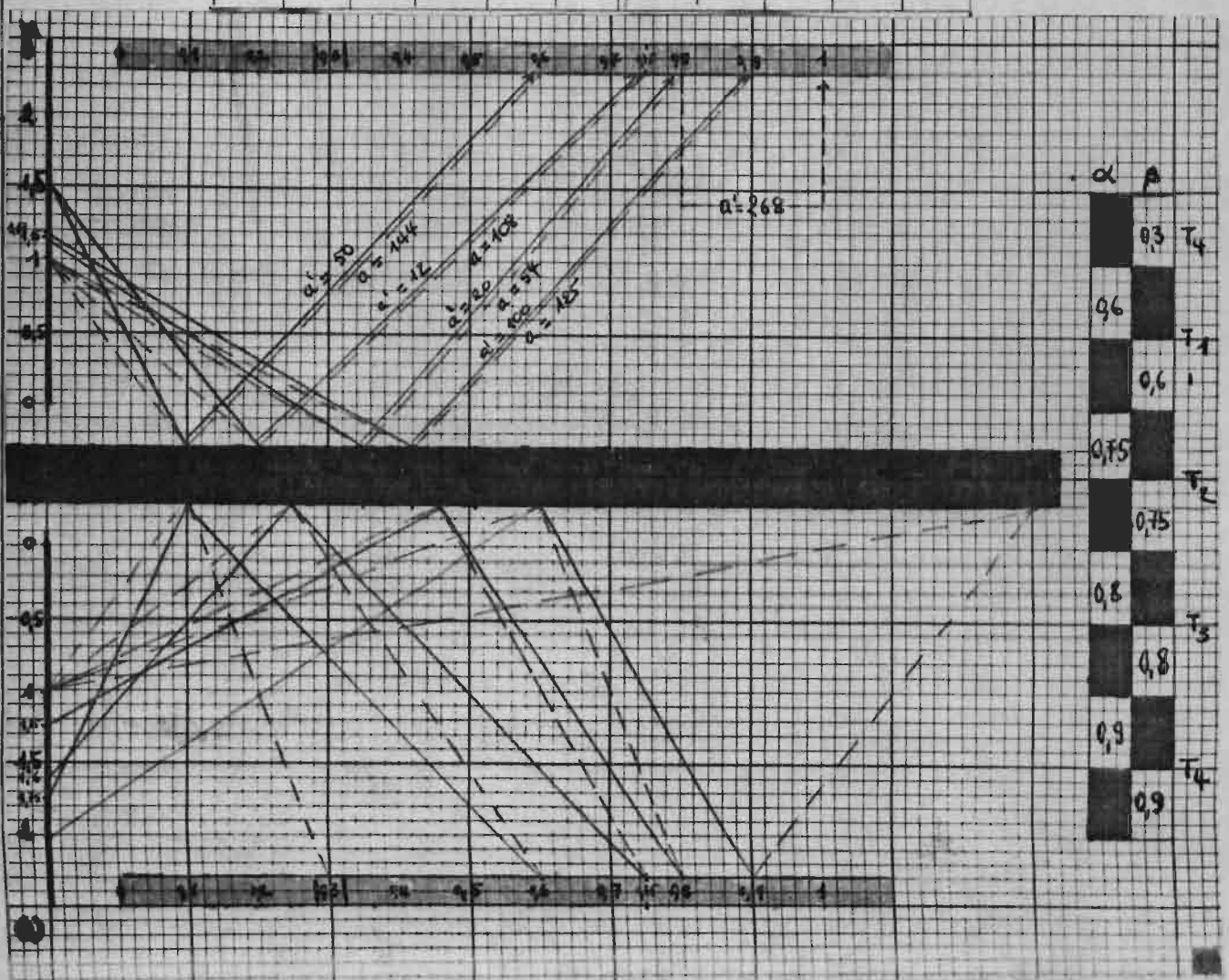
"Ubutegane mpuzantego"

Bakoresha ω icyo E ~~ahindutse~~ yiyongera, A yo idahinduka. Urugero

Igishushanyo mbonerakamwe.

Igishushanyo mbonerakamwe ni icyerekana uko Ia z'intego zagerwaho bakoresheje ω na γ . Kugirango dukubore kugikora, turafashisha imbonerakamwe ikurikira.

P	ω	E	E'	β	α	γ	E	E'	β	α
$T_4^{(k)}$		20		0,3			20		0,3	
T_1	1,75		35		0,6	1,5	30		0,6	
T_2	1,6		56		0,75	1,5	45		0,75	
T_3	1,25		70		0,8	1,15	52		0,8	
T_4	2		140		0,9	1,17	61		0,9	



Ibisobanuro ku gishushanyo mboneramuhati.

- Imirongo itambitse, ubanza n'uko hasi, igaragaraho uturungamuhati.
 - Umurongo utambitse wo hagati, ugaragaraho umubare w' abanyamulyango; uko bagenda biyongera.
 - Umurongo uhagaliye wo hejuru ni uwa kowefisiya y'ubwiyongere bw'abanyamulyango γ .
 - Umurongo uhagaliye wo hejuru ni uwa kowefisiya γ ubwiyongere bw'abanyamulyango ω .
 - Umurongo mboneramuhati uhaza kowefisiya n'umubare w' abanyamulyango biyaza n'akarangamuhati k'intego. Umubare mushya w'abanyamulyango ugerwaho n'umurongo mboneramuhati ukubikira.
- Urugero: Umurongo mboneramuhati uvuye kuri $\omega = 1,75$ ugera kuri $E = 20$. Ubwo umushya ni 35 ugerwaho n' umurongo mboneramuhati uvuye kuri $\omega = 1,6$.

Iyo kowefisiya ingana na 1, E utabwo ihinduka.

Ahakoresha γ , hafi uburyo A imaze, bityo $\gamma = 1$. icyo gihe $a' = a$. Hafi n'uburyo kandi I_a y'intego ishobora kungana na 1 mu gihe A imaze ikungana na 0.

- Igishushanyo gihagaliye i buri cyerekeranye I_a nta yabonetse (β) na I_a nini igomba kugerwaho (α) mu gikembwe iki n'iki.
- Akarangamuhati kafi hagati y'umurongo tubili duhagaliye kuri ya mirongo itambitse y'uturungamuhati ni akaranga-muhati kabonetse bashingiraho bakora imboneramuhati.

Ibyitonderwa

- Igishushanyo mboneramuhati gifite akamashyamba cyane mu bugandurambaga bw'amashyirahamwe y'abantu bakora imilimo rusange. Umugandurambaga ushaka gukora imboneramuhati ashobora kukifashisha. Iyo agikubise ijisho, ahita abona uko yabyifatamo kugirango umuhati uyu n'uyu ugerweho.

Hagomba aho no gukorwa ingandiko mboneramuhati yumvikana ku buri yakoresheye n'abashobora kwumva icyo gishushanyo.

- Twabonye ko mu buri mpanga y'uburyo kandi hafi I_a y'intego. Iyo ishira hamwe ligize umuhati cyane likayirenga aba ari ubuhoro. Ndetse icyo bakoreye icyo bwabaga I_a ikungana na 1 aba ari byiza cyane. Ni nabyo bakwiliye guharanira.

Mu bulyo mpamyanze bakoresha no kwifashisha ikome
 ya munani aho E na A bimamuka mu gihe kandi
 abanyamuryango bali mu rwego rwa gashyamba bagomba kwigira
 bakomeye nro kuri e bamanya uko bakamurira A kugira
 I a igenda izamuka.

Bagira nro a y'itege kuburyo $r < R$. Iyo r igenda
 iba nroya, ni bwo I a igenda izamuka. Bakora ku bulyo
 r imamuka cyane, ndetse byashoboka bakamurira A
 kugera kuri 0. Iyo $A = 0$, I a yaba ingana na 1.

UMWANZURO

Dushubije amaso inyuma, turabona ko mbere yo kugandura abanyamulyango, ari ngombwa kubanza kuboneza ubuzima bw'ishyirahamwe. Hagategurwa ku bulyo bwumvikana amategeto agezwe umulyango, iteganyacyerekezo n'iteganyabikorwa. Hagashyirwaho inzego zihamye z'ishyirahamwe kandi izo zego zikahatira gutunganya imilimo zishinzwe. Ibikorwa byose mu ishyirahamwe bigomba kugira inzira-nyobozi igaragarira mu iteganyabikorwa. byaba ibikorwa by'ubwenge, nk'icungamali... n'ibikorwa by'amaboko, nk'ubuhizi n'ibindi. Twibuke kandi ko ibyo bateganyaga gukora bigendana n'icyerekezo cy'ishyirahamwe. Hakorwa igenwa ly'imilimo ku bulyo bubonye, ndetse bagakita-mo ihuza lyayo bakulikije ibigomba gukorwa.

Kugandura abanyamulyango bifite akamaro kanini cyane kuko bituma bahaguruka, bagakora batiziganye ibyo bashinze. Umugandurambaga afiti n'umwete ku mulimo utoroshye wo gutabura no kwongera umuhati n'umwete ku mulimo by'abagize ishyirahamwe. Kugirango ashobore kwutunganya, muho yabanza kwiwanya ubwe akamenya n'abo ashinzwe kugira inama. Iyo ari umuntu wicisha bugufi, umuho abandi agafatanya na bo umukerezo n'amagorwa, akabagira inama za kigabo, akaba ari intagarugero n'umunyamuraba kenshi abantu bitabira iby'ababwirako bityo batagandurako. Ntabwo akwiliye kwereka abo ashinzwe kugobora ko ari umutegetsi utanga amabwiza y'ibyo bagomba gukora, ahubwo yiyerekana nk'umugishyamba muri byose. Agomba gukora yihugura kugirango agire ubumenyi buhagije bumufasha muri ubwo bugandurambaga. Akamenya gutegura inama kandi akaziyobora neza; akagenzura ko ibyemejwe byashyizwe mu bikorwa. Agatera inkunga abagize icyo bakora kandi akagandura abaturanye agati mu gihugu. Agomba kumenya gukora neza inyandiko-mungu z'inama na raporo ku gihe kandi akanwonsora ubulyo bwo kwandikira n'abandi mu byerekeye akazi ashinzwe. Mu kugandura imbaga, akulikira n'abandi hafi umuhati w'abo ashinzwe, bityo akamenya ubulyo yabafasha kwongera mu gihe udahagije. Yiga yitonde ubudokoke bw'abanyamulyango kugirango arebe neza ubulyo yabafasha kurwanya icyo ndwara y'ubukene. Mu rwego rw'ishyirahamwe, yiga umuhati w'abo ku bulyo buhoze, ibyo bigatuma ashobora kubabwira. Umulimo w'imubonye umuhati utitonde-rwa cyane kuko utuma ishyirahamwe litera imbere kuko icyo abantu bamaze kwiwemera gukubira hamwe ingufu zabo batiziganye bituma bagera kuri byinshi bishimishije; baba umugani ngo: "Nta mugabo umwe".

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UMUGEREKA

Muli uyu mugereka, hakubiyemo ibi bikulikira:

- Imbonerahamwe yagaciro k'ubu mu byerekeye akituwalizasiyo.
- Uko bashakira umubare w'iminsi igomba gutorwaho mu ibara Iya Imana Id.
- Kwerekana ishingiro ry'amahamwe yerekeranye n'umukati.
- Ibitabo byifashishijwe

INYONGERA I

Imbonerahamwe y'agaciro k'ubu.

$$\frac{100}{(1+a)^n}$$

Imyaka n	Ipanisha by'akitumabazasiyo : a			
	5%	10%	15%	20%
1	95,2	90,9	87	83,3
2	90,7	82,6	75,6	69,4
3	86,4	75,1	65,8	57,9
4	82,3	68,3	57,2	48,2
5	78,4	62,1	49,7	40,2
6	74,6	56,4	43,2	33,5
7	71,1	51,3	37,6	27,9
8	67,7	46,7	32,7	23,3
9	64,5	42,4	28,4	19,4
10	61,4	38,6	24,7	16,2
15	48,1	23,9	12,3	6,5
20	37,7	14,9	6,1	2,6
25	29,5	9,2	3	1
30	23,1	5,7	1,5	0,4
40	14,2	2,2	0,4	0,1
50	8,7	0,9	0,1	-

INYONGERA II.

Uko bashaka umubare w'iminsi igomba gukorwaho mu ibara lya Ia.

a. Iyo E idakinduka na m ntihinduke

Dushake PP mu mezi ake :

Mu kwezi : $PP = mE$

Mu mezi 2 : $PP = mE + mE$

Mu mezi 3 : $PP = mE + mE + mE$

Mu mezi 4 : $PP = mE + mE + mE + mE$

Ubworo rero myuma y'ayo mezi 4 : $PP = 4mE$. Biragaragara ko ubwo umubare 4 ari uw'amezi yakozwemo, ukaba ushobora guhagararirwa n'inyuguti p.

Bityo rero :

$$PP = mpE$$

b. Iyo E ihinduka, naho m yo ntihinduke.

Dushake PP mu mezi atanu :

$$PP = mE + m(E+1) + m(E+2) + m(E+3) + m(E+5).$$

$$PP = mE + mE + m + mE + 2m + mE + 3m + mE + 5m$$

$$PP = 5mE + 11m$$

$$PP = m(5E + 11).$$

Urebye neza, usanga umubare 5 ari umubare w'amezi yakozwemo. Nako umubare 11 ni igiteranyo e (Σe); icyo e bakayishakira buho gihe bahereye kuri E yambere. Twibuke ko p ihagararirwa umubare w'amezi.

$$PP = m(pE + \Sigma e)$$

Icyitonderwa : Turamutse duze PP = $5mE + 10m$ aho Σe ari igikubo cya p. dushobora kwandika ubi.

$$PP = 5mE + 5 \cdot 2m.$$

$$PP = 5m(E + 2)$$

$$PP = pm(E + q)$$

$$\text{Hano } \frac{\Sigma e}{p} = q.$$

c. Iyo E idakinduka, m yo ihinduka.

Dushake PP mu mezi atanu.

$$PP = mE + (m+1)E + (m+2)E + (m+4)E + (m-2)E$$

$$PP = mE + mE + E + mE + 2E + mE + 4E + mE - 2E$$

$$PP = 5mE + 5E$$

$$PP = 5E(m + 1)$$

Iyo twitegereye neza, dusanga umubare 5 ari umubare w'amezi, ushobora guhagararirwa n'inyuguti p. Hano, itinyuranyo cya m ushya na m yambere, bacyita E.

$$PP = pE(m + q).$$

$$\text{Hano } \frac{\Sigma E}{p} = q.$$

Mu gihe Σe idashobora kugabanyika na p :

$$PP = E(pm + \Sigma E)$$

d. Iyo E ihinduka na m igahinduka.

Iyo biteye bitya, bashobora gushakira PP ya buho kwezi bakaza guteranya myuma.

Kwerekana ishingiro ly'amahamwe yerekeranye n'umuhati.

Ihame Iya mbere.

$$\text{Ihame: } E_1 \rightarrow A_1 \Rightarrow I_a$$

Icyerekanwa: Niba $\varphi > 0$ tugomba kubona:

$$I_a' = I_a - \varphi$$

$$I_a' < I_a$$

I_a : akarangamuhati mu gihembwe cya mbere.

I_a' : akarangamuhati mu gihembwe cya kabiri.

Tubyerekane

Turuge ko a ari umubare wiyongereye ku minsi yasibweho, I_a akarangamuhati mu gihembwe cya mbere na I_a' akarangamuhati mu gihembwe cya kabiri.

• Igihembwe cya mbere gishize:

$$I_a = 1 - \frac{A_1}{m_p E_1} \quad (1)$$

• Igihembwe cya kabiri gishize:

$$A_1 + a = A_2$$

$$E_1 = E_2$$

$$I_a' = 1 - \frac{A_2}{m_p E_2}$$

$$I_a' = 1 - \frac{A_1 + a}{m_p E_1} \quad (2)$$

Dufate (1), dukuremo (2), turebe ko $\varphi > 0$.

$$\varphi = \left(1 - \frac{A_1}{m_p E_1}\right) - \left(1 - \frac{A_1 + a}{m_p E_1}\right)$$

$$\varphi = 1 - \frac{A_1}{m_p E_1} - 1 + \frac{A_1 + a}{m_p E_1}$$

$$\varphi = \frac{A_1 + a}{m_p E_1} - \frac{A_1}{m_p E_1}$$

$$\varphi = \frac{A_1 + a - A_1}{m_p E_1}$$

$$\varphi = \frac{a}{m_p E_1}$$

Turabona ko $\varphi > 0$.

Bityo rero:

$$I_a' = I_a - \varphi$$

$$I_a' < I_a$$

Ihame Iya kabili

$$\text{Ihame : } E_1 \downarrow, A_1 \nearrow \Rightarrow I_a \downarrow$$

Icyerekanwa : Mu gihe $\varphi > 0$, tugomba kubona :

$$\boxed{\begin{aligned} I_a' &= I_a - \varphi \\ I_a' &< I_a \end{aligned}}$$

Tubyerekane

Hano na ko twifashisha inyuguti twakoresheje mu ihame Iya mbere. Inyuguti e ihagaraliye umubare w'abanyamuryango biyongeraho.

• Igihembwe cya mbere gishize :

$$I_a = 1 - \frac{A_1}{m_p E_1} \quad (1)$$

• Igihembwe cya kabiri gishize :

$$A_1 + a' = A_2$$

$$E_1 - e = E_2$$

$$I_a = 1 - \frac{A_2}{m_p E_2}$$

$$I_a' = 1 - \frac{A_1 + a'}{m_p (E_1 - e)} \quad (2)$$

a' umubare w'iminsi yiyongeraho a ikoreshejwe mu ihame Iya mbere w'itya gatanu kubera ko hali icyo bidufasha mu gushakira kweziya za E .

Dufate (1), dukuremo (2), turebe ko $\varphi > 0$.

$$\varphi = \left(1 - \frac{A_1}{m_p E_1}\right) - \left(1 - \frac{A_1 + a'}{m_p (E_1 - e)}\right)$$

$$\varphi = 1 - \frac{A_1}{m_p E_1} - 1 + \frac{A_1 + a'}{m_p (E_1 - e)}$$

$$\varphi = \frac{A_1 + a'}{m_p (E_1 - e)} - \frac{A_1}{m_p E_1}$$

$$\varphi = \frac{(A_1 + a') m_p E_1 - A_1 m_p (E_1 - e)}{m_p E_1 \cdot m_p (E_1 - e)}$$

$$\varphi = \frac{A_1 m_p E_1 + m_p E_1 a' - A_1 m_p E_1 + A_1 m_p e}{m_p E_1 \cdot m_p (E_1 - e)}$$

$$\varphi = \frac{m_p E_1 a' + m_p A_1 e}{m_p E_1 \cdot m_p (E_1 - e)}$$

$$\varphi = \frac{m_p (E_1 a' + A_1 e)}{m_p \cdot m_p E_1 (E_1 - e)}$$

$$\boxed{\varphi = \frac{E_1 a' + A_1 e}{m_p E_1 E_2}}$$

Biragaragara ko $\varphi > 0$

Bityo rero :

$$\boxed{\begin{aligned} I_a' &= I_a - \varphi \\ I_a' &< I_a \end{aligned}}$$

Kowefisiya z'ubugabanyuke bwa $\bar{E}$

Dukomeye kuli ili hamwe iya kabili, dushobora gushyamba kowefisiya z'ubugabanyuke bwa E . Izo kowefisiya mu utubare bakubana na E bakabona uto yagabanyutse, bityo bikaba byaratumye σ imanyuka ku buryo ubu m'ubu.

Kowefisiya ituma babona e (icyagabanyutseho).

Iyo kowefisiya bandika σ bayishyamba bakomeye kuli φ .

Twabonye ko :

$$\varphi = \frac{E_1 a' - A_1 e}{m_p E_1 E_2} \quad E_2 = E_1 - e$$

Dushyamba e :

$$E_1 a' + A_1 e = \varphi m_p E_1 (E_1 - e)$$

$$E_1 a' + A_1 e = \varphi m_p E_1^2 - \varphi m_p E_1 e$$

$$A_1 e + \varphi m_p E_1 e = \varphi m_p E_1 E_1 - E_1 a'$$

$$e(A_1 + \varphi m_p E_1) = E_1 (\varphi m_p E_1 - a')$$

Nyamara tuzi ko $\varphi m_p E_1 = a$, ubwo rero dushobora kwandika :

$$e(A_1 + a) = E_1 (a - a')$$

$$e = \frac{a - a'}{A_1 + a} E_1 \quad \text{Ikigabanyo } \frac{a - a'}{A_1 + a} \text{ tucyite } \sigma$$

$$e = \sigma E_1$$

Ubwo rero :

$$\sigma = \frac{a - a'}{A_1 + a}$$

$$\sigma = \frac{a - a'}{N}$$

(*) N ihagararira igiteranyo $A_1 + a$.

Kowefisiya ituma bahita babona E nshya (bandika λ)

Iyo bakuye σ muri 1 bakabikubana na E_1 babona E_2

$$E_2 = \left(1 - \frac{a - a'}{A_1 + a}\right) E_1$$

$$E_2 = \left(\frac{A_1 + a}{A_1 + a} - \frac{a - a'}{A_1 + a}\right) E_1$$

$$E_2 = \frac{A_1 + a - a + a'}{A_1 + a} E_1$$

$$E_2 = \frac{A_1 + a'}{A_1 + a} E_1 \quad \text{Ikigabanyo } \frac{A_1 + a'}{A_1 + a} \text{ tucyite } \lambda$$

$$E_2 = \lambda E_1 \quad \text{Ubwo rero :}$$

$$\lambda = \frac{A_1 + a'}{A_1 + a}$$

Nyamara ariko kandi $A_1 + a' = A_2$
 $A_1 + a = N$

Bityo rero :

$$\lambda = \frac{A_2}{N}$$

(*) Uko babona N batari A_1 .

$$\text{Tuzi ko } A_1 = (1 - I_a) m_p E_1$$

$$a = (I_a - I_a') m_p E_1$$

$$N = (1 - I_a) m_p E_1 + (I_a - I_a') m_p E_1$$

$$N = m_p E_1 (1 - I_a + I_a - I_a')$$

$$N = (1 - I_a') m_p E_1$$

Ihame Iya gatahu.

Ihame: $E_1 \searrow, A_1 \rightarrow \Rightarrow I_a \searrow$

Icyerekanwa: Mu gihe $\varphi > 0$, tugomba kubona:

$$\boxed{\begin{array}{l} I'_a = I_a - \varphi \\ I'_a < I_a \end{array}}$$

Tubyerekane

Turakomeza twifashishe inyuguti^(*) twatangiranye. Hano $a' = 0$.

Igihe mbere cyambere gishize:

$$I_a = 1 - \frac{A_1}{m_p E_1} \quad (1)$$

Igihe mbere cyakabiri gishize:

$$E_1 - e = E_2$$

$$A_1 = A_2 \quad \text{kuko } a = 0$$

$$I'_a = 1 - \frac{A_2}{m_p E_2}$$

$$I'_a = 1 - \frac{A_1}{m_p (E_1 - e)} \quad (2)$$

Dufate (1), dukuremo (2), turebe ko $\varphi > 0$.

$$\varphi = \left(1 - \frac{A_1}{m_p E_1}\right) - \left(1 - \frac{A_1}{m_p (E_1 - e)}\right)$$

$$\varphi = 1 - \frac{A_1}{m_p E_1} - 1 + \frac{A_1}{m_p (E_1 - e)}$$

$$\varphi = \frac{A_1}{m_p (E_1 - e)} - \frac{A_1}{m_p E_1}$$

$$\varphi = \frac{A_1 m_p E_1 - A_1 m_p (E_1 - e)}{m_p (E_1 - e) \cdot m_p E_1}$$

$$\varphi = \frac{A_1 m_p E_1 - A_1 m_p E_1 + A_1 m_p e}{m_p E_1 \cdot m_p (E_1 - e)}$$

$$\varphi = \frac{A_1 m_p e}{m_p E_1 \cdot m_p (E_1 - e)}$$

$$\boxed{\varphi = \frac{A_1 e}{m_p E_1 E_2}}$$

Turabona neza ko $\varphi > 0$

Bityo nabo:

$$\boxed{\begin{array}{l} I'_a = I_a - \varphi \\ I'_a < I_a \end{array}}$$

(*) Mu mahame yose, turakomeza gutomera inyuguti twatangiranye, utubare tugaragara heho ku inyuguti ni uduhagariye igihembwe.

Kowefisiya z'ubugabanuke bwa E

Dukereye ku ihame rya gatatu, dushobora gushaka kowefisiya z'ubugabanuke bwa E. Akaba ari utubare bakuba na E bakabona uko yagabanyutse, ari byo bituma I_a imauka.

Kowefisiya ituma babona e

Iyo kowefisiya bandika p bayishaka bahereye kuri φ .

Tuzi ko :

$$\varphi = \frac{A_1 e}{m_p E_1 E_2} \quad E_2 = E_1 - e$$

Dushobora gushaka e :

$$A_1 e = \varphi m_p E_1 (E_1 - e)$$

$$A_1 e = \varphi m_p E_1^2 - \varphi m_p E_1 e$$

$$A_1 e + \varphi m_p E_1 e = \varphi m_p E_1 \cdot E_1$$

$$e(A_1 + \varphi m_p E_1) = \varphi m_p E_1 \cdot E_1$$

Nyamara tuzi ko, dukereye ku ihame rya mbere :

$$\varphi m_p E_1 = a$$

Ubwo rero dushobora kwandika :

$$e(A_1 + a) = a E_1$$

$$e = \frac{a}{A_1 + a}$$

Ikigabanyo $\frac{a}{A_1 + a}$ tucyite p

$$\boxed{e = p E_1}$$

Tumaze kubona ko $p = \frac{a}{A_1 + a}$; dushobora kuyisha ku bundi bulyo.

$$p = \frac{pp(\alpha - \beta)}{pp(1 - \alpha) + pp(\alpha - \beta)}$$

Hano, twibuke ko $pp = m_p E_1$

$$p = \frac{pp(\alpha - \beta)}{pp(1 - \alpha + \alpha - \beta)}$$

$$p = \frac{\alpha - \beta}{1 - \beta}$$

Nyamara tuzi ko $\alpha - \beta = \varphi$

Ubwo rero :

$$\boxed{p = \frac{\varphi}{1 - \beta}}$$

Kowefisiya ituma bahita babona E nshya (bandika θ).

Iyo bakuye p muri 1 bakabikuba na E_1 , babona E_2

$$E_2 = \left(1 - \frac{a}{A_1 + a}\right) E_1$$

$$E_2 = \left(\frac{A_1 + a}{A_1 + a} - \frac{a}{A_1 + a}\right) E_1$$

$$E_2 = \frac{A_1 + a - a}{A_1 + a} E_1$$

$$E_2 = \frac{A_1}{A_1 + a} E_1$$

Ikigabanyo $\frac{A_1}{A_1 + a}$ tucyite : θ

$$\boxed{E_2 = \theta E_1}$$

Tunaze kubona ko $\theta = \frac{A_1}{A_1 + a}$; tuyishake ku bundi buliyoyoyi:

$$\theta = \frac{A_1}{A_1 + a}$$

$$\theta = \frac{PP(1-\alpha)}{PP(1-\alpha) + PP(\alpha-\beta)}$$

$$\theta = \frac{PP(1-\alpha)}{PP(1-\alpha + \alpha - \beta)}$$

$$\theta = \frac{1-\alpha}{1-\beta}$$

Ihame lya kawe

Ihame: $E_1 \uparrow, A_1 \rightarrow \Rightarrow I_a \uparrow$

Joyekanwa: Mu gihe $\varphi > 0$, tugomba kumenya ko

$$\begin{aligned} I_a' &= I_a - \varphi \\ I_a' &> I_a \end{aligned}$$

Tubyerekane

Igihe mbere cyambere gishize:

$$I_a = 1 - \frac{A_1}{mp E_1} \quad (1)$$

Igihe mbere cyakabiri gishize:

$$E_1 + e = E_2$$

$$A_1 = A_2 \quad \text{kuko } a = 0$$

$$I_a' = 1 - \frac{A_2}{mp E_2}$$

$$I_a' = 1 - \frac{A_1}{mp(E_1 + e)} \quad (2)$$

Dufate (2), dukuremo (1), turebe ko $\varphi > 0$

$$\varphi = \left(1 - \frac{A_1}{mp(E_1 + e)}\right) - \left(1 - \frac{A_1}{mp E_1}\right)$$

$$\varphi = 1 - \frac{A_1}{mp(E_1 + e)} - 1 + \frac{A_1}{mp E_1}$$

$$\varphi = \frac{A_1}{mp E_1} - \frac{A_1}{mp(E_1 + e)}$$

$$\varphi = \frac{A_1 mp E_1 + A_1 mpe - A_1 mp E_1}{mp E_1 \cdot mp(E_1 + e)}$$

$$\varphi = \frac{A_1 mpe}{mp E_1 \cdot mp(E_1 + e)}$$

$$\varphi = \frac{mp \cdot A_1 e}{mp \cdot mp E_1 (E_1 + e)}$$

$$\varphi = \frac{A_1 e}{mp E_1 E_2}$$

Turabona ko $\varphi > 0$

Bityo rero

$$\begin{aligned} I_a' &= I_a + \varphi \\ I_a' &> I_a \end{aligned}$$

Kowefisiya z'ubwiyongere bwa E.

Dukeraye ku ihame Iya Kane, dushobora gushaka kowefisiya z'ubwiyongere bwa E. Ni utubare bakuba na E bakabona uko abanyamulyango biyongereye kugirango akarangamuhati aka waka kagerweho.

Kowefisiya ituma babona e (ikiyongereyeho)

Iyo kowefisiya bandika η bayishaka bahereye kuli ~~ihame~~ Iya gatanu.

Tuzi ko :

$$\varphi = \frac{A_1 e}{m_p E_1 E_2} \quad E_2 = E_1 + e$$

Dushake e :

$$A_1 e = \varphi m_p E_1 (E_1 + e)$$

$$A_1 e = \varphi m_p E_1^2 + \varphi m_p E_1 e$$

$$A_1 e - \varphi m_p E_1 e = \varphi m_p E_1^2$$

$$e(A_1 - \varphi m_p E_1) = \varphi m_p E_1^2$$

Nyamara dukeraye ku ihame Iya gatanu, tuzi ko :

$$\varphi m_p E_1 = a$$

Ubwo rero dushobora kwandika :

$$e(A_1 - a) = a E_1$$

$$e = \frac{a}{A_1 - a} E_1 \quad \text{Ikigabanyo } \frac{a}{A_1 - a} \text{ twayite } \eta$$

$$\boxed{e = \eta E_1}$$

Tumaze kubona ko $\eta = \frac{a}{A_1 - a}$; dushobora kubishaka mu bundi bulyo :

$$\eta = \frac{a}{A_1 - a}$$

$$\eta = \frac{IP(\alpha - \beta)}{IP(1 - \beta) - IP(\alpha - \beta)}$$

$$\eta = \frac{IP(\alpha - \beta)}{IP(1 - \beta - \alpha + \beta)}$$

$$\eta = \frac{\alpha - \beta}{1 - \alpha}$$

Nyamara tuzi $\alpha - \beta = \varphi$, ubwo rero :

$$\boxed{\eta = \frac{\varphi}{1 - \alpha}}$$

Kowefisiya ituma bahita babona E nshya (bandika ω)

Iyo bonyeye 1 kuli η bakayikuba na E_1 babona E_2

$$E_2 = \left(\frac{a}{A_1 - a} + 1\right) E_1$$

$$E_2 = \left(\frac{a}{A_1 - a} + \frac{A_1 - a}{A_1 - a}\right) E_1$$

$$E_2 = \frac{a + A_1 - a}{A_1 - a} E_1$$

$$E_2 = \frac{A_1}{A_1 - a} E_1 \quad \text{Ikigabanyo } \frac{A_1}{A_1 - a} \text{ twayite } \omega$$

$$\boxed{E_2 = \omega E_1}$$

Dukeraye kuli ibi bili haruguru, tuzi ko $\omega = \frac{A_1}{A_1 - a}$; dushobora kuyishaka ku bundi bulyo.

$$\omega = \frac{IP(1-\beta)}{IP(1-\beta) - IP(\alpha-\beta)}$$

$$\omega = \frac{IP(1-\beta)}{IP(1-\beta-\alpha+\beta)}$$

$$\boxed{\omega = \frac{1-\beta}{1-\alpha}}$$

Ihame Iya gatanu.

Ihame: $E_1 \rightarrow, A_1 \downarrow \Rightarrow I_a \rightarrow$

Icyerekanwa: Mu gihe $\varphi > 0$, tubona ko:

$$\boxed{\begin{aligned} I'_a &= I_a + \varphi \\ I'_a &> I_a \end{aligned}}$$

Tubyerekane:

• Igihembwe cya mbere gishize:

$$I_a = 1 - \frac{A_1}{m_p E_1} \quad (1)$$

• Igihembwe cya kabiri gishize:

$$E_1 + e = E_2 = E_1 \quad \text{kuko } e = 0$$

$$A_1 - a = A_2$$

$$I'_a = 1 - \frac{A_2}{m_p E_2}$$

$$I'_a = 1 - \frac{A_1 - a}{m_p E_1} \quad (2)$$

Dufate (2), dukuremo (1), turebe ko $\varphi > 0$.

$$\varphi = \left(1 - \frac{A_1 - a}{m_p E_1}\right) - \left(1 - \frac{A_1}{m_p E_1}\right)$$

$$\varphi = 1 - \frac{A_1 - a}{m_p E_1} - 1 + \frac{A_1}{m_p E_1}$$

$$\varphi = \frac{A_1}{m_p E_1} - \frac{A_1 - a}{m_p E_1}$$

$$\varphi = \frac{A_1 - A_1 + a}{m_p E_1}$$

$$\boxed{\varphi = \frac{a}{m_p E_1}}$$

Turabona ko $\varphi > 0$

Bityo rero

$$\boxed{\begin{aligned} I'_a &= I_a + \varphi \\ I'_a &> I_a \end{aligned}}$$

N.B. Bahereye kuli φ bashobora gushakira a :

$$a = \varphi m_p E_1$$

Ihame Iya gataudatu.

$$\text{Ihame : } E_1 \nearrow, A_1 \searrow \Rightarrow I_a \nearrow$$

Icyerekanwa : mu gihe $\varphi > 0$, tugomba kubona ko :

$$I'_a = I_a + \varphi$$

$$I'_a > I_a$$

Tubyerekane :

. Igihembwe cya mbere kirangiye :

$$I_a = 1 - \frac{A_1}{m_p E_1} \quad (1)$$

. Igihembwe cya kabiri kirangiye :

$$E_1 + e = E_2$$

$$A_1 - a = A_2$$

$$I'_a = 1 - \frac{A_2}{m_p E_2}$$

$$I'_a = 1 - \frac{A_1 - a}{m_p (E_1 + e)} \quad (2)$$

Dufate (2), dukuremo (1), turabe ko $\varphi > 0$.

$$\varphi = \left(1 - \frac{A_1 - a}{m_p (E_1 + e)} \right) - \left(1 - \frac{A_1}{m_p E_1} \right)$$

$$\varphi = 1 - \frac{A_1 - a}{m_p (E_1 + e)} - 1 + \frac{A_1}{m_p E_1}$$

$$\varphi = \frac{A_1}{m_p E_1} - \frac{A_1 - a}{m_p (E_1 + e)}$$

$$\varphi = \frac{A_1 m_p E_1 + A_1 m_p e - A_1 m_p E_1 + m_p E_1 a}{m_p E_1 \cdot m_p (E_1 + e)}$$

$$\varphi = \frac{m_p A_1 e + m_p E_1 a}{m_p E_1 \cdot m_p (E_1 + e)}$$

$$\varphi = \frac{m_p (A_1 e + E_1 a)}{m_p \cdot m_p E_1 (E_1 + e)}$$

$$\boxed{\varphi = \frac{A_1 e + E_1 a}{m_p E_1 E_2}}$$

Turabona ko $\varphi > 0$

Bityo rero :

$$I'_a = I_a + \varphi$$

$$I'_a > I_a$$

Kowefisiya z'ubwiyongere bwa E

Dakomeye kuli iyi hame Iya gataudatu, twashakaga kowefisiya z'ubwiyongere bwa E. Ni utubare bakuba na E bakabona uko yiyongera kugirango atarangamuhabwaho aha n'aka kagerwaho.

Kowefisiya ituma babona e

Iyo kowefisiya bandikira δ bayishakaga bakomeye kuli φ .

Tuzi ko :

$$\varphi = \frac{A_1 e + E_1 a}{m_p E_1 E_2}$$

$$E_2 = E_1 + e$$

Dushake e :

$$E_1 a' + A_2 e = \varphi_{mp} E_2 (E_1 + e)$$

$$E_1 a' + A_1 e = \varphi_{mp} E_1^2 + \varphi_{mp} E_1 e$$

$$A_1 e - \varphi_{mp} E_1 e = \varphi_{mp} E_1^2 - E_1 a'$$

$$e(A_1 - \varphi_{mp} E_1) = E_1 (\varphi_{mp} E_1 - a')$$

Nyamara duherereye dukubwira ikomeye ya gatanu, tuzi ko

$$\varphi_{mp} E_1 = a$$

$$e(A_1 - a) = E_1(a - a')$$

$$e = \frac{a - a'}{A_1 - a} E_1 \quad \text{Ikiyuranyo } \frac{a - a'}{A_1 - a} \text{ tucyite } \beta$$

$$e = \beta E_1$$

Turabona ko $\beta = \frac{a - a'}{A_1 - a}$; dushobora kubyangirira ku bundi bulyo na none.

$$\beta = \frac{a - a'}{N'}$$

$$N' = A_1 - a = (1 - I_a') \varphi_{mp} E_1$$

Kwefisiya ituma babona E nshya (bandika β).

Iyo bongeye 1 kuri β bakabikubira na E_1 babona E_2

$$E_2 = \left(\frac{a - a'}{A_1 - a} + 1 \right) E_1$$

$$E_2 = \left(\frac{a - a'}{A_1 - a} + \frac{A_1 - a}{A_1 - a} \right) E_1$$

$$E_2 = \frac{a - a' + A_1 - a}{A_1 - a} E_1$$

$$E_2 = \frac{A_1 - a'}{A_1 - a} E_1 \quad \text{Ikiyuranyo } \frac{A_1 - a'}{A_1 - a} \text{ tucyite } \gamma$$

$$E_2 = \gamma E_1$$

Ubwo rero :

$$\gamma = \frac{A_1 - a'}{A_1 - a}$$

$$\text{Nyamara tuzi ko : } \begin{aligned} A_1 - a' &= A_2 \\ A_1 - a &= N' \end{aligned}$$

Ubwo rero :

$$\gamma = \frac{A_2}{N'}$$

$$(*) \text{ Tuzi ko : } A_1 = (1 - I_a) \varphi_{mp} E_1$$

$$a = (I_a' - I_a) \varphi_{mp} E_1$$

$$N' = (1 - I_a) \varphi_{mp} E_1 - (I_a' - I_a) \varphi_{mp} E_1$$

$$N' = \varphi_{mp} E_1 (1 - I_a' + I_a)$$

$$N' = (1 - I_a') \varphi_{mp} E_1$$

Ihame Iya kalindwi.

Ihame : $E_1 \rightarrow, A_1 \rightarrow \Rightarrow I_a \rightarrow$.

Icyerekanwa : Mu gihe $\varphi = 0$, tugomba kubona :

$$\boxed{I'_a = I_a}$$

Tubyerekane

. Igikumbwe cya mbere gishize :

$$I_a = 1 - \frac{A_1}{m_p E_1} \quad (1)$$

. Igikumbwe cya kabiri gishize :

$$A_1 = A_2$$

$$E_1 = E_2$$

$$I'_a = 1 - \frac{A_2}{m_p E_2}$$

$$I'_a = 1 - \frac{A_1}{m_p E_1} \quad (2)$$

Dufate (1), dukuremo (2), turebe ko $\varphi = 0$

$$\varphi = \left(1 - \frac{A_1}{m_p E_1}\right) - \left(1 - \frac{A_1}{m_p E_1}\right)$$

$$\varphi = 1 - \frac{A_1}{m_p E_1} - 1 + \frac{A_1}{m_p E_1}$$

$$\boxed{\varphi = 0}$$

Bityo nabo :

$$I'_a = I_a - \varphi$$

$$I'_a = I_a - 0$$

$$\boxed{I'_a = I_a}$$

Ihame Iya munani.

Ihame : $E_1 \rightarrow, A_1 \rightarrow \Rightarrow I_a \rightleftharpoons$

Icyerekanwa : Mu gihe $\varphi \neq 0$, $\varphi = 0$, tubona ko :

a) Iyo $\varphi < 0$

$$I'_a = I_a - \varphi \Rightarrow I'_a > I_a$$

b) Iyo $\varphi = 0$

$$I'_a = I_a$$

c) Iyo $\varphi > 0$

$$I'_a = I_a - \varphi \Rightarrow I'_a < I_a$$

Tubyerekane.

. Igikumbwe cya mbere gishize :

$$I_a = 1 - \frac{A_1}{m_p E_1} \quad (1)$$

. Igikumbwe cya kabiri gishize :

$$E_1 - e = E_2$$

$$A_1 - a' = A_2$$

$$I'_a = 1 - \frac{A_2}{m_p \bar{E}_2}$$

$$I'_a = 1 - \frac{A_1 - a'}{m_p (E_1 - e)} \quad (2)$$

Dufate (1), dukuremo (2) :

$$\varphi = \left(1 - \frac{A_1}{m_p E_1}\right) - \left(1 - \frac{A_1 - a'}{m_p (E_1 - e)}\right)$$

$$\varphi = 1 - \frac{A_1}{m_p E_1} - 1 + \frac{A_1 - a'}{m_p (E_1 - e)}$$

$$\varphi = \frac{A_1 - a'}{m_p (E_1 - e)} - \frac{A_1}{m_p E_1}$$

$$\varphi = \frac{(A_1 - a') m_p \bar{E}_1 - A_1 m_p (E_1 - e)}{m_p E_1 \cdot m_p (E_1 - e)}$$

$$\varphi = \frac{A_1 m_p \bar{E}_1 - m_p E_1 a' - A_1 m_p E_1 + A_1 m_p e}{m_p E_1 \cdot m_p (E_1 - e)}$$

$$\varphi = \frac{A_1 m_p e - m_p E_1 a'}{m_p E_1 \cdot m_p (E_1 - e)}$$

$$\varphi = \frac{m_p (A_1 e - E_1 a')}{m_p \cdot m_p E_1 (E_1 - e)}$$

$$\boxed{\varphi = \frac{A_1 e - E_1 a'}{m_p \bar{E}_1 E_2}}$$

a) Ubwiyongere bwa I_a

Iyo $A_1 e < E_1 a'$ nibwo $I_a \rightarrow$

Dore uko umukuro uteye :

$$\frac{e}{a'} < \frac{E_1}{A_1} \quad \text{Turugako } \frac{e}{a'} = r, \quad \frac{E_1}{A_1} = R.$$

Dushobora kwandika :

$$\boxed{r < R} \Rightarrow I_a < I'_a$$

b) Ubudahinduka bwa I_a

Iyo $A_1 e = E_1 a'$ nibwo $I_a \rightarrow$

Umukuro umaze utya rero :

$$\frac{e}{a'} = \frac{E_1}{A_1}$$

$$\boxed{r = R} \Rightarrow I_a = I'_a$$

c) Vbugabanyuka bwa I_a

Iyo $A_1 e > E_1 a'$, nibwo $I_a \searrow$

Uko umukuro uteye :

$$\frac{e}{a'} > \frac{E_1}{A_1}$$

$$\boxed{r > R} \Rightarrow I'_a < I_a$$

Ihame Iya cyenda

$$I_{hame}: E_1 \nearrow, A_1 \nearrow \Rightarrow I_a \searrow$$

Icyerekakwa : Mu gihe $\varphi \neq 0$, $\varphi = 0$, tubona ko :

a) Iyo $\varphi < 0$

$$I'_a = I_a - \varphi \Rightarrow I'_a > I_a$$

b) Iyo $\varphi = 0$

$$I_a = I'_a$$

c) Iyo $\varphi > 0$

$$I'_a = I_a - \varphi \Rightarrow I'_a < I_a$$

Tubyerekane :

• Igihembwe cy'ubwenge gishize :

$$I_a = 1 - \frac{A_1}{m_p E_1} \quad (1)$$

• Igihembwe cy'ubwenge kabiri gishize :

$$E_1 + e = E_2$$

$$A_1 + a' = A_2$$

$$I'_a = 1 - \frac{A_2}{m_p E_2}$$

$$I'_a = 1 - \frac{A_1 + a'}{m_p (E_1 + e)} \quad (2)$$

Dufate (1), dukuremo (2) :

$$\varphi = \left(1 - \frac{A_1}{m_p E_1}\right) - \left(1 - \frac{A_1 + a'}{m_p (E_1 + e)}\right)$$

$$\varphi = 1 - \frac{A_1}{m_p E_1} - 1 + \frac{A_1 + a'}{m_p (E_1 + e)}$$

$$\varphi = \frac{A_1 + a'}{m_p (E_1 + e)} - \frac{A_1}{m_p E_1}$$

$$\varphi = \frac{(A_1 + a')m_p E_1 - A_1 m_p (E_1 + e)}{m_p E_1 \cdot m_p (E_1 + e)}$$

$$\varphi = \frac{A_1 m_p E_1 + m_p E_1 a' - A_1 m_p E_1 - A_1 m_p e}{m_p E_1 \cdot m_p (E_1 + e)}$$

$$\varphi = \frac{m_p E_1 a' - m_p A_1 e}{m_p E_1 \cdot m_p (E_1 + e)}$$

$$\varphi = \frac{m_p (E_1 a' - A_1 e)}{m_p \cdot m_p E_1 (E_1 + e)}$$

$$\boxed{\varphi = \frac{E_1 a' - A_1 e}{m_p E_1 E_2}}$$

a) Ubwiyongere bwa I_a

Iyo $E_1 a' < A_1 e$ ni bwo $I_a \nearrow$

Umukuru rero uteye utya :

$$\frac{a'}{e} < \frac{A_1}{E_1}$$

Niba $\frac{a'}{e} = r'$, $\frac{A_1}{E_1} = R'$ dushobora kwandika :

$$\boxed{r' < R'} \Rightarrow I_a < I'_a$$

b) Ubudahinduka bwa I_a

Iyo $E_1 a' = A_1 e$ ni bwo $I_a \rightarrow$.

Umukuro uteye utya:

$$\frac{a'}{e} = \frac{A_1}{E_1}$$

$$\boxed{r' = R'} \Rightarrow I_a = I_a'$$

c) Ubugabanyuka bwa I_a

Iyo $E_1 a' > A_1 e$ ni bwo $I_a \downarrow$.

Umukuro uteye utya:

$$\frac{a'}{e} > \frac{A_1}{E_1}$$

$$\boxed{r' > R'} \Rightarrow I_a' > I_a.$$

INYONGERA IV.

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Gushimira

Iki gitabo gishoboye gusohoka kubera inkunga natwe n'abandi.

Ndashimira cyane Ministeri y'Amashuri Makuru n'Ubushakashatsi mu by'Ubuhanga yangiliye inama zihamye zo kuboneza ubushakashatsi bwanyije; ikaba yaragiye ishingira bamwe mu bakazi bayo gusesengura inyandiko nagiye myegeraho zilimo bimwe bigaragara mu iki gitabo. Muli bo, nkaba nshimira cyane

ba Bwana RWAMBONERA Fransisiko, NZAHUMUNYUWA Isidore na HABIYAMBERE Enoki kubera ko bize ko nyandiko, bakaba baragiye bangira inama utiza zo kuboneza ubwo bushakashatsi no kubukomeza.

Ndashimira kandi Bwamusewizimana Siméon wasomye iki gitabo, akangira izindi nama zizakomeza kunononora ubushakashatsi bwanyije.

Ndashimira umufasha wanyije AKEHUYA Virginie wagiye amfasha mu milimo imwe n'imwe natoraga mu iyandikira iyi gitabo; ndetse akaba yaremeye kenshi ko mkorera mu mutuzo nihereye, akibangamira kuba ari wenyine, akora imilimo y'urugo.

Nongeye kubashimira bose kandi nkaba mbasaba kuzakomeza kuntera inkunga muri uyu mulimo wo gufasha abakorera mu mashyirahamwe.

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