

Mazingira Bora



TIST

The International Small Group & Tree Planting Program
www.tist.org

English Version

An Environmental, Sustainable
Development and Community Forestry
Program.



Dr Madhukar (Third from right), an Auditor from Epic Sustainability, India, talks to and interview TIST Farmers in Bushenyi, Uganda last month. For TIST farmers to sell their carbon credits, their tree groves must meet international standards set by Verified Carbon Standards and get audited by third party Auditor. One of the requirements is keeping trees alive for a period of 30 years and more.

Inside:

Sustainable Agriculture: Agroforestry. Page 2

The Rains Have Come Time to Plant Many More Trees. Page 5

The Importance of Trees. Page 6

Controlling Mosquitoes. Page 6



Sustainable Agriculture: Agroforestry.



Definition: Growing trees and shrubs together with agricultural crops or livestock.

The overall aim of agroforestry is to increase the productivity of the land through the use of trees.

Trees have many benefits for the farmer:

- Building material
- Fuel wood
- Fruits and other food
- Fodder
- Soil stabilization
- Soil fertility
- Moisture retention
- Wind shelter
- Marking of boundaries
- Medicine
- Cash income
- Reduced erosion (if a layer of litter/mulch is kept)

Agroforestry practices: There are many different techniques and new methods are being discovered all the time. Some techniques are successful in one place and a disaster in others. People need to try different techniques and share the best practices in the Cluster training meetings. The following are some common methods of agroforestry:

1. Hedges: This involves selecting a tree species which can be placed in a line and which have benefits for the land. Hedges require little space, control erosion, and can produce leaves for fodder or mulch. An example of hedging is to plant a row of trees around the field boundary.



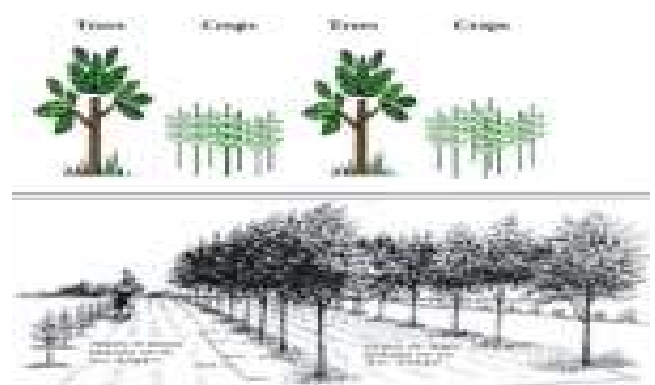
Recommended spacing is around 1.5 - 2m. The best design includes a mixture of tall and short trees.

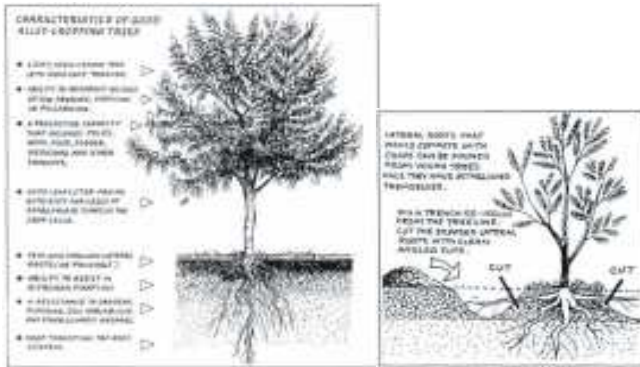
e.g. *Croton megalocarpus* planted with *Euphorbia tirucalli*

2. Alley cropping: This involves establishing trees at very narrow spacing (0.5-2m) in rows along fields. There may be a tree row, then two or three rows of crops, then another tree row, then crops etc. An example of this is planting alternating rows of maize with *Leucaena*, or coffee and bananas.

The most suitable trees are leguminous ones (ones that fix nitrogen for the soil). Spacing between rows of trees should not be more than 5-8m. The tree rows need to be weeded and pruned regularly. The trees cannot grow too tall otherwise they will compete with the crops for soil nutrients and light. The pruned leaves can be added to the soil to improve the soil fertility. So these trees will not be suitable for TIST payments, as they have to be kept short, but they will improve the agricultural land and provide many other benefits to the farmer.

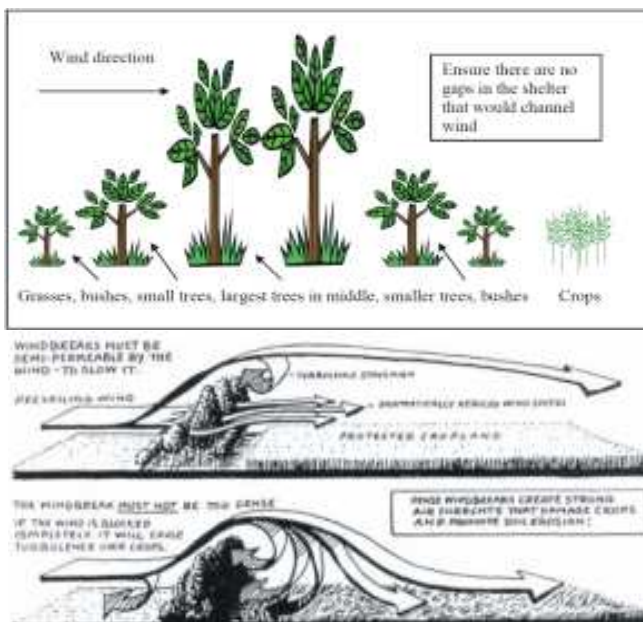
Some good alley cropping trees have the ability to re-grow after they have been cut. This means they can be cut every crop season so that they do not





grow too big and compete too much with the crops. This practice is called coppicing, and only works with some species. Some commonly coppiced species are *Calliandra calothyrsus*, *Cassia siamea*, *Cassia spectabilis*, *Leucaena leucocephala*, *Markhamia lutea*. Some species coppice well when they are young but may not coppice when they are mature e.g. *Casuarina spp.*, *Grevillea robusta*, *Sesbania sesban* and some *Albizia spp.*

3. Windbreak: Planting wide strips of trees to provide a windbreak. This then protects crops from the oncoming wind. Plant large trees in the center,



and smaller trees for the next two rows and low shrubs, bushes and grasses on the outside. Plant trees at right angles to the prevailing wind. Spacing within the lines of trees can be 4-5 m with 2-4 m between the lines.

The advantage of windbreaks is that the farmer

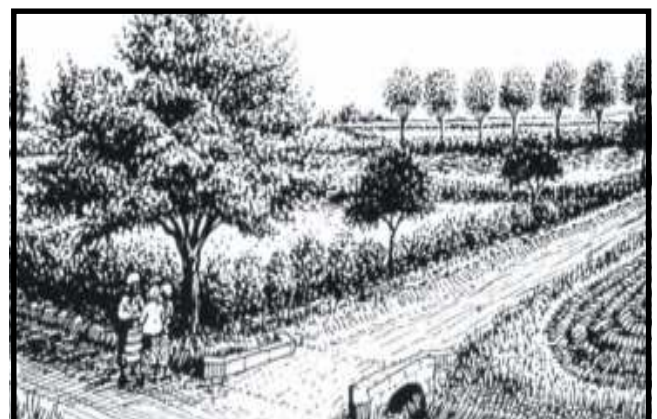
does not have to sacrifice an entire plot of land for trees. It only takes a strip of land, and the benefits can improve yields by 30% in some areas. Note that poorly planned windbreaks can damage crops more because it can channel the wind through gaps. Find someone experienced in this to help you design your windbreak.

4. Fallow cropping: This is where farmers stop growing crops on a piece of land and let trees take over to help restore soil fertility. Mostly nitrogen-fixing shrubs are chosen e.g. *Sesbania spp.* and *Gliricidia sepium*.

5. Inter-cropping: This involves wide and even spacing of trees among food crops. Good trees are those that have light canopies and fix nitrogen.

6. Grazing area improvement: Managing trees on grazing land to provide wood and fodder. For example, in arid and semi-arid lands, consider *Acacia tortilis* or some of the following: *Salvadora persica*, *Cordia sinensis*, *Acacia eliator*, *Ziziphus mauritiana*, *Acacia albida*, *Acacia nubica*, *Acacia Senegal*, *Hyphaene compressa*.

In higher potential areas, depending on the altitude, consider *Leucaena leucocephala*, *Sesbania sesban*,



Calliandra calothyrsus and *Leucaena diversifolia*. Consider supplementary feeding using leaves (15-20% of the feed) during the dry season for your animals.



7. Woodlots: Small woodlots can be grown on unused or unproductive land, e.g. woodlots planted on stony outcrops or in gullies. Woodlots can also be planted on cropland to serve as a windbreak, or they can be planted on fallow land.

8. Marking boundaries e.g. *Croton megalocarpus* and *Commiphora zimmermannii* subsp.

It is important to note that TIST trees have to be correctly spaced in order to grow fully and remain in the ground long-term. Some of the above agro-forestry methods are best practices for agriculture, but may not qualify for TIST tree payments.

Other ideas to consider for certain ecological zones in Kenya:

Higher altitude slopes with acidic soils (e.g. areas where tea grows well)

Consider *Calliandra calothyrsus* and *Morus alba* for fodder production.

Consider boundary planting and windbreaks with *Croton megalocarpus*, *Grevillea robusta*, *Casuarina cunninghamiana*, *Milletia dura*, *Hakea saligna*.

Consider orchards for temperate fruits (e.g. plums, peaches, pears).

Lower altitude slopes (e.g. where coffee grows well)

Consider *Jacaranda mimosifolia* for boundary planting.

Consider *Syzygium* spp. for windbreaks and planting along watercourses.

Consider fruit trees such as *Cyphomandra betacea* (tree tomato), *Persea americana* (avocado), *Macadamia tetraphylla* (macadamia), *Passiflora edulis* (passion fruit), *Casimiroa*.

Edulis (white sapota), *Annona senegalensis* (custard apple), *Psidium guajava* (guava), *Eriobotrya japonica* (loquat).

Calliandra, *Morus alba*, *Grevillea* and *Markhamia lutea* are good options for planting on areas you want to control for soil erosion (soil conservation structures).

Grevillea is a good shade tree for coffee.

High altitude plains, with gentle sloping land and scarce numbers of trees:

Consider windbreaks to protect crops, boundary planting and live fences e.g. *Acacia mearnsii*, *Grevillea robusta*, *Hakea saligna*, *Croton macrostachyus*, *Dombeya* spp., *Dodonaea angustifolia*, *Casuarina cunninghamiana*, and *Dovyalis caffra*. Some temperate fruit trees may do well.

Rift valley maize and dairy system

Since maize does not do well in shade, consider small woodlots or windbreaks, or trees planted on soil conservation structures e.g. *Grevillea robusta*, *Sesbania* spp., *Croton macrostachyus*, *Croton megalocarpus*, *Acacia abyssinica*, *Eucalyptus* spp., *Acacia mearnsii*, *Casuarina cunninghamiana*, *Dovyalis caffra*, *Markhamia lutea*, *Cordia abyssinica*.

Reminder:

Do remember that whilst planting trees brings many benefits you need to research the best types for your specific land type. Remember that trees compete with crops for water, and some crops do not like a lot of shade, for example. Get information from your nearby small groups and your extension workers.

- Particularly get advice on suitable trees with deep roots and fewer surface roots (these trees are beneficial in agroforestry since surface roots compete with crops). *Casuarina* spp., *Leucaena leucocephala*, *Cupressus lusitanica*, and *Sesbania sesban* have shallow root systems and may be better for stabilising soil on conservation areas. *Eucalyptus* spp. and *Gmelina arborea* can produce compounds that inhibit crop growth.
- Intercropping may not work very well in areas receiving less than 800mm rainfall annually.



The Rains Have Come Time to Plant Many More Trees.

Preparing seedlings for transplanting (Hardening Off)

Now that the rains have come, seedlings need to be planted out. It is important this month to make sure that seedlings will be ready to be moved from the nursery and planted in the field.

Seedlings first need to be prepared for the harsher conditions of the field. If seedlings were properly looked after in a nursery, they may have received more water and shade than they would have once they have been planted. Gradually reduce the watering and expose the seedlings to full sunlight to make this transition successful.

Characteristics of good seedlings

As a general guide (remember different species have different characteristics) good seedlings for planting out have the following characteristics:

- ✓ The shoot should be twice the length of the roots or the pot.
- ✓ The stem should be strong and woody.
- ✓ The seedlings should have many thin roots in addition to the main roots.
- ✓ Many seedlings will achieve these characteristics two months after germinating.

Transplanting

- Transport the seedlings in an upright position
- Mark out a circle with a diameter of 30cm in the field
- Remove the topsoil and place in a pile

- Remove the next soil layer to a depth of 30cm and place in a separate pile
- Put in a 5cm layer of grass (dry grass in rainy season, fresh grass in dry season called mulching). Some groups add manure as well.
- Remove the seedling from the polythene bag; do not break the earth-balls around the roots.
- Place the seedling in the hole
- Replace the topsoil first, then the second soil layer.
- Some groups do not fill the hole completely, but leave a gap of a few cm. This helps the rainwater enter the hole and infiltrate the soil.
- This can be especially helpful in dry areas.
- Any remaining soil can be placed in a mound on the downhill side of the seedling. This will help trap any rain water and divert it into the hole.
- Water the seedling

Also remember that to give your seedling the best chance of survival you should plant them 3m 4m apart. If you plant them closer together then the seedlings will not get all the water or soil nutrients they need because there is much competition. They will become weak and may die so follow the best practice of a spacing of 2.5 - 3m. ?

Where trees are closely spaced, TIST does skip count with a spacing of 2m. In tightly spaced trees (less than 2m), it is advisable for the farmers to continue thinning trees for firewood or fodder as trees mature and canopies get thicker.



The Importance of Trees.

Trees are very important for environmental and material reasons:

A. Environmental improvement:

- Trees cover soil, which protects it from wind and water erosion.
- Leaves and twigs fall to the ground and provide the soil with extra nutrients.
- Trees increase soil moisture by covering the soil and hence reducing evaporation.
- Tree roots help bind the soil and therefore reduce erosion.
- Tree roots also help water to enter the soil and improve underground water circulation.
- Trees improve local weather conditions by increasing the amount of water vapor in the air (increased humidity).
- Trees improve air quality by absorbing carbon dioxide and releasing oxygen.

- Trees provide shade and shelter.

B. Material and nutritional value:

- Construction materials (furniture, posts, fences, rope etc.)
- Fuel wood
- Medicine
- Food/fodder

These benefits are really valuable for farmers and for the world. A recent survey of TIST farmers in Kenya showed that the value of fruits, nuts, fodder, and firewood from trees they have planted in TIST and improved yield from using Conservation Farming averaged almost 37,000 shillings per farmer. It's harder to put a value on the benefits of cooler, moister soil, cleaner air and some of the other benefits of the work we do in TIST, but we feel it on our farms every day.

Promoting tree planting is of great importance to the community. Imagine what we can do when we plant more together!

Controlling Mosquitoes.

During wet seasons, malaria infections become common. Mosquitoes, which are responsible for the spread of malaria pathogens, breed fast. It is important to look after your homes to reduce the presence of mosquitoes.

These steps can help:

- Clear your compound of any unwanted bushes or grasses.
- Drain away any stagnant water near your

compound; stagnant water provides breeding ground for mosquitoes.

- Clear away any leftover food over-night.
- Keep rubbish outside the house in a covered container or rubbish pit.
- Sweep your house and compound daily

Remember to use mosquito nets when possible.

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Daktari Madhukar (mtu wa tatu kutoka kulia) mhadisi kutoka Epic Sustainable, India akiongea na kuhonji wakulima wa TIST kutoka Bushenyi, Uganda mwezi uliopita. Kwa wakulima wa TIST kuuza Carbon Credits vikundi za mti lazima wafikie kiwango cha kimataifa kile kimewekwa na Verified Carbon Standards na kuhesabiwa na mhadisi asiye tegemea upande wowote. Kati ya mahitaji ni kuchunga miti kwa kati ya miaka thelathini na zaidi.

Inside:

Urimi bwa Kungaania miiti na Imera Bingi. Page 2

Mbura ikwija- Ni igita ria kuanda miti ingi imingi. Page 5

Bata ya miti. Page 6

Kunyyia rwagi. Page 6



Urimi bwa Kungania miiti na Imera Bingi.



Nteto cia gitumi iguru ria urimi bwa gitegemea bwa kungania miti na imera.

Maana: Gukuria miti amwe na imera bingi bia muunda.

Mworoto jwa kwaanda miti amwe na imera bingi ni gutetheria maciaro ja miunda jongerekete niuntu bwa gutumira miiti. Miiti iji iri na gitumi gikinene kiri murimi. Itumi bimwe ni:

- Mbao cia gwaka nyomba
- Nku
- Matunda na biakuria bingi
- Iria ria ndithia
- Kurigiria muthetu jutigetithue ni ruuji
- Kwongera unoru bwa muthetu
- Kwongera ruuji muthetune
- Kurigiria ruuo rurwingi
- Gwita mianka ya miunda
- Ndawa cia mithemba imingi
- Kureta Mbeca
- Kirugiria muthetu gwita na ruuji

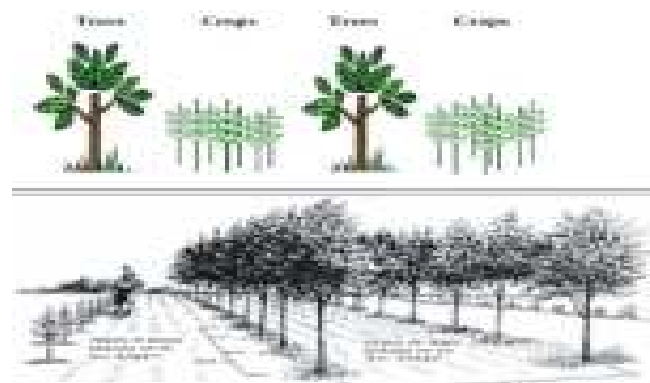
Kurima gwa kungania Imera na miiti: Kuri na njira inyingi na ingi injeru iria ikwenderea kumenyekana o igita na igita. Njira imwe ni injega gitumirwa na ingi ni inthuku. Antu ni babwiri kugeria njira mwanya mwanya na kwirana iria njega nkuruki ya iria ingi igita ria micemano ya kuritanwa.. Aja nandi ni ni njira iria itumagirwa mono mono kiri urimi bwa kungania imera na miiti.

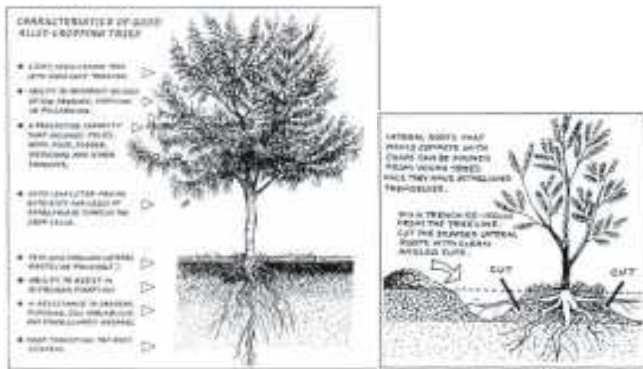
I. Mianka ya miti: Iji ni njira ya kwaanda miti itaari na muraini. Mianka iji itiendaga kaanya gakanene gati gati ka miiti na ni itethagiria kurigiria mono muthetu gukamatwa ni ruuji. Miti iji ni imiega ya gutwira iria ria ndithia kana mati ja gukunikira imeera bia kumiithia. Kionekaria gikiega ni kwaanda miiti ithiurukirite mwanka jwa muunda kana kieni. Watho bwa kwaanda ni mita imwe na nusu mwanka ijiri (1.5M – 2m). Mwaandire juria mwega ni kuungania miiti imiraja na imikui



Croton megalocarpus yaandaniritue na Euphorbia tirucalli amwe na kana na Lantana camara

2. Kwaanda na Mistari: Iji ni njira ya kwaanda miti na twaanya tutuceke mono. Twanya ja twa nusu mita (0.5 – 2M) na mistari gati gati ka mistaari iri kana ithatu ya imera na gwita na mbeere muundeene junthe. Biria bibujanagira mono na njira iji ni imera ja mpempe amwe na Leucaena kana kauwa na marigu. Miiti iria miega mono ya urimi bubu ni iria iretaga riera ririega mithetune. Mianya gatigati ga mistaari iji ni kuuma mita ithano mwanka inyanya (5-8) na igakurikia kithimi kiu. Miiti iji nibwiri kurimirwa na gwitwa sakasi ogita na igita. Miiti iji itibwiri kurekerua irea mono nontu igashindana na imera bingi na bitikura bwega ikwaga biakuria muthetune na weru bwa kungana. Mabura jaria jaiti sakasi nijatethagia kwongera unoru muthetune. Niuntu bwa untu bubu, miti iji itiumba kuriwa ni TIST niuntu no mwanka igitwe ikare iri imikui. Amwe na buu miti iji ni itenthagiria kunoria mithetu ya muunda na kwongera mantu jangi jamega kiri murimi. Miti imwe iria itumagirwa kiri urimi bubu ni kuraga bwega kinya nyuma ya gutemwa. Guku ni ja kuuga no mwanka igitwe o nyuma ya iketha rionthe kurigiria itakanenee mono yambiria gushindanira irio na weru na imera bingi. Urimi bubu bubujaa na miti imitare. Imwe ya miti iji ni Calliandra calothyrsus, Cassia Siamea, Cassia Spectabilis, Eucalyptus ssp, Grevillea robusta, Sesbania Sesban na miti imwe ya Mwiriga jwa Albiza spp.

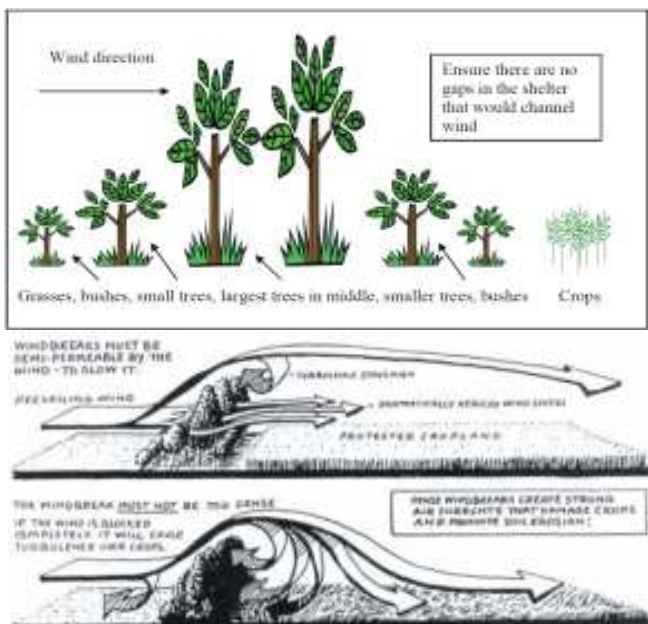




Ni Arimi babaingi bagutumira njira iji ya urimi ya kungania miti na imera amwe? Kethira niu ri, ibakwona urimi bubu bukibatethia? Borie berane uria bakwona urimi bubu bukari na beeje na ntento nkuruki mucamanione juu jungi jwa kuritanwa mantu nkuruki.

Arimi bamwe ibabwiri kugeria kwaanda mistari imikai ya miti miundene yao maanda jaja boone uria maketha jakethirwa jakari. Boona jabui no bongere mistari ingi ya miti maandene jau jangi

3. Miti ya kurigiria Ruuo: Kwaanda miiti na mistari itaraniritie ni itethagiria kurigiria kurutwa mono ni ruuo. Miiti iji ni irigagiria imera kurutwa ni ruuo rurwingi nkuruki. Anda miti imenene gatigati, na iminiini mistarine iu ingi iiri na tumiti tungi tutukui ruteere. Miiti iji ibwiri kwaandwa



itegene na naria ruuo rukuma. Twanya twa kwaanda miti iji ni gatigati ka mita inya na ithano (4 –5) na mita ijiiri na inya (2 – 4) gatigati ka mistari

Weega bwa miti lji ya kurigiria ruuo ni ati murimi atiendeka gutumira muunda jumunene kwaanda miiti lji. Miiti iji ijukagia kamunda kaniini aki na mawega ja miiti iji nijamaingi niuntu nijatethagiria

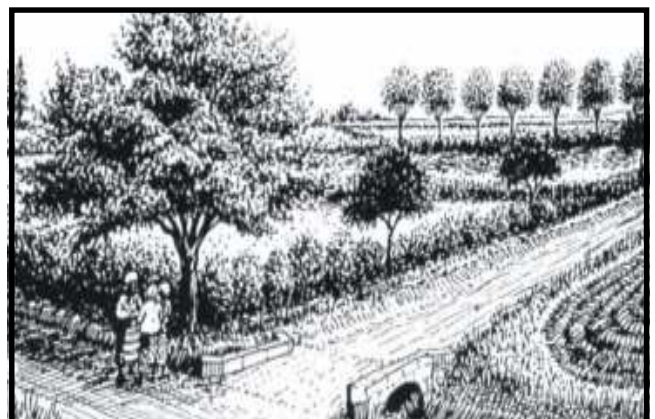
kwongera maciara ja munda na kiwango gia mirongo ithatu kiri igana(30%) guntu kumwe na kumwe. ni bwega kumenya ati miti imwe ya kurigiria ruuo ikarega kwaandwa bwega ni ithukagia imera nkuruki nontu ni itemere ruuo njira kwethirwa gutigi na twanya tutwingi nkuruki ya turia tubwirite. Ni bwega kuuria muntu uria uri na umenyo guguthenteria kubangangania kwaanda muunda jwaku.

4. Kwaanda Miti Yonka: Urimi bubu ni buria mirimi andaaga miti yonka guti kimera kinya kimwe muundene jwawe. Urimi bubu ni butethagiria muthetu gucokia unoru. Ni bwega mono mono kwaanda tumiti turia twongagiria riera riria mithetu yendaaga mono (nitrogen) ja Sebania spp na Gliricidia sepium

5. Urimi bwa Kungania: Kwanadaniria miti amwe na imera ukiejaga miti twanya gatigati ka imera biaku. Mithemba imiega ni iria iri na mugunya munini na iyongagira riera ririega muthetune. Tukabwira ntento nkuruki au mbere.

6. Kubwithia antu akurithiria: lji ni njira ya kubangania miti muundene jwa kurithia kenda miiti iji Yuma nku na iria ria ndithia ciaku. Ja kethirwa kuri guntu Rwanda nibwega kwaanda ja Acaciatortilis kana ingi ja Salvadora persica, cordial sinensis, Acasia eliator, ziziphus mauritiana, Aca-cia albida, Acacia nubica, Acacia Senegal, Hyphaene compressa.

Kuri guntu kuria kuumba gukura miiti nkuruki



kuringana na riera ria ku ri thugania kwaanda miiti ja Leucaena Leucocephala, Sesbania sesban, Calliandra calothyrsus na leucaena diversifolia. Miiti iji no ikwee gancunci ga mirongo iri kiri igana(20%) ga iria ria ndithia ciaku.

7. Urimi bubu ni bwa kwaanda miiti rutere rwa muunda jwaku naria gutikuraa imera bwega. Ja



kwaanda miti rurete rwa muunda naria kwina maiga kana mitaro imenene. Miiti iji no yaandwe mundeene amwe na imera na gutumirwa kurigiiria ruo rurwingi kana kinya kwaandwa ja urimi buria twariririe au mbeere bwa namba inya

8. Gwita mianka. Ja *Croton Megalocarpus* na *Commiphora zimmermannii* subsp.

Aritani, menyeni ati miiti ya TIST no mwanka yaandwe bwega na ikejagwa twanya turia tubwiri kenda ikura bwega na ituura muthetune igita ririraja. Njiira Imwe iria twarikia kwariria ya kwaanda miti na imera ni njira injega mono cia uriimi Indi nibwega kumenya ati no ti mwanka iriwe ni TIST.

Njira ingi cia urimi cia nteere imwe cia Kenya iria cirimaga na njira cia kumenyera mithetu.

Nteere Iria iria iri mpio mono na muthetu ya acidi (Ja nteere iria ciandagwa majani)

Ni bwega kwaanda *Calliandra calothyrsus* na *Morus alba*. Iji niejanaga iria ria ndithia.

Gwita mianka ya miunda no waande *Croton megalocarpus*, *Grevillea robusta*, *Casuarina cunninghamiana*, *Millettia dura*, *Hakea saligna*.

Thugania kwaanda Plum na pear ja matunda nterene iu.

Nteere iria iti na mpio mono. Ja naria kauwa gakuraa bwega anda miti ja misakaranda (*Jacaranda mimosifolia*) gwita mianka

Thugania kwaanda *Syzygium* spp. Kurigiria ruo rurwingi na nteere cia miuro ya ruuji.

Matunda najo ni ja *Cyphomandra betacea* (Ntunda cia ndamu), *Persea americana* (mibokado)

Macadamia tetraphylla (macadamia), *Passiflora edulis* (ntuunda cia muugu), *Casimiroa edulis* (white sapota), *Annona senegalensis* (custard apple), *Psidium guajava* (Mbeera), *Eriobotrya japonica* (ndukuati).

Calliandra, *Morus alba*, *ngirivillea* and *Markhamia lutea* iji ni miiti imiega mono ya kurigiria mithetu gukamatwa ni ruuji.

Ngirivillea ni muti jumwega jwa kwaa kauwa mugunya jumwega.

Nteere cia mpio na guntu guti na rigiri mono na naria guti na miiti:

Thugania kwaanda miti ja *Acacia mearnsii*, *ngiriverea robusta*, *Hakea saligna*, *Croton macrostachyus*, *Dombeya* spp., *Dodonaea angustifolia*, *Casuarina cunninghamiana*, and *Dovyalis caffra*. Na kinya miiti imwe ya matunda, ni ikuraa bwega mono nteere Iji.

Mpempe cia Rift Valley na ndairi. Nontu pempe citikuraga bwega rungu rwa kirundu, thugania kwaanda miiti miniini kana miti ya kurigiria ruo kana ya kurigiria mithetu gwitithua ni ruuji jayo *Ngiriverea robusta*, *Sesbania* spp., *Croton macrostachyus*, *Croton megalocarpus*, *Acacia abyssinica*, *Eucalyptus* spp., *Acacia mearnsii*, *Casuarina cunninghamiana*, *Dovyalis caffra*, *Markhamia lutea*, *Cordia abyssinica*.

Kirikania

Rikana ati ukianda miti ati kinya kethira nikuretagira mantu jamaingi jamega, ni bwega kithithia ucunkuni bwaku kenda umenya munda jwaku bwega na uumba gutaara miti iria igakara bwega mundeene jwaku. rikana ati miri na imera ibicindanagira ruuji na imera, na Imera bingi nabio bitienda mugunya. No urie ntento nkuruki kuuma kiri ikundi biria biri akui na aritani baria bariungaga na miunda.

- Mono mono, uria nkuagaya iguru ria miiti iria iri na miiri iria yorokagira mono na Iria iri na miiri imikai Itiorokagira (ntento iji no igutenthia mono nontu miiri iria itiorokagira nio ishindanagira ruuji na irio na imera bingi) *Casuarina* spp., *Leucaena leucocephala*, *cupressus lisutanica* na *Sesbania sesbania* iiri miiri itorokagira nthi mono na ibui mono ya gucokanaria mithetu *Eucalyptus* spp. na *Gmelina arborea* ni ciitaga kimiko Irigagiria imera bikura bwega.

- *Kungania* imera na miti no irege kubwa nterene iria cionaga ngai yarungu rwa milimita magana 800mm) o mwaka



Mbura ikwija- Ni igita ria kuanda miti ingi imingi.

Kuthuranira miti iria iumithitue ithamua ita muundene (Kumithithia uria ikomba kuumiria muundene)

Nandi niuntu mbura ikwija, miti iria iumithitue nigwiia kuandwa ome ya munanda. Burina bata mweri juju kumenyeera ati miti iu yaku iri tayari kuthamua kuuma munandene iandwa muundene. Miti iji iumithitue mbele nikwenda kuthuranirwa niuntu bwa mantu jamomu nkuruki naria muundene. Kethira miti nithiritwe ikimenyagirwa bwega munandene, no ithirwe ikiiri ruuji na kirundu gikingi nkuruki ya kiria kiri muundene yarikia kuandwa. Mpari mpari nyiyia ruuji ruria ukumikiira na umirugurire riu rionthe nikenda yumba gukara bwega yathama.

Miti ya kuanda iria miega ithagirwa irina jaja

Ta njira ya kawaida (ukirikanaga mithemba mwanya irina mantu mwanya) miti imiega ya kuanda niithagirwa irina jaja:

- Gitina kiria kiumirite kithirwe kiri na uraja bwa miri kana mubuko jairi
- Gitina kithirwe kirina inya na kiri gikiumu
- Miti ithirwe irina miri imiceke imingi na imwe iminene
- Miti iria mingi nikinyithagia mantu jaja na igita ria mieri iiri yarikia kuuma

Kuthamiria miti muundene

- Kamata miti irungi

- Maka kithiururi kiri na warie bwa 30cm muundene kana aria ukwenda kuanda
- Rita muthetu jwa iguru na urikire amwe
- Rita muthetu jou jungi mwanka 30cm kwinama na urikire muthetu juju angi.
- Ikira nyaki centimeter ithano (nyaki imbumu riria gukuura, nyaki itiumi igitene ria uumu)
- Rita muti mubukone. Ukagwithia muthetu jou jugwatene na miri.
- Ikira muti kirinyene
- Cokia muthetu jwa iguru mbele, riu jou jungi jwa iiri
- Ikundi bimwe bitiujuragia kirinya buru, indi nibatigaga kanya ga cm inkai. Bubu nibutethagia ruuji rwa mbuura gutonya kirinyene na kwou gutonya muthetune. Bubu nobutethie mono mono naria kuri gukuumu
- Muthetu jungi juria jumba kwithirwa jutigere nijwikagwa na kibango bwagaiti ya muti. Juju nijugwatagia ruuji rwa mbuura na jukarutongerira gutonya kirinyene
- Ikira muti ruuji.

Ririkana kinya ati nikenda ua muti kanya gakanene ga gukura nuubati kuanda utarenie meter ithatu gwita inya. Waanda ikwianiritie nkuruki miti itikinyirwa ni ruuji na irio biria ikwenda nontu kwina gushindana gukwingi. Ikaaga inya na no ikue, kwou thingata mwithire jumwega buru jwa gutarania na meter ijiri na nusu gwita ithatu.



Bata ya miti.

Miti iri bata mono niuntu bwa mantu jeienaria gututhiurukite na biria tutumagira:

A. Kuthongomia naria gututhiurukite:

- Miti nikunikagira muthetu, untu buria buebithagia gukamatwa kwa muthetu ni ruugo na ruuji.
- Mathangu na maang'i nijagujaga muthetune na jakongeera irio muthetune
- Miti niingiagia ruuji muthetune gukurukira gukunikira muthetu na kwou kunyiyia gukamatwa kwa ruuji ni riuu.
- Miri ya miti nitethagia kugwata muthetu na kwou kunyiyia gukamatwa kwa muthetu.
- Miri ya miti nitethagia kinya ruuji gutonya muthetube na kwou kuthongomia kuthiuruka kwa ruuji nthiguru ya muthetu.
- Miti nitethagia kutongomia rera ya aria iandi gukurukira kwingiyia ruuji ruria ruri ruugone.
- Miti nithongomagia uthongi bwa ruugo gukurukira gukucia ruugo ruruthuku na kurita ruugo rurwega.
- Miti niejanaga kirundu na antu a gwikunikira.

B. Into na irio biria miti iejanaga:

- Into bia gwaka (into bia nyomba, ikingi, ndwego, mikanda)
- Nkuu na makara
- Ndawa
- Irio bia antu na ndithia

Baita iji icithiritwa ciri inene mono kiri arimi na nthiguru yonthe. Uteri bwarua bwa arimi ba TIST ndene ya Kenya nibwonenie ati baita cia matunda, nkandi, iria ria ndithia na nkuu kuumania na miti iria baandite ndene ya TIST na maciara jamathongi nkuruki kuumania na urimi bubwega niikinyite baita ya ngiri mirongo ithatu na mugwanja kiri o murimi. Burina inya nkuruki kuthima baita ya muthetu juri na ruuji rurwingi nkuruki na ruugo rurutheru nkuruki na kinya imwe cia baita ingi cia ngugi iria turitaga ndene ya TIST, indi nitucigagua ndene ya miunda yetu ntuku cionthe.

Kwou gwitithia na mbele uandi bwa miti kurina bata mono kiri antu betu. Thugania jaria tuthithia tukeja kuanda miti ingi turi amwe!

Kunyiyia rwagi.

Igitene ria mbura, rwagi nirugwatanangaga mono. Rwagi, ruria rutumaga antu bagwata ni murimo juu jwa rwagi, niruciarangaga. Buri na bata kumenyeera njaa cienu nikenda bunyiyia rwagi. Matagaria jaja nojatethie:

- Theria njaa yaku ukiritaga mathaka na nyaki iria itikwendeka
- Riita ruuji runthe ruria rwigari akui na kieni giaku. Ruuji rwigari niruejaga rwagi antu a guciarania
- Rita irio biria bitigaraga ugoro.
- Rita ruko wikire kiri gikebe gikunikiri kana kirinyene oome ya nyomba
- Egera nyomba na kieni giaku ntuku cionthe
- Ririkana gutumira net cia kurigiria rwagi riria kuumbika

Mazingira Bora



TIST

The International Small Group & Tree Planting Program
www.tist.org

Kikuyu Version

An Environmental, Sustainable
Development and Community Forestry
Program.



Dr. Madhukar (gatatu kuma guoko kwa mwana wa urio) na mutari wa mathabu kuma Epic Sustainability, India magitereta na kuhunga uhoro arimi a TIST kuma Bushenyi, Uganda mweri muthiru. Hari arimi a TIST kwendia Carbon Credits ikundi-ini nini ciao no nginya mahingie uigiririku wa kimabururi uria uthondeketwo ni Verified Carbon Standards na magekirirwo muhuri ni mutari wa mathabu wa gatatu. Ibatari ria mbere ni kumenyerera miti handu ha miaka mirongo itatu na makiria.

Inside:

Uhandi wa miti migunda-ini ya irio. Page 2

Mbura niyurite – kahindaga kuhanda miti makiria. Page 5

Bata wa miti Page 6

Kunyahia rwagi. Page 6



Uhandi wa miti migunda-ini ya irio.



Gutariria: Guku ni kuhanda miti hamwe na irio cia mugunda na kuriithia mahiu mugunda-ini umwe.

Gitumi kinene kia urimi uyu ni kwongerera magetha kuhitukira uhandi wa miti.

Miti niikoragwo na mawega maingi kuri arimi.

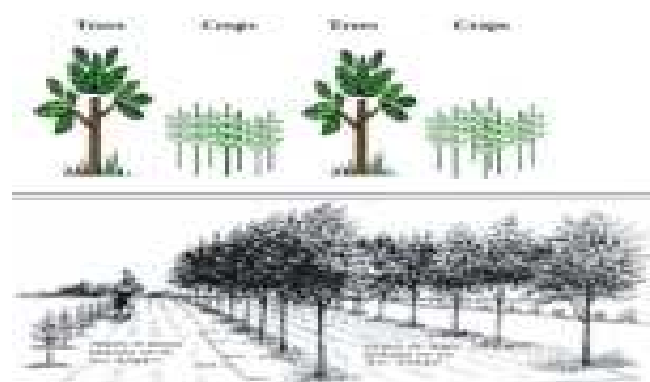
- Indo cia gwaka.
- Ngu cia riiko.
- Matunda na mangi maingi.
- Irio cia mahiu.
- Kwagirithia tiiri.
- Kwongerera unoru tiiri-ini.
- Kuiga tiiri uri mugunyu.
- Kunyihia ruhuho.
- Kuonania mihaka ya mugunda.
- Dawa cia urigitani.
- Kurehe mbeca.
- Kunyihia tiiri gukuuo ni maai.

Urimi wa agroforestry: kuri na njira nyingi na ingi cirathundurwo. Njira ingi nicikoretwo na umithio kundu kumwe no cigakorwo citakwagirira kuria kungi. Andu nimagiriirwo nikugeria njira ngurani na mathomithanie micemano-ini. Ici ni imwe cia njira cia agro-forestry.

1. Hedges: ino ni njira imwe kuria ucaguraga miti iria ukuhanda na muhari na iri na umithio kuri mugunda. Hedges ibataraga mugunda munini, niugiragiriria tiiri gukuuo ni maai na nourute irio cia mahiu na mahuti ma kuiga ugungu. Muhiano wa hedges ni kuhanda muhari wa miti mugunda-ini na utaganu uria mwitikiriku ni 1.5-2M. Njira njega nigutukania miti miraihu n amikuhi. Kwa muhiano *Croton megalocarpus* ihandaniirio na *Euphorbia tirucalli* na *lantana camara*.



2. Alley cropping: ino ni njira ya guchagura miti ini na utaganu munini wa (0.5-2m) thiini wa muhari mugunda-ini. Nogukorwo na muhari wa miti urumiriirwo ni mihari 2 kana 3 ya irio cia mugunda. Muhiano wa njira ino ni kuhanda mihari ya mbembe utukanitie na ya leucena kana kahuwa na marigu. Miti iria miega na alley ni iria ithondekaga tiiri. Utaganu wagiriirwo nigukorwo uri wa 5-8M. Miti thiini wa mihari niyagiriirwo nikurimirwo maita maingi kana miti yage kuraiha muno. Ngingi, noicindanire irio na riia ohamwe na utheri. Mahuti maria macehwo nomarekio thi niguu mongerere unoru no miti ndingitikirika marihi-ini ma TIST tondu timiraihu , no niiguteithia migunda na njira ingi nyingi. Miti imwe miega na alley niikoragwo na uhoti wa gukura ringi ona thutha wa gutemwo. Uu nikuga ati noitemwe thutha wa kimera niguu ikure iri minene na ihote gukuranira na irio. Njira ino itagwo coppicing, na irutaga wiro na mithemba imwe. Mithemba iria ihuthikaga muno ni *Calliandra calothyrsus*, *Cassia siamea*, *Cassia spectabilis*, *Eucalyptus spp.*, *Leucaena leucocephala*, *Markhamia lutea*. Mithemba imwe niyagagirira riria iri minini, muhiano, *Casuarina spp.*, *Grevillea robusta*, *Sesbania sesban* ana ingi ta *Albizia spp.*





8. Marking Bounderies: athomithania nimagiriirwo ni kuririkana ati miti ya TIST niyagiriirwo nigutaganio niguu ikure wega na iikare kahinda kanene. Imwe cia njira irianjega kuri urimi, no citingihuthika thiini wa TIST ta *roton megalocarpus and Commiphora zimmermannii subsp.*

Rora maundu maya niundu wa kundu kungi thiini wa Kenya:

Kundu kuri na riera riega(kuria miti ikuraga wega)

Calliandra calothyrsus and Morus alba niundu wa irio cia mahiu.

Handa miti muhaka-ini niguu unyihie ruhuho na *Croton megalocarpus, Grevillea robusta, Casuarina cunninghamiana, Millettia dura, Hakea saligna*

Huthira orchards kuri miti ya matunda ta prumd, peaches na pears.

Riera ria thi kundu kuinamu kuria kahuwa gakuraga wega.

Huthira jacaranda mimosifolia mihaka-ini

Huthira *Syzgium spp* niguu kunyihia ruhuho na kuhanda njuui-ini.

Handa matunda ta *Cyphomandra betacea* (tree tomato), *Persea Americana* (avocado), *Macadamia tetraphylla* (macadamia), *Passiflora edulis* (passion fruit), *Casimiroa Edulis* (white sapota), *Annona senegalensis* (custard apple), *Psidium guajava* (guava), *Eriobotrya japonica* (loquat)

Calliandra, Morus alba, Grevillea and Markhamia lutea. Nimiega kuhanda niguu kugiririria tiiri. *Grevillea* nimiega ningi niundu wa kiiruru gia kahuwa

Kuria riera riri iguru na kuinamu hanini na miti mitaganu

Huthira windbreaks kugitira irio, mihakana rugiri ta *Acacia mearnsii, Grevillea robusta, Hakea saligna, Croton macrostachyus, Dombeya spp., Dodonaea angustifolia, Casuarina cunningharniana, and Dovyalis caffra.*miti ingi ya matunda noikorwo iri miega

Ruhonge rwa urimi wa mbembe na uriithi wa mahiu Riftvalley.

Tondu mbembe nicikuraga wega handu hari na kiiruru, huthira woodlots kana windbreaks kana miti iria ikuragio kuria tiiri uramenyererwo ta *Grevillea robusta, Sesbania spp., Croton macrostachyus, Croton megalocarpus, Acacia abyssinica, Eucalyptus spp., Acacia mearnsii, Casuarina cunninghamiana, Dovyalis caffra, Markhamia lutea, Cordia abyssinica.*

Kiririkania – ona uhandi wa miti ukirehaga mawega maguo, niwagiriirwo nikuhanda miti iria miega kuri migunda. Ririkana ati miti niicindanagira maai na irio na irio cikaga gukura wega. Caria uhoro kuma ikundi-ini na aruti wira angi.

- Makiria caria utaaro wa miti iria miega iri na miri mirumu(miti ino niikoragwo iri miega na agroforestry tondu miri yayo icindanaga na irio) *Casuarina spp., Leucaena leucocephala, Cupressus lusitanica, and Sesbania sesbanhave shalloe* niikoragwo na miri miega na nimiega hari guthondeka tiiri. *Eucalyptus spp. na Gmelina arborea* niithondekaga indo njega ciagukuria irio. Kuhandaniria miti na irio nokwage gukorwo kuru kwega miena iria itamukagira mbura nyingi.

- Resources: rurenda rwega muno ruria ruraheana uhoro wa miti iria miega thiini wa Kenya kuria ungenicaria uhoro uyu ni <http://agroforesttrees.cisat.jmu.edu/>



Mbura niyurite – kahindaga kuhanda miti makiria.

Kuhariria mimera niguu kuhanda mugundaini.

Riu tondu mbura niyurite, mimera niyagiriirwo nikuhandwo migundaini kuuma nthari. Niwega mweri uyu gutigirira mimera iri ho ya kuhandwo. Mimera yagiriirwo ni wambere kuharirio niundu wa riera iritu mugundaini. Angikorwo mimera nditoretwo wega iri nathariini , akorwo niirahetwo maai maingi na kiiruru gukira uria yagiriirwo kana gukira uria ikuheo yathii mugundaini. Kahora kahora nyihia muhere wa maai na wehutie kiiruru hari mimera niguu ihote guikara migundaini

Mimera miega ikoragwo na;

Ta kioereria kiega, (ririkana mithemba ngurani ya miti ndihanana) mimera miega ya kuhanda ikoragwo na;

- Mimera uraihe maita meeri gukira muri
- Mumeru ukorwo na hinya
- Mumeru ukorwo na miri miingi
- Mimera miingi niikinyanagiria maundu maya thutha wa mieri 2

Guthamia miti.

- Thamia mimera irugamite na iguru
- Cora tuthiururi twa warii wa 30cm mugundaini

- Eheria tiiri wa iguru
- Eheria tiiri ucio ungi urumiriire nginya uriku wa 30cm
- Ikira mahuti urku wa 5cm(nyeki nyumu hingo ya mbura nanjigu hingo ya riuu) ikund ingi cihuthagira thumu
- Ruta mimera kuuma maratathiini na ndugatinie gatiiri karia kari muthiaini wa muri
- Ikira mimera irimaini
- Ikira tiiri wa iguru na ucokerere na ucio ungi.
- Ikundi ingi citihuragia irima na tiiri biu. Njira ino niiteithagiriria maai ma mbura kuingira irimaini na gutonya tiiriini na njira ino ninjegamahinda ma riuu.
- Tiiri uria ungikorwo utigarite nougo nakianda ia irima niguu uhingiririe maai.
- Itiriria mimera maai.

Ningi tigurira niwahee mimera maundu mega niguu ihote gukura wega na kuhanda na utaganu wa 3cm-4cm. ungimihanda ikuhaniriirie ndikuhota gukinyirwo ni maai na unoru wa tiiri uria irabatara tondu kuri na ucindani na indo ingi. Niikwaga hinya na noyume, kwa uguo rumirira maundu ma gutagania 2.5-3cm



Bata wa miti

Miti niiri bata wa maundu maria maturigiciirie.

A. Kwagirithia maria maturigiciirie:

- Miti niihumbagira tiiri, njira iria iugitagira kumana na ruhuho na maai
- Mahuti magwa thi nimatumaga iiri ugie na ugunyu
- Mahuti magwaa thi nimongagirira thumu tiiriini
- Miri ya miti niinyitagirira tiiri kumana na gukuuo ni maai
- Miri ningi niiteithagia maai kuingira tiiriini
- Miti niyagiragia riera na ikaingiria maai rieraini
- Miti niitheragia riera na njira ya kugucia carbon dioxide na kuruta oxygen.
- Miti niikoragwo na kiiruru

B. Indo cia micii na cia kuria:

- Indo cia gwaka(mbau, rugiri, ndigi etc)
- Ngu
- Dawa
- Irio cia mahiu.

Maundu maya nimakoragwo na umithio kuri arimi othe thi yothe. Uthuthuria uria wikitwo ni TIST thiini wa Kenya wonanitie ati umithio wa matunda na iria cia mahiu na ngu kuma mitiitni iria ihanditwo ni arimi a TIST niikoretwo ikiongereka kumana na urmi wa Kilimo Hai na igateithia arimi na 37,000 hari o murimi. Niuritu kumenya umithio kumana na tiiri na riera riega na maundu mangi maingi no nituonete TIST igiteithia arimi o muthenya.

Kwa uguo kuhanda miti nikuo kumgiteithia arimi na matuura. Tawicirie maundu maria tungika riria twahanda miti ino turi hamwe!

Kunyahia rwagi.

Kimera kia mbura, mrimu ya malaria niingihaga.

Rwagi, ruria rurehaga mirimu ino nirukuraga nau ihenya na rugaciarana, niwega kuora mucii waku niguu kunyahia rwagi. Makiny maya nomateithiririe.

- Theria mucii waku
- Thereria mmai mothe marugamite tondu nikuo rwagi ruciaranagira

- Theria irio iria ciatigara

- Ehutia giko giothe nmuciini

- Haata nja yaku o muthenya.

Huthira neti ya rwagi riria kurabatarania

Mazingira Bora



TIST

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Kiswahili Version

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Program.



Daktari Madhukar (mtu wa tatu kutoka kulia) mhadisi kutoka Epic Sustainable, India akiongea na kuhonji wakulima wa TIST kutoka Bushenyi, Uganda mwezi uliopita. Kwa wakulima wa TIST kuuza Carbon Credits vikundi za mti lazima wafikie kiwango cha kimataifa kile kimewekwa na Verified Carbon Standards na kuhesabiwa na mhadisi asiye tegemea upande wowote. Kati ya mahitaji ni kuchunga miti kwa kati ya miaka thelathini na zaidi.

Inside:

Kilimo Endelevu: Kilimo Mseto. Page 2

Mvua imefika - Wakati wa kupanda miti mingine mingi. Page 5

Umuhimi wa miti. Page 6

Kudhibiti mbu. Page 6



Kilimo Endelevu: Kilimo Mseto.



Mada muhimu kwa kilimo endelevu ni Kilimo mseto.

Ufafanuzi: Kupanda miti na vichaka pamoja na mimea ya chakula au mifugo.

Lengo la kijumla la klimo mseto ni kuongeza uzalishaji wa ardhi kupitia matumizi ya miti. Miti ina faida nyingi kwa mkulima:

- Vitu vya ujenzi
- Kuni
- Matunda na chakula kinginecho
- Chakula cha mifugo
- Kutuliza udongo
- Rutuba ya udongo
- Kuweka unyevu
- Wind shelter
- Kiashiria cha mipaka
- Dawa
- Mapato ya kifedha
- Kupungua kwa mmomonyoko wa udongo (iwapo safu ya taka au mimea itatandazwa)

Mitindo katika kilimo mseto:

Kuna mbinu mbalimbali na zingine mpya zinazogunduliwa kila wakati. Baadhi ya mbinu hufanikiwa mahali pamoja na kuwa na maafa kwingine. Watu wanahitajika kujaribu mbinu mbalimbali na kugawana mitindo iliyo bora zaidi katika mikutano ya mafunzo. Zifuatazo ni baadhi ya mbinu zinazotumika sana sana katika kilimo mseto:

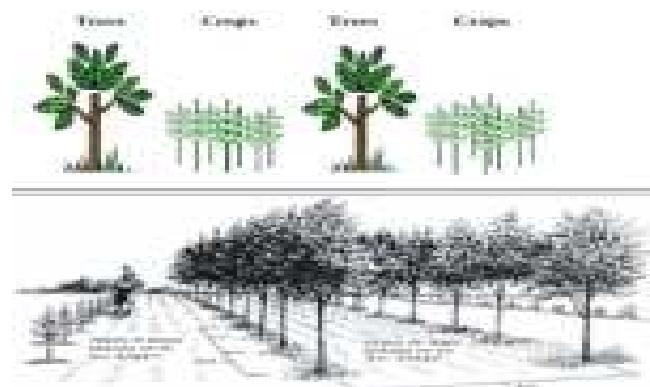
I. Nyua: Hili huhusisha kuchagua aina ya mti utakaopandwa kwa mstari na ambao una faida kwa ardhi. Nyua huhitaji nafasi ndogo, huzuia mmomonyoko wa udongo na hutengeneza majani kwa ajili ya chakula cha mifugo na matandazo. Mfano wa kutengeza ua ni kupanda miti kwa mstari ikizunguka mpaka wa shamba.

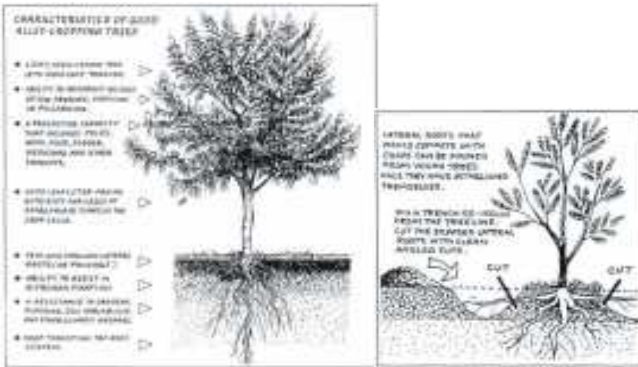
Nafasi kati ya miti inayopendekezwa ni kati ya mita moja na nusu na mita mbili. Njia bora zaidi ni kuchanganya miti mirefu na mifupi.

Kwa mfano *Croton megalocarpus* wawezwa pandwa pamoja na *Euphorbia tirucalli* pamoja na lau *Lantana camara*.



2. Kilimo mseto kwa mistari: Hili huhusisha kupanda miti iliyo na nafasi ndogo sana (nusu mita kufika mita mbili) iliyopandwa kwa mistari shamba lilivyo. Kwaweza kuwa na mstari wa miti halafu mistari miwili au mitatu ya mimea, halafu mstari mwingine wa miti, halafu mimea, na kadhalika. Mfano wa hili ni kupanda mistari ya mahindi iliyoandana na *Leucaena* au kahawa na ndizi. Miti iliyo bora zaidi ni ile ya familia ya kunde (inayoweka naitrojeni udongoni). Nafasi kati ya mistari ya miti yafaa kuwa mita tano kufika nane. Mistari hiyo ya miti yafaa kupaliliwa na kupunguzwa majani mara kwa mara. Miti hiyo isiwe mirefu au itaanza kupigana na mimea ili kupata virutubisho na mwangaza. Majani yaliyokatwa yaweza kuongezwa kwa udongo ili kuongeza rutuba ya udongo. Kwa hivyo miti hii haitaweza kupata malipo ya TIST, kwani inafaa kuwekwa ikiwa mifupi, lakini itaboresha ardhi kwa kilimo na kumpa mkulima faida zingine nyingi. Baadhi ya mimea mizuri ya kupanda pamoja na mimea huweza kukua tena inapokatwa. Kumaanisha inaweza kukatwa kila msimu wa mimea ili isiwe mikubwa sana isije ikapigana sana na mimea. Mtindo huu unaitwa 'copicing' na hufanikiwa kwa baadhi ya mimea. Aina za miti hii ni *Calliandra calothyrsus*, *Cassia siamea*, *Cassia spectabilis*, *Eucalyptus spp.*, *Leucaena leucocephala*, *Markhamia lutea*. Baadhi ya miti humea tena vizuri inapokuwa change lakini haime tena inapokomaa kwa mfano *Casuarina spp.*, *Grevillea robusta*, *Sesbania sesban* na baadhi ya *Albizia spp.*

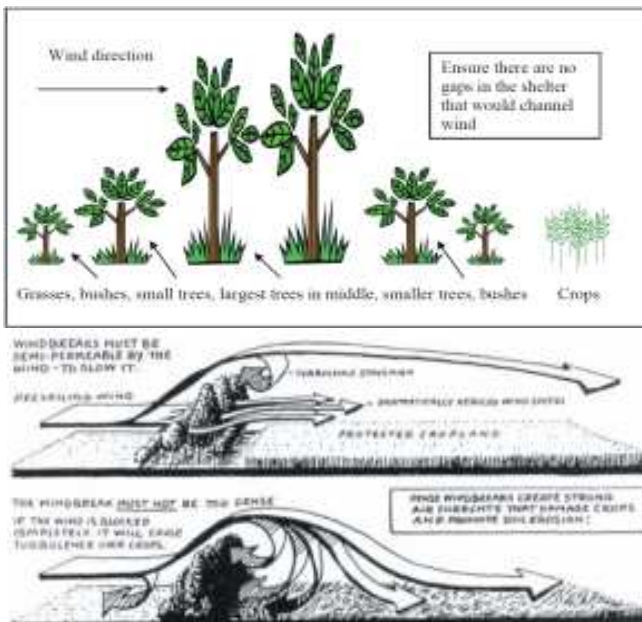




Je, wakulima wametumia jinsi hii ya kupanda miti na kulima? Kama ndivyo ni njia gani mwafaka ya kuchanganya? Wauleze wajandiliene na wakuje na majibu kwenye mkutano ujao.

Pengine wakulima wanaweze jaribu mistari kadhaa kwenye mashamba zao. Wangalie majibu. Kama majibu iko sawa waongeze mistari mingine musimu ujao

3. Kizuia upepo: Kupanda miti iliyofuatana ili kutengeneza kizuia upepo. Miti hii hulinda mimea kutokana na upepo unaokuja. Panda miti mikubwa kati kati, midogo zaidi mistari miwili inayofuata na miti mifupi, vichaka na nyasi nje. Panda ikiwa dhidi ya upepo unaokuja. Nafasi kati ya miti iwe mita nne au tano na mbili kufika nne kati ya mistari.



Faida ya viziua upepo ni kuwa mkulima si lazima hatoe shamba lote ili kupanda miti. Inachukua kipande cha ardhi na faida zaweza ongeza mazao kwa asilimia thelathini katika baadhi ya maeneo. Kumbuka kuwa viziua upepo visivyopangiwa vizuri vyaweza kuharibu mimea kwani vinaweza kupitisha upepokupitia nafasi. Tafuta mtu aliye na ujuzi kukusaidia kupangia kizuia upepo.

4. Kupumzisha ardhi:

Hapa ni ambapo wakulima huacha kupanda mimea kwa kipande cha ardhi na kuiacha miti kumea ili kusaidia kurejesha rutuba ya udongo. Ni miti mifupi inayoweka naitrojini udongoni inayochaguliwa mara nyingi kwa mfano *Sesbania* spp. na *Gliricidia sepium*.

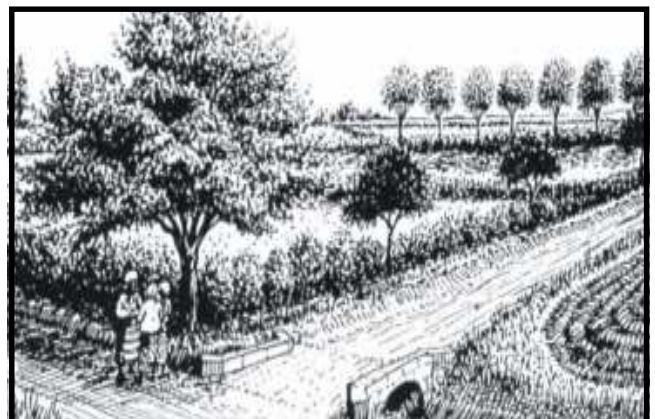
5. Kuchanganya mimea na miti: Hili huhusisha kupanda miti yenye nafasi kubwa kati kati ya mimea. Miti mizuri ni isiyo na matawi mengi na inayoweka naitrojini udongoni.

6. Kuboresha pahali pa kulisha mifugo: kuchunga miti iliyo katika ardhi ya kulisha mifugo ili kukupa kuni na chakula cha mifugo. Kwa mfano, katika maeneo kame fikiria kupanda *Acacia tortilis* ama baadhi ya miti ifuatayo: *Salvadora persica*, *Cordia sinensis*, *Acacia eliator*, *Ziziphus mauritiana*, *Acacia albida*, *Acacia nubica*, *Acacia Senegal*, *Hyphaene compressa*.

Katika maeneo mazuri zaidi, kulingana na urefu juu ya ziwa, panda *Leucaena leucocephala*, *Sesbania sesban*, *Calliandra calothyrsus* na *Leucaena diversifolia*. Fikiria kuhusu malisho ya nyongeza kutumia majani (asili mia kumi na tano kufika ishirini ya malisho) wakati wa ukame ya mifugo wako.

7. Misitu midogo wa miti:

Miti mifupi yaweza kupandwa katika maeneo yasiyotumika au yasiyozalisha, kwa mfano miti ilipondwa katika eneo lenye mawe yaliyojitokeza juu na katika mitaro. Miti mifupi pia yaweza kupandwa katika ardhi yenye mimea kufanya kazi



ya kizuia upepo, ama yaweza kupandwa katika ardhi iliyopumzishwa.

8. Kuashiria mipaka e.g. *Croton megalocarpus* na *Commiphora zimmermannii* subsp.



Wanaofunza, jua kuwa miti ya TIST inapewa nafasi nzuri ili ikue inavyofaa na ikae ardhini kwa muda mrefu. Baadhi ya mbinu za kilimo mseto zilizo hapo juu ni mitindo bora zaid ya kilimo lakini miti haitaweza kupata malipo ya TIST.

Fikiria zingine za kujaribu katika baadhi ya maeneo ya kiasiri Kenya.

Miteremko iliyo katika maeneo ya urefu mkubwa yenye udongo wenye acidi (kwa mfano ambapo majani chai hukua vizuri).

Fikiria kupanda *Calliandra calothyrsus* na *Morus alba* kupata chakula cha mifugo.

Kupanda mipaka na vizuia upepo fikiria miti kama *Croton megalocarpus*, *Grevillea robusta*,

Casuarina cunninghamiana, *Millettia dura*, *Hakea saligna*.

Kwa matunda fikiria miti ya bustani (kama plums, peaches, pears).

Miteremko iliyo maeneo yenye urefu mdogo (kwa mfano ambapo kahawa hukua vizuri)

Fikiria kupanda *Jacaranda mimosifolia* kama mti wa kutengeza mipaka

Unweza panda *Syzygium* spp. Ili kuzuia upepo au kando ya mikondo ya maji.

Fikiria kupanda miti ya matunda kama *Cyphomandra betacea* (tree tomato), *Persea americana* (avocado), *Macadamia tetraphylla* (macadamia), *Passiflora edulis* (passion fruit), *Casimiroa edulis* (white sapota), *Annona senegalensis* (custard apple), *Psidium guajava* (guava), *Eriobotrya japonica* (loquat).

Calliandra, *Morus alba*, *Grevillea* na *Markhamia lutea* ni miti mizuri ya kupanda katika maeneo unayotaka kudhibiti mmomonyoko wa udongo (miundo ya kuhifadhi udongo).

Grevillea ni mti mzuri wa kuipa mimea ya kahawa kivuli

Maeneo tambarare yaliyo na urefu mkubwa, yenye ardhi iliyo na mteremko mdogo na miti michache:

Kama vizuia upepo ili kulinda mimea yako, miti ya mipaka na nyua zilizo hai fikiria miti kama *Acacia mearnsii*, *Grevillea robusta*, *Hakea saligna*, *Croton macrostachyus*, *Dombeya* spp., *Dodonaea angustifolia*, *Casuarina cunninghamiana*, and *Dovyalis caffra*. Baadhi ya miti ya matunda inayokua mahali penye joto la kawaida yaweza kukua vizuri. Mfumo wa mahindi na maziwa katika bonde la ufa kwa sababu miti haikui vizuri chini ya kivuli, fikiria miti mifupi ama vizuia upepo au miti inayopandwa katika mifumo ya kuhifadhi udongo kwa mfano *Grevillea robusta*, *Sesbania* spp., *Croton macrostachyus*, *Croton megalocarpus*, *Acacia abyssinica*, *Eucalyptus* spp., *Acacia mearnsii*, *Casuarina cunninghamiana*, *Dovyalis caffra*, *Markhamia lutea*, *Cordia abyssinica*.

Kumbuka

Kumbuka kuwa ingawa kupanda miti huleta faida nyingi unahitajika kutafiti kuhusu aina bora zaidi kwa aina maalum ya ardhi yako. Kumbuka kuwa miti hushindana na mimea kupata maji na mimea mingine haipendi kivuli kingi, kwa mfano. Pata taarifa kutokana na vikundi vidogo vilivyo karibu nawe na wafanyikazi katika sekta ya kilimo.

- Pata ushauri sana sana kuhusu aina ya miti inayofaa iliyo na mizizi inayofika chini zaidi na yenye mizizi ya juu michache (miti hii ina faida katika kilimo mseto kwa sababu mizizi ya juu hushindana na mimea). Mizizi ya *Casuarina* spp., *Leucaena leucocephala*, *Cupressus lusitanica*, na *Sesbania sesban* have shallow yaweza kuwa bora kwani inatuliza udongo katika maeneo yanayohifadhiwa. *Eucalyptus* spp. na *Gmelina arborea* hutengeneza misombo inayozuia mimea kukua.
- Kupanda mimea pamoja na miti haifanikiwi san asana katika maeneo yanayopata mvua isiyozidi milimita mia nane kila mwaka.



Mvua imefika - Wakati wa kupanda miti mingine mingi.

Kutayarisha miche ili kuihamisha (Kuitayarisha kuishi katika hali ngumu)

Sasa kwa kuwa mvua imefika, miche inahitaji kupandwa. Ni muhimu mwezi huu kuhakikisha kuwa miche iko tayari kuhamishwa kutoka kitaluni na kupandwa shambani.

Miche kwanza inahitaji kutayarishwa kwa hali ngumu iliyo shambani. Kama miche imekuwa ikichungwa vyema kitaluni, inaweza kuwa ikipata maji zaidi ya ambayo itapata ikishapandwa shambani. Kidogo kidogo, ipunguzie maji unayoipa na uifungulie jua lote kuhakikisha itaweza kuhimili uhamisho huu inavyofaa.

Sifa za miche mizuri

Kama mwelekezo wa kijumla (ukikumbuka namna mbalimbali huwa na sifa mbalimbali) miche mizuri ya kupanda huwa na sifa zifuatazo:

- Shina linapotokeza lafaa liwe na urefu wa mizizi au mfuko mara mbili.
- Shina lafaa kuwa lenye nguvu na gumu.
- Miche inapaswa kuwa na mizizi myembamba mingi pamoja na mizizi mikubwa.
- Miche mingi itakuwa na sifa hizi baada ya miezi miwili ikishaota.

Kuhamisha

- Beba miche ikiwa imesimama inavyofaa
- Pima duara lenye upana wa sentimeta thelathini shambani

- Toa mchanga wa juu na huuweke kwa pango
- Toa safu la pili la mchanga hadi sentimeta thelathini na uweke kwa pango lingine.
- Safu la nyasi sentimeta tano (nyasi kavu msimu wa mvua, nyasi mbichi msimu wa ukavu). Vikundi vingine huongeza mbolea pia.
- Toa mche mfukoni. Usivunje mchanga uliozunguka mizizi.
- Weka mche shimoni
- Rudisha mchanga wa juu kwanza, halafu safu la pili la mchanga.
- Vikundi vingine havijazi shimo hadi pomoni, ilhali huacha pengo lasentimeta chache. Hili husaidia kuingiza maji ya mvua shimoni na mchangani. Hili sana sana husaidia maeneo makavu.
- Mchanga ambao hubaki unaweza kuwekwa kwa pango kwa upande wa chini wa mche. Tendo hili husaidiakushika maji yoyote ya mvua na kuyarudisha shimoni.
- Chotea mche maji.

Kumbuka pia kuwa ili kuupa mche wako nafasi nzuri ya kuishi inafaa huipande ikitengana meta tatu kwenda nne . Ukiipanda karibu kuliko hivyo, miche yako haitapata maji na madini ya mchanga yote inayoitaji kwa sababu ya ushindani mwingi. Itakosa nguvu na yaweza kufa, kwa hivyo fuata mwenendo mwema zaidi wa kutenganisha kwa meta mbili na nusu kwenda tatu.



Umuhimi wa miti.

Miti ni muhimu sana kwa sababu za kimazingira na kibidhaa:

A. Kuboresha mazingira:

- Miti hufunika mchanga, tendo ambalo hulinda mchanga kutokana na mmomonyoko unaosababishwa na upepo na maji.
- Majani na matawi huanguka ardhini na kuoongeza madini mchangani.
- Miti huongeza unyevu mchangani kwa kuufunika mchanga na kupunguza **evaporation**.
- Mizizi ya miti husaidia kuushika mchanga na hivyo basi kupunguza mmomonyoko.
- Mizizi husaidia maji kuingia mchangani na hivyo basi kuboresha mzunguko wa maji yaliyo chini ya ardhi.
- Miti huboresha hali ya anga ya ilipopandwa kwa kuongeza unyevu hewani (kuoneza ubaridi)
- Miti huboresha uzuri wa hewa kwa kunyonya hewa chafu na kupumua hewa safi.
- Miti hutupa kivuli na pa kujifunika.

B. Thamani ya kibidhaa na kilishe:

- Bidhaa za kujenga (vyombo vya kutumia ndani ya nyuma, gogo, kamba na kadhalika)
- Kuni au makaa
- Dawa
- Lishe ya watu na ng'ombe

Faida hizi ni zenye thamani sana kwa mkulima na kwa dunia yote. Utafiti wa hivi juzi wa wakulima wa TIST katika Kenya ulionyesha kuwa thamani ya matunda, lishe ya ng'ombe na kuni kutoka kwa miti waliyopanda wakiwa TIST na mavuno bora kutokana na Ukulima Bora ilifika elfu thelathini na saba kwa kila mkulima. Ni ngumu kupima thamani ya faida za mchanga baridi na wenye unyevu zaidi na faida zingine za kazi tunayofanya katika TIST, lakini tunaiona thamani hii mashambani mwetu kila siku.

Kupendakeza upandaji wa miti hivyo basi, ni muhimu sana kwa jamaa. Fikiria ambayo twaweza kufanya kukipanda zaidi tukiwa pamoja!

Kudhibiti mbu.

Katika majira ya mvua, maambukizi ya ma laria huwa kawaida. Mbu, ambao hueneza vimelea vya ugonjwa huu, huzaliana kwa haraka. Ni muhimu kutunza nyumba zenu ili kupunguza uwepo wa mbu. Hizi hatua zaweza kusaidia:

- Wazisha kiwanja chako kutokana na vichaka na nyasi zozote zisizohitajika
- Toa maji yoyote yaliyotuma karibu na kiwanja chako. Maji yaliyotuma huwapa mbu pahali pa kuzaliana

- Tupa chakula chochote kilichoashwa usiku mzima
- Weka taka nje ya nyumba katika chombo kilichofunikwa au katika shimo la taka
- Fagia nyumba na kiwanja chako kila siku

.Kumbuka kutumia vyandarua vya mbu kila iwezekanapo

Mazingira Bora



TIST

The International Small Group & Tree Planting Program
www.tist.org

Kikamba Version

An Environmental, Sustainable
Development and Community Forestry
Program.



Daktari Madhukar (mtu wa tatu kutoka kulia) mhadisi kutoka Epic Sustainable, India akiongea na kuhonji wakulima wa TIST kutoka Bushenyi, Uganda mwezi uliopita. Kwa wakulima wa TIST kuuza Carbon Credits vikundi za mti lazima wafikie kiwango cha kimataifa kile kimewekwa na Verified Carbon Standards na kuhesabiwa na mhadisi asiye tegemea upande wowote. Kati ya mahitaji ni kuchunga miti kwa kati ya miaka thelathini na zaidi.

Inside:

Uimi kana ndilikasa ya kuendee. Page 2

Mbua niyukie - Ivinda yingi ya uvanda miti ingi mingi. Page 5

Vata wa Miti. Page 6

Kwisiania na umuu. Page 6



Uimi kana ndilikasa ya kuendee.



Nima ya miti la liu Kilungu kya vata kya uimi na ndilikasa ni nima ya liu na miti.

Ualyulo: Kuvanda miti, ikuthu vamwe na liu kana mimea na kana ndithya ya indo Mwolooto wa nima ya miti na liu yithiawa na mwelekelo umwe ula ni kwongela w’umi wa kitheka kwa nzia ya kutumia miti.

Miti yithiawa ya vaita mwingi kwa muimi ta:-

- Miti ya kwaka
- Ngu
- Matunda na liu
- Uithyo / Wovo
- Kulumya mbithanga
- Kwongela muthanga unou
- Kwikalya kimeu
- Kusii kiseve
- Kwikia muvaka
- Ndawa
- Kuete mbesa
- Kuola kukuwa kwa muthanga.

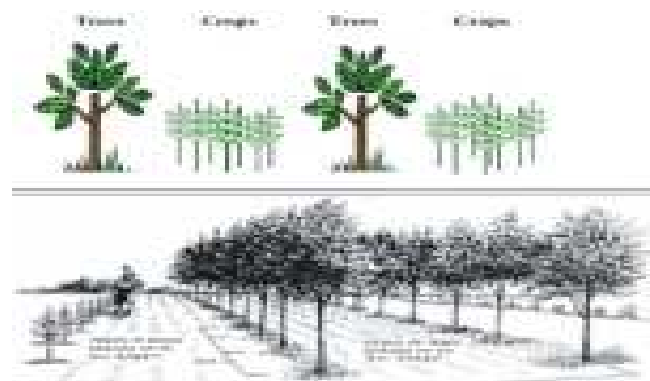
Nzia sya uvandi na uimi wa miti na liu; Kwi nzia mbingi ila iatiawa na kwi ona ingi nzau. Nzia imwe ni nzeo kwa isio imwe na nithuku kwa isio ingi. Andu nimendaa kutata nzia kwiana na kisio kila mai na kuete ona nzia ingi nzau na kwona nisyiva syaile kisio kyoo, ingi nimaile kwonasya ala angi yila mena mbumbano undu wa nzia ithi. Vaa ve nzia imwe ila itumiawa kaingi nthini wa nima ino:-

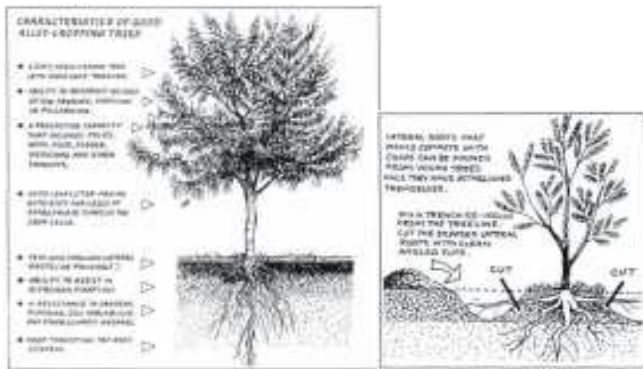
I.Wiio: Nzia ino yendaa ukamba usakua muthemba wa miti ula wavandwa lainini wikaa nesa na unengae muthanga vaita. Wiio wendaa kisio kinini, nusiiia muthanga kukuwa, niwumasya matu ma liu wa indo na kuvwika muthanga. Ngelekany’o ni kuvanda miti ithyululukitwe kiwanza ta muvaka. Miti ino niyaile



uvandwa na utaaniu wa 1.5 - 2m. Kingi wiio withiawa museo yila wavanda miti miasa na mikuvi ivulene ngelekany’o Mithulu na ndau kana mutavisi.

2. Kuvanda mitauni:- Nzia no yendaa kuvanda kwa misitali ithengeanie tanyusu itambya kuvika matambya eli. No uvande mutau wa miti, mitau ili kana itatu ya liu ngelekany’o mutau wa mbemba mutau wa lusina kana maiu na kaawa. Miti ila miseo ya uvandaniw’a na liu ni ila inengae muthanga nzeve ya nitrogen. Utaaniu wa miti waile matmbya 5 - 8(m). Utaaniu niwaile kwika uyiimwa na iisewa nikana ndikasindane na liu undu wa unou na kyeni. Matu ala masewa no mavulanwe namuthanaga kuete unou kana makanengwa indo ta liu. Kwoou miti ino nundu niseawa ndikaasave muno ndithiawa yaile kwondu wa nima ya ndivi nthini wa TIST onakau nimiseu niseuvasya mawithyululuko undu wa nima nzeo na kwithiwa yi ya vaita kwa muimi. Miti imwe ila ivanda mitauni yithiawa nzeo nundu nithongooa nesa na kwoou noyithiwe itemwe kila mbua nikana inenge mimea/liu nzeve nesa. Nzia ino yithiwa nzeo na mithemba imwe ya miti ta Cassia siamea, Cassia Spectabilis, musanduku, Lusina, Kyoo miti imwe niyithiawa miseo ila mini no yeananga withiaa ndivandaniw’a na kindu nayo nita Mvinje, mukima / muvaliti, munyongo na Albzia spp.

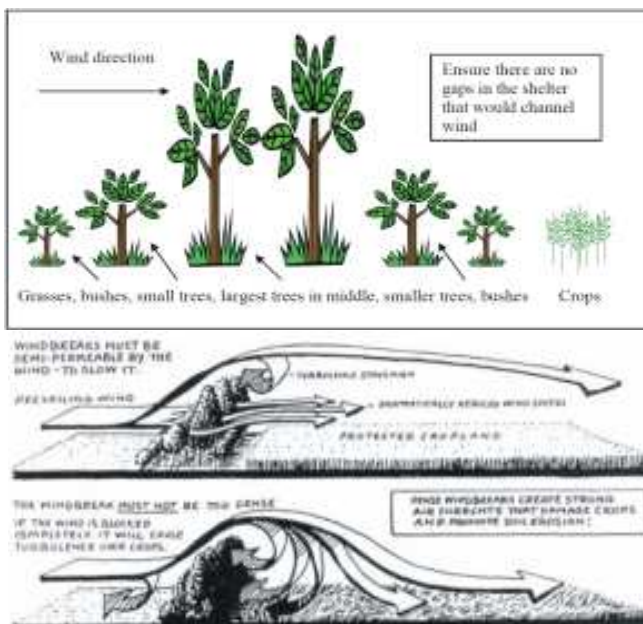




Ve muimi waatumia nzia ino ya kuvanda miti na liu vamwe? ethiwa evo, ni miti na liu wiva syeekie nesa syavandaniw'a? Makulye mamunenge uvo uulu wa kila mamanyie kumanana na mbanda ino na muyuka na umanyi uyu ila ingi kukwithiwa na mauvundisyo.

Imwe aimi no matate kwa kuvanda mitau o minini niundani yoo na kwona kana vena kivathukany'o na mbua ila ingi.

3. Kusiia kiseve: Kuvanda miti laini itaanie nisiiaa kiseve. Uu naw'o nusiiaa mimea/liu kumana na kukomwa ni kiseve na kwanangika, Vanda miti ila minene kati, miti ila mini iatiioe lainini usu ungi,



na ikuthu na nyeki iyatiia. Vanda isiie kiseve. utaaniwa wa laini sya miti waile ithiwa wi 4-5m na 2.4m katikati wa miti ila yi lainini.

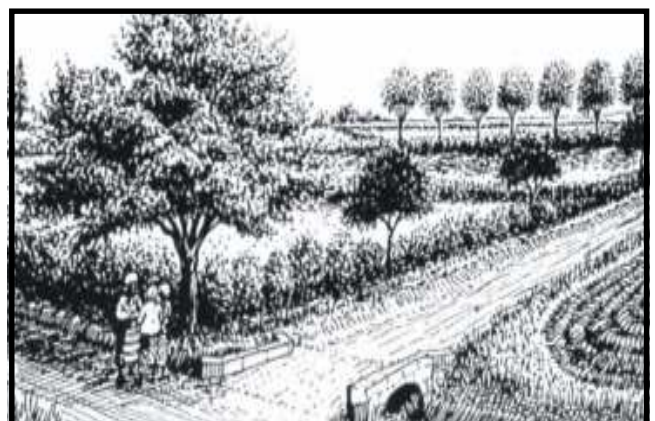
Useo wa kuvanda miti ya kusiia nzeve nundu muimi ndeithiawa ayumya kisio kinene kya muunda kuvanda miti no viata wa miti ino niwonekaa na ukatuma withiwa na ngetha nzeo nundu kiseve kila

kitonya kwananga liu nikisiie. Ingi miti ya kusiia nzeve yavandwa nai nitonya utuma liu wangika nundu ethiwa nzeve yeelekelw'a ngali ila itaile kana mwina mwanya nzeve itonya ulikila nitonya kwananga mimea. Sisy mundu wisi undu miti ya kusiia nzeve ivandawa autetheesye ethiwa wienda uvanda miti ya kusiia nzeve.

4. Kutiia uvanda:- Vaa ni vala muimi wambaa ukilila mbia siana una ate kuima kisio kina kya muunda na ayieka ikuthu iimea nikana muthanga utunge unou. Kana nutonya uvanda ikuthu ila syongelaa muthanga nitrogen ta munyongo na wuti. **5. Nima ya Kuvulany'a:** vaa ni vala muimi uvandaa miti na liu vamwe indi miti uyithia ivanditwe mataila. Miti miseo ya nima ino ni miti ila ietae muunyi na kwongela unou wa muthanga. Uvo mbeange kilunguni kingi.

6. Kwailya kisio kya ndithya: Kusuvia miti kisioni kya ndithya nikana wongele uithyo/ wovo na ngu. Kwa ngelekany'o kundu kula kumu miti ya imwea na isemei kana imwele, ivoa, muthiia, kyaiki, mulaa, kilului nimiseo nundu matu mayo ni maseo kwa kwa liu wa indo yila kwi thano.

7. Kuvanda miti ta tukuthu:- Kuu ni kuvanda miti mingi vandu vamwe tusio tusio tula twavandwa liu tutekaa nesa na no ivandaniw'e na liu



ngelekany'o kuvanda muundani vala vakue ni kiw'u na kuu utee uivanda liu. ingi miti ino nisiiaa nzeve. Miti ino no ivandwe vandu vamosu kuseuvya muthanga wavo.



8. Kwikia muvaka: ngelekany'o Mithulu kana commiphora zimmermannii subsp.

Amanyisya, lilikanai kana miti ya TIST niyaile ithiwa itaaniw'e undu vaile nikana yiane na kwikala kwa ivinda yila yaile. Nzia imwe kati wa ila ineenewe vaa iulu ni nzeo kwa nima ya uvandi wa miti na liu kana ndithya yoka na iitonya utumika kwa nima ya TIST ya ndivi.

Mawoni angi ma kuisya nundu wa mbua isioni imwe sya Kenya.

Isio ila syi iimani syithiawa na muthanga wina asiti mbingi (kula maiani mekaa nesa)

Sisya kuvanda Calliandra Calothyrsus na Morus alba kwa uithyo wa indo.

Kwa muvaka na kusia kiseve vanda Mithulu, Mikuvulya, Casuarina Cunninghiana, Millettia dura kana Hakea saligna.

Kwonderu wa matunda vanda miti ite uthui ta Ndunda, Ndula kana mapeasi.

Isio ila syinthi (ta kula kaawa kekaa nesa)

Sisya uvande jacaranda Mimosifolia mivakani
Kwa kusia nzeve na w'umo wa kiw'u vanda mumba-aume/kisambalau.

Kwonderu wa matunda vanda kitanda, kiluma, kivakato, kikandania, kikundi, casimiroa. Edulis (white sapota), Annona senegalensis (custard apple), ivela, na Eriobotrya japonica

Vala ukwenda usia kukuwa kwa muthnga no uvande Calliandra, Morus alba, Grevillea na Markhamia.

Mukima ni muti museo kwa muunyi wa kaawa.

Kundu kula kwiiulu muno na kwikitheo kite kinene na miti ni minini.

Vanda miti ya usia kiseve na wii ila nita Imwea, Mikima, Hakea saligna, Mithulu, Dombeya Spp., Dodoneae angustifolia, Casuarina cunninghiana, Dovyalis caffra. Na mithemba imwe ya miti ya mitunda noyikaa nesa kuu

Memba na ndithya ya ngombe syeia nthini wa Rift Valley.

Nundu mbemba iyikaa nesa vandu ve muunyi sisya uvande na isio sya miti ithengeanie (wood lots) kana miti ya usia nzeve undu wa kusuvia muthanga ta mikima, Sesbania Spp., Mithulu, mutundu, imwea, ndau, mithia, ming'olola, casuarina cunninghiana, Dovyalis Caffra, Markhamia lutea, cordia abyssinica. kililikany'o

Lilikana

Kila miti ietae na uyika ukunikili umanye mthemba ula museo kwa kisio kyaku. Lilikana miti niyuaniia kiw'u, liu na mimea na mithemba ingi ya miemea ndyendete muunyi. Osa uvoo na utao mbeange kuma kwa tukundi twaku kana kwa athukumi maitu ma TIST.

- Kwa ngelekany'o kulya muti ula withiawa na mii miliku na mii minini vaa yiulu kwonderu wa uimi wa miti na liu/mimea. Casuarina Spp. Leucaena leucocephala, Cupressus lusitanica na Sesbania sesban syithiawa na mii yi vaa iulu na noyithiwe miseo kwa kusuvia muthanga kukw'a. Ndau (eucalyptus spp na Gmelina arborea niyumasya sumu ula wuaa mimea ila ingi kana ukethia ndimea.
- Nima ya kuvulanya ndikaa nesa kwa isio ila ikwataa mbua yi itheo wa 800mm kwa mwaka.



Mbua niyukie - Ivinda yingi ya uvanda miti ingi mingi.

Kusevya miti yikivuioni nikanya ithyamiw'e muundani/kithekani (Kumiumiisya)

Nundu yu mbua niyukie, miti ila yikivuioni niyaile uvndwa miundani. Ni useo kuikiithya miti ila yikivuioni yina ivinda yaile ya kuthamiw'a miundani.

Miti ino niyaile kuumiwa kwa kumyeteelya kuvanda kuithekani vala iteusuviwa muno ta kivuioni. Ngelekany'o ila yikivuioni nikwataa kiw'u kingi, muunyi kwi yathamiw'a kithekani. Nikana iumiie niuseo kuola kiw'u kila uungithya na mavinda ala uungithya na kumiveta muunyi nikana wamithamya ndikew'e thina yithiwe itonya kumiisya.

Mbeu nzeo iilye yithiawa na mawonany'o mailye ata.

Kwa mithemba yoonthe nikana mithemba kivathukany'o yithiawa na mawonany'o kivathukanyo. Miti ya mbeu nzeo iilye uu

- Munguthe wayo ni muasa kundu kwili kwa mwii kana mbisu.
- Muthamba withiawa na vintya na wimunou
- Ingi yaile ithiwa natumii tungi twingi vamwe na mwii ula munene.
- Mithemba mingi ya miti yaile ithiwa na mawonany'o aya itina wa kumea.

Kuthamya.

- Mikue iungye ndukakulumanie
- Thima kyelenge kina uthathau wa 30cm kithekani vala uvanda
- Umya muthanga wa iulu na uyumba kavumbu
- Umya muthanga ula uatiie ta uliku wa 30cm na uyumba kavumbu kangi.
- Ikiya nyeki susue kisio kya 5cm ethiwa kwi mbua ongela vuu.
- umya ithanguni kana mbisuni na uyumya nesa ndukatilange mii.
- Vanda yiimani yiu
- Ususya na ula muthanga wayiulu
- Ikundi imwe iyusuasya muthanga vyu nimatiaa mwanya wa kiw'u. Kii kithiawa kiseo kya utwiikana kiw'u yila mbua yaua na kutetheesya kiw'u kunywa muthangani.
- Ngithya mbeu isu wavanda.

Ingi lilikana kunenga muti usu wavanda ivinda ya kwikala na uivanda utaaniu wa matambya 3-4. Wamivanda itherngeanie ndikwata kiw'u na unou mwianiu. Wavanda ithengeanie yiithiwa yimimosu na nitonya ukwa kwoou nikavaa kuvanda utaniiu wa 2.5-3m



Vata wa Miti.

Miti niyavata muno kwa mawithyululuko nundu wa itumi ii:-

A. Kwailya mawithyululuko

- Miti niwika muthanga, na kuusiana na kukuwa ni kiseve kana kiw'u
- Matu na ngava ila syavaluka nisyooa na kutwika liu kwa muti
- Miti niyongelaa wiu wa muthanga nundu nisiiia kiw'u kukuwa ni nzeve kuma muthangani.
- Mii ya miti nayo niyovaa na kukwatany'a muthanga na kuola muthanga kukuwa
- Mii ya miti ingi nitetheesya kiw'u kunywa nthi na kwailya kiw'u kya ungu wa muthanga kuyaiikani.
- Miti niyailasya nzeve ya vandu kwa kuthithya nzeve
- Miti nitheesya nzeve kwa kuveta nzeve itavisaa nzeveni ila ingi.
- Miti ninenganae muunyi na wivitho / Mawikalo.

B. Kutune unou ula waile na miti ya utumia

- Miti ya kwaka, kwikia wiio, makanda etc
- Ngu
- Ndawa
- Liu wa andu na uithyo wa indo.

Vaita ula miti itunengai niwavata muno kwitu aimi na nthi yonthe. Ukunikili ula uneekiwe o mituki kwa aimi ma tist niwoonanisye kana matuna, mbindi, liu wa indo syonthe kuma mitini ila ivanditwe ni aimi ma TIST kwa nzia ya nima ya kusuvia ninenganite ueti museo na vaita wa silingi 37,000 kwa kila muimi. Ve vinya kwikia thooa kwa vaita ula umanite na uthithu, kimeu kya muthanga na nzeve ntheu wivo vaita na useo ungi mwingi kumana na wia wa TIST, indi nitwiw'aa useo kila muthenya twi miundani yitu.

Kwoou ni useo munene kutavya angu vaita na vata wa kuvanda miti ala twi isioni imwe namo na mbaitu. Kweesilye undu tutonmya kwika tukavanda miti mingaingi mbee kwa vamwe!

Kwisiania na umuu.

Kwavika ivinda ya uthithu na mbua, malelia nitwika uwau kundu kwingi, Umuu ula niw'o unyaiikasya uwau uyu niuyaiikasya uwau kwa mituki. Ni useo kuola umuu musyi kwaku.

Matambya aya nimatonya utetheesya:

- Enga ikuthu ila syi vakuvi na nyumba vamwe na nyeki
- Temea kiw'u kila kituumanite kithi kila

kivakuvi na mawikalo/nyumba nundu nikw'o umuu usyaaniaa

- Veta matialyo ma liu ula wakoma
- Mavuti ndukaie nyumba ikya iimani ya kiko
- Tuta nyumba yaku na nza kila muthenya.

Lilikana kutumia neti sya usiia umuu vatonyeka.

Mazingira Bora



TIST

The International Small Group & Tree Planting Program
www.tist.org

Kipsigis Version

An Environmental, Sustainable
Development and Community Forestry
Program.



Daktari Madhukar (mtu wa tatu kutoka kulia) mhadisi kutoka Epic Sustainable, India akiongea na kuhonji wakulima wa TIST kutoka Bushenyi, Uganda mwezi uliopita. Kwa wakulima wa TIST kuuza Carbon Credits vikundi za mti lazima wafikie kiwango cha kimataifa kile kimewekwa na Verified Carbon Standards na kuhesabiwa na mhadisi asiye tegemea upande wowote. Kati ya mahitaji ni kuchunga miti kwa kati ya miaka thelathini na zaidi.

Inside:

Tononetab minutik: Minetab ketik ak minutik. Page 2

Iwatgut inguni: Ongemin ketik. Eng kasari komiten Robta neo ogemin ketik. Page 5

Komonut nebo ketit: Page 6

Teretab konyingisik (Mosquitoes). Page 6



Tononetab minutik: Minetab ketik ak minutik.



Ororunet: minetab ketik ak bugonok koboto minutikab imbar anan ko baetab kiyakik en kayumetab niton kotogingei minetab ketik ak rurutik asi kotes rurutik chebo emet ye kiboisien ketik.

Tinye temik kelulenoik chechak en ketik.

- Kitekseen, logoek ak omitwogik alak.
- Kinyorunen kwenik, omitwogikab tuga.
- Ngungunyek chegororon, ngetunen beek ngungunyek, tere koristo, toreti kiwotosiek.
- Kerichek, konu rabinik, tere ngungunye komoib beek.

Koborunetab minutik ak ketik.

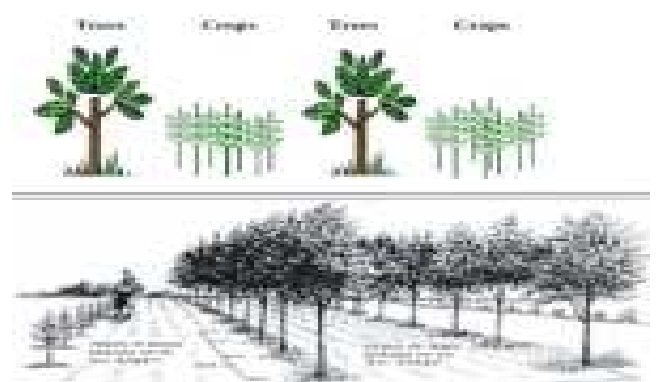
Miten kobotutik cheterchin chechang ak ortinuwek chelelachen chekinyoru en kasarta age tugul, kobowotutik alak kinyorunen kelut en komosto age ak kewelnatet en orage, kimoche biik koboisien kobotutik cheter ak kobchei en tuyosiek, cheisibu ko ortinuwek chebo.

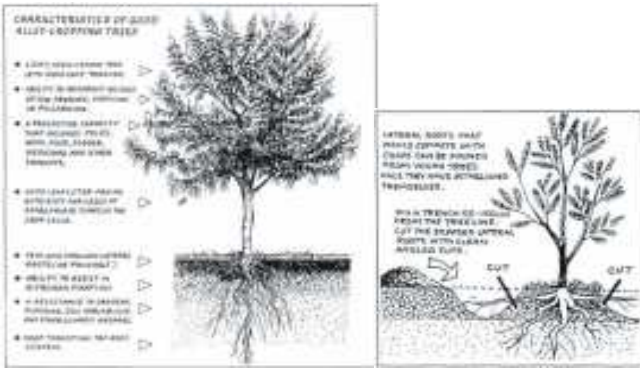


Koletab minutik ak ketik;

1. Ngotuuet: Niton kotinyegei ak lewenet nebo ketik cheichome asi imin koik ngotuuet an chetoreti imbaret, ketichuton kemin komoginge kokwoutik che mengech asi komuch koter ngungunyek ak kogonon beek ak kinyorunen omitwogikab tuga, koborunent nebo ketichu kemine en kiwoto komuti moche anyun kokwoutik kongeten 1.5-2m niton ko koborunet ne kararan komiten ketik chemengech ak chenuongen kou kelelwet ak lantana camara

2. Ketik chetinye boronik: Niton kotinyegei ak kakwoutik chemengech (0.5-2m) en tebesindo imuchi kolainitab ketik ko oeng konebo minutik agichek ko somok kounoton en imbar korogunet ko kou bandaek ak indabibit ana ko gawek ak ndisinik, ketik anyun chegororo ko cheteche omitwogik en ngungunyek, en kokwoutik chebo ketik komosire (5-8m) en ketichun konyolu anyun kechoror en abogora asi komoegitun asi kobor



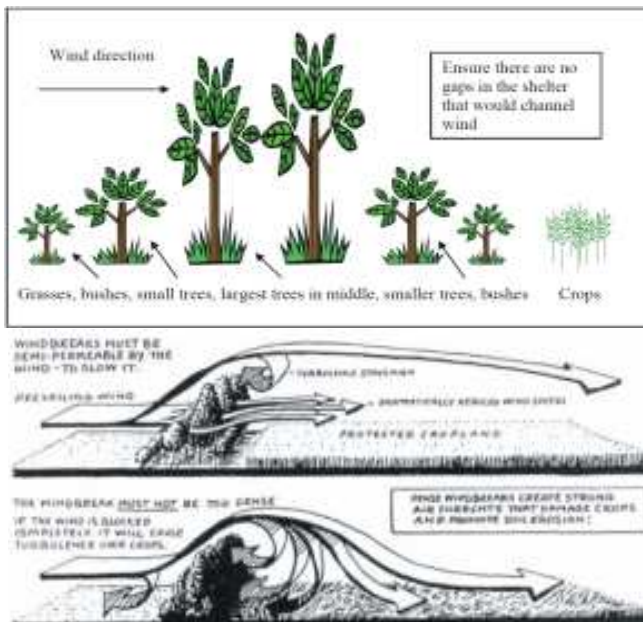


chigei omitwogik ak lobiyyet, sogek anyun kogochin konyor okwoiyet ngungunyek en abogora ketichon anyun komoliboni TIST amun ibe kasarta ne mingin toreti temik en tugul alak chechang, chechang en ketichu ko ingetil kongotos, niton kogochin ko moegitun koba barak, chenootin mising ko kou, calliandra, cassi siameo, cassia spectabilus, eucalyptus spp, leucaena, markhamia alak kogororon yon mengechen kou chesarur, sebesebe, sesbania sesban

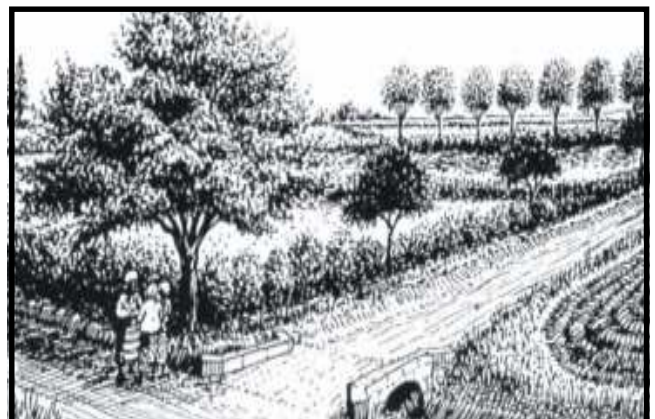
3. **Tere koristo:** kemin ketik chetinye kimnotet asi komuchi koter minutik en kasarta nemiten koristo ko kararan ingeminchin kwenetab imbar, kosib ketik chemengech en lainisiek oeng ak bugonok, ak susuek en komosta age, ibe kokwoutik (4-5) kongen ketit kot koit ak kokwouk (2-4m) en lainit, toret mising temik amun nyurenen ketik chechang, toronito bo koristo komoche biik cheigen amun imuch kogon asenet agot komanai ole keminte

4. **Keter imbaret amakikol:** Niton komu che timik kobat imbaret ak kebagach koma kigol minutik alak tugul asi korut ketik kowegik okwoiyet ngungunyek, choton cheteche ngungunyek ko kou sesbania spp and gliricidia sepium

5. **koyometar minutik ak ketik:** Nito koibe kokwoutik cheboroen en minutik ak ketik asi kengalalen en kasarta ne nyone



Ara anyu miten temik che kogotiem koyai kouniton agot kogotiem konee ne kararan, ongebchei en tuiyosiek yon kitinye en abogora, asi kesuen walet



6. **Kiyagen kiyakik kotoreti:** Yeimuch irib ketik en imbar inyoru ibai tuga amun inyoru kwenik ak omitwokikab tuga en komosto ne momiten robta kekole ketik kou chepnyolilok, sertuwet,



chebitet, nikiruwet, chepkomon en emet ne miten robta komuche koboisien kou; callianda calothyru, sesbania, sesban ak leucaena, diversifolia, kiboisien sogek cheyomiotin keboen tugaana ko lego

7. Kimin kosibiny: En minaniton kemine ketik kosibiny en ole morutunen kii anan ole miten koik anan ko chepnyesut, toreti koter kosito ana ketem agebagach ko magigol

8. Kiyoen kinotosiek: Toretikab TIST kongen kole en minetab ketik chebo TIST kotinye kokwouting asi konyor ketik koengitun ago cheibe kasarta negoi, kararan niton baten monyoru chekondok chebo TIST kou; kelelwet, ak commiphora zimermnii susp

Kerchinel kabwatan ak kebeberuwek chemiten en kenya;

- Korotinuwek chemiten barak ago tororen ago birir ngungunyat (kemine ketitab chaiyat)
- Kerchinen callianda calothyru ak morus aiba en bayetab tuga
- Kerchinen kiwotosiek ak koristo kou; kelelwet, sebesebe, chesarur, milletia dura ak hakea saliga
- Kerchinen ketikab logoek kou; plums, peaches and pears
- Ole burgei ago chortaat ole rure kawek komie
- Kerchinen jacaranda ole kagiminen en kiwotosiek
- Kerchinen lamaiyat ye kagimin kosim oinet ak kotoreti koristo

- Kerchinen ketikab logoek kou; tree tomoto, perseia american (avocado) macadamia teraphylla, passiflora aduilus (kirintila) psidium guajara (maberiat) eriobotrya japonica (lakwat)
- Miten ketik chegororon en teretab ngungunyek kou; calliandra, morus alba, sebesebe ak markhamia lutea sebesebe ko kararan en uronok en kapchain ana en kawek

Koret nemi barak amaleike ako miten ketik che ngerin

Kerchinen ketik chetoreti minutik chemiten kiyotosiek ak ketik kou; chebitoik, sebesebe, hakea saliga, kelelwet silibwet, chesarur ak logoek koyoe komie

Baetak kiyakik ak minetab bandek en rift valley.

En bandek komorure en olemiten uronok chebo ketik kou olekagiminen ketik chechang, olemiten che tere koristo, olemiten chetere ngungunyek ketik kou; grevillea robusta, sesbania spp, croton macrostachyus, kelewet, chepnyaliliat, eucayptus ssp ak corchia abbyssnica

Kibwat: yon kimine ketik ko konech kelunoik chechang ko nyolu ilewen komie chebo oleimenye, alage kogororon en minutik alak komomoche keurto onyoru konetisiek koyob kurubit anan ko en kiboitinikwok

Ketik chetinye tigitik che koen ko kororon amun motinye en baragunyin chechak nomegei niton ak minutik miten che mogororon en minutik kou; eucalyptbhus spp ak gmelina arborea



Iwatgut inguni: Ongemin ketik. Eng kasari komiten Robta neo ogemin ketik.

Chobchingei chitugul eng arawani ile
kegol eng chonginto.

Nebotai ko kechobchigei kesuwek:

Chobchigei eng kabeti amun miten beek
chechng. Eng kabeti iger ile keter beek
komowech ak ingany uruwet asi mowechok
ketik en kabeti.

kosibet ne karan nebo kesuwek: (en abogora
kotiye ketik terchinet eng kabeti kotienge
korikab ketik.) Tinye ortinuwek che uchu:

- Metitab kesuwot kotiye kebarta oeng
kosir tigitiyot.
- Nyonu kogimit temet
- Nyonu kotiye tigitik chemengechen
chechang.
- Nyonu en orowek oeng kotiye oteboni.

Minet:

- Min ketit kotonon komie
- Bal keringet nebo 30cm kotuyo
- Itaban ngungunyek chebo barak
- Itaban chebo orit ak ichek
- Inte susuwek cheyomiyotin koit 5cm ak
itesi keturek.
- Itutun ketit mat imin ak selele.
- ingoto ngugngunye chetai
- Mat inyit ngugngunyek kerimget asi
kotoche beek.
- Ingo nyor koguwouti 3m-4m asi komuchi
koet ak kosich omituwogik.



Komonut nebo ketit.

Bo komonut ketit eng ribetab Itondab Emet ak amuneisiek checheng:

A - Ribetab Emet:

- Ketik kotere ngungunyek, koristo asi moib.
- Tesin sogek ngungunyek koyor omituwogik.
- Igochin ketik koyor beek ngungunyek ak koter beek komaiyeso koba barak.
- Igochin tigitik koyum asi moib beek
- Nyorunen Emet koristo ne karan.
- Kiyorunen uronok ak teretab koristo.

B -Tuguk chegiboisien ak Omituwogik:

- Kimyorunen (bogoinikak kwenik)
- Kerichek
- Omituwogik eng biik ak Tuga

Tuguchuton tugul kobo komolut eng temik ak Nguwony komugul. Miten chi en tist ne koyai kosegei komwa kole bogomolut logoek, kuwelik ak ketik chegigemin ak imarenik chema kigol komuchi koyor Temintet age tugul Ksh 37,000. Kimoginigei tuguk chechang eng kaa ak eng imarenikiyok asi keitin mogutikiyok.

Ogetes ketik eng mbarenik kiyok asi keyorun mengotet ne kararan. Ogibwat kemin eng kibagenge keigu koborunet eng biik.

Teretab konyingisik (Mosquitoes).

Eng kasartab robta eng Emet komugul ko kasarta neo mising Eset en emet. Nito koibu konyinyisik amun bitos en kasariton ko nyonu ketiye ribet ne kararan eng kaa kou:

- Itilil yebo kaa iiste saratik kou susuwek ak bugonok.
- Mat kobit beek che katerem eng kaa amun igochin kotesak.

- Kemeto ngetunanikab omituwogik che konget.
- Ketuch saratik anan kinte kapsarati.
- Ibuchu kaa ak kongung.

Ibuwat iboisien net tab konyinyisik.