

# Mazingira Bora



# TIST

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

English Version

An Environmental, Sustainable  
Development and Community Forestry  
Program.



Maironne cluster members during their Cluster meeting last month.

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# TIST Farmers Combat Global Warming and Climate Change.

**T**IST farmers have responded to a global call to combat global warming and climate change. Many farmers have sought understanding through TIST seminars /trainings and at Cluster meetings to learn and understand more about global warming, its effect on the climate, and mitigation approaches. We see many impacts of climate change today. Just to illustrate a few instances of impacts, the El Nino floods of 1998 that ravaged most of the country and the long drought that followed, and the strong hurricane of 2004 were likely intensified by global warming. Other notable illustrations are the gradual wearing off of the glaciers at the peak of Mt. Kenya, unpredictable weather patterns that have resulted to crop failures in many areas, drying of water springs and water catchments areas, among many others.

This month's newsletter will share training notes from seminars so that we all can understand global warming and climate change better. We will begin by defining each term and explaining it further and then learn how your trees play a significant role in mitigating the effects of global warming.

## What is Global Warming?

Global warming refers to an average increase in the Earth's temperature, which in turn causes changes in climate. A warmer Earth may lead to changes in rainfall patterns, stronger storms, a rise in sea level, crop failures, and a wide range of impacts on plants, wildlife, and humans. When scientists talk about the issue of climate change, their concern is about global warming caused by human activities and the extremes of climate and weather variability this brings about.

## Is the Earth getting warmer?

Yes! The Earth has warmed by about 1°C over the past 100 years. Many of the world's leading climate scientists think the things people do are helping to make the Earth warmer, such as burning of fossil fuels including coal, petrol, and natural gas, and cutting forest and managing land poorly.

## What is the Greenhouse Effect?

The greenhouse effect is the rise in temperature that the Earth experiences because certain gases

in the atmosphere, called greenhouse gases, like carbon dioxide, nitrous oxide, sulphur dioxide, and methane trap energy from the sun. Major sources of carbon are: deforestation, gases emitted from industries, gases emitted from motor vehicles, gases emitted from burn of wood fuel or charcoal and burning of forests.

## What are dangers of Global Warming?

- Severe water stress in the arid and semiarid land areas. This would result in more areas becoming desert.
- Increased spread of diseases like malaria. As areas become warmer, more become suitable breeding grounds for mosquitoes, increasing risks of malaria infection. Many families and health institutions can be impacted, average life spans decline, and infant mortality rates rise.
- Decreased agricultural production in many tropical and subtropical countries, especially countries in East Africa. Due to decreased rainfall and increased breeding of pests due to increased warming, the production of food crops may decrease and this results in poverty and hunger among many families and communities.
- Higher worldwide food prices as more farmers get less yields and food supplies become scarce, the prices increase because the demand is high and supply is low.
- Major changes in the productivity and composition of critical ecological systems particularly forests. Water catchment areas in the mountains and forests continue to dry up. This will affect the ability to irrigate crops and will reduce stream flows necessary to keep dams and reservoirs replenished. This will reduce generation of hydroelectric power. Our industries, hospitals and other institutions that heavily rely on electricity will be severally affected. The supply of piped water to urban areas as well as rural homes will also be affected.
- Tens of millions of people at risk from flooding and landslides, driven by projected increases in rainfall intensity and, in coastal areas, rising sea levels.



### How can I prevent Global Warming?

Plant and care for trees!

As mentioned above, carbon dioxide is one of the gases that cause global warming. Trees absorb carbon dioxide from the air during photosynthesis and store it in the wood, roots and soil as cellulose carbon. However, when trees are cut and burned, they release the carbon they had stored back to the air.

### Did you know each tree can create a microclimate?

Trees and their cover cool the surface of the earth. Feel the comfort of the shade of a tree. Notice that the soil below is moister than where the sun bakes it with no shade. When the ground stays cooler, the ground holds more moisture longer. This means that trees on your land will help improve the amount of water in your soil, and help retain it for a longer time. This will help your crops and also even help the water users in your area.

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## Thinning your trees for successful growth, Avoid Clear-Cutting.

**W**e are very proud that almost all TIST members are following the TIST Values and living by the contract that they signed. Very few TIST members have broken the contract, clear cut their trees, and sold them for other uses. In fact less than 1% of the 40,000 TIST groves in Kenya have been cut during the 8 years that TIST has been operating in Kenya.

The purpose of having regular thinning is to achieve maximum growth and value of the trees that are left standing. The cuttings also provide firewood, poles, building materials, and other benefits directly to the TIST participant. That is the reason that we have the policy of creating a sustainable forest by only harvesting a maximum of 5% of the trees per year after the trees are 10 years old.

When an occasional TIST member decides to clear cut their grove, they harm all the rest of the TIST members in their Small Group, in their Cluster and in all of Kenya. In fact, the actions of that very few people can cause big problems for everyone. We expect other small group members and members of the Cluster to pay attention and make sure that no one cuts trees before they are supposed to.

The OLC is going to work with some of the participants who made a mistake and cut the trees to work out a proper plan for those people to reinvest some of their profits into the TIST Program so they are able to help other farmers rather than hurt them.

When we signed the GhG Agreement, we committed to maintain trees we plant for TIST to

let them grow for 30 years before harvest. This is one reason it's so important to think carefully about what kinds of trees we want to grow on our farms. Thinning and pruning can help keep trees healthy and provide useful products while the trees grow.

In general, the purpose of thinning and pruning trees is to improve individual tree health, as well as overall forest health. This is done by protecting the "best" trees in the forest and thinning the others. For many species, including hardwoods, Grevillea, eucalyptus and cypress, the trees to thin around are the largest trees, each with a single, straight stem. Trees may have different needs for space depending on species, site, planting style (woodlot, incorporated into crop fields, or windbreak), and climate, but some general principles apply.

To grow strong, healthy trees, a spacing of two meters or more is recommended. This spacing works for many TIST trees (i.e. Grevillea and cypress), but remember some trees require more space (mango and macadamia, for example). Giving trees proper spacing helps them get enough water and nutrients to grow to their full potential. Closer spacing is acceptable when trees are young. As the trees begin to mature, some trees will be larger and more robust than their neighbors. These are the trees that should be kept. In determining which trees should be removed, look at the best trees and determine if they are appropriately spaced. If they are not, you should remove some nearby trees.

When making thinning choices, remember that growth rate varies greatly by species. If a mango tree is growing near lots of eucalyptus, the mango may be far smaller and slower growing than the

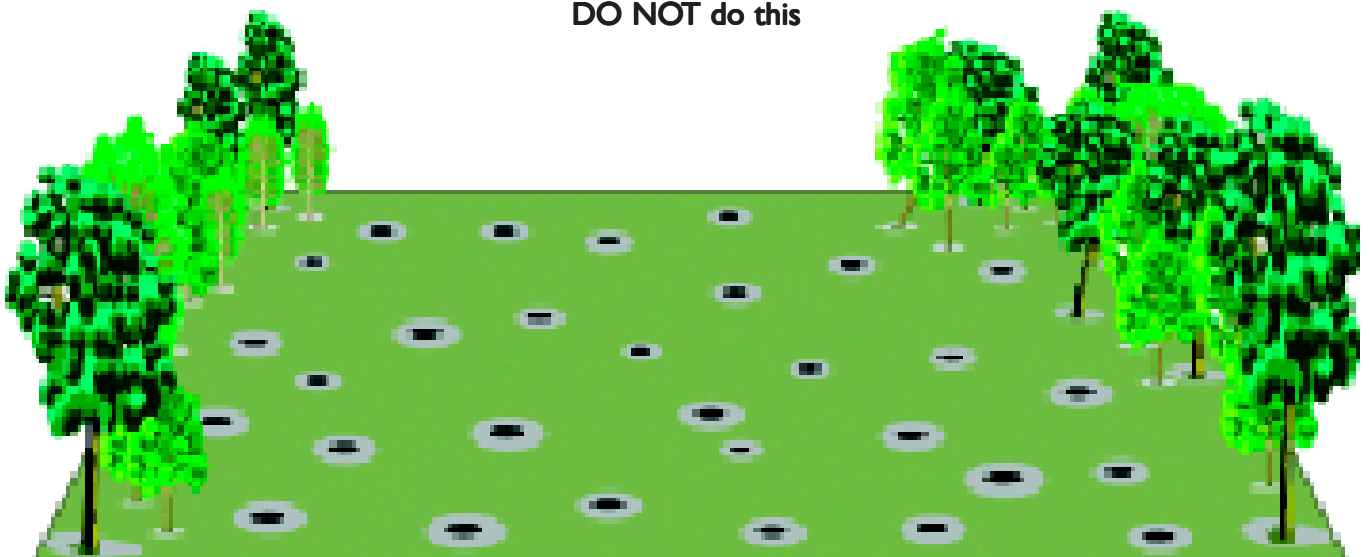


fast-growing eucalyptus, but it certainly should not be cut simply because it is smaller! In fact, a tree like mango is of great importance due to its usefulness in producing fruit for food and sale.

**Best Practices while Thinning**

- Allow crop trees to grow to maturity.
- Thin to proper stocking (number of trees per acre). In TIST, we can select up to 5% of our trees, after 10 years, thinning by selecting as they grow, and providing income.
- Remove dying, diseased, decaying, and poor quality trees.
- Protect trees from logging damage.
- Use low-impact logging methods.
- Promote tree species diversity.
- Monitor your forest for insect and disease outbreaks.
- Cooperate with government agencies in controlling forest insect and disease outbreaks.
- Prevent wild fire.

**DO NOT do this**



**Clear cutting**

**DO THIS**



**Single tree selection**



## Best Trees For TIST: Alternatives to Eucalyptus.

**M**any environmentalists are concerned about the impact eucalyptus has on the environment. The arguments against eucalyptus are complicated because of the many different species of eucalyptus. Scientists are still uncertain about some of the evidence. However, here are some of the arguments against planting eucalyptus that many environmentalist believe:

- The trees can dry up the land by taking up a lot of water from the ground.
- The trees can use a lot of soil nutrients making the land unsuitable for agriculture.
- The leaves do not decompose easily and even decrease beneficial soil microorganisms.
- Some types of local flora and fauna cannot survive in eucalyptus plantations.

While everyone may not agree on many of these points, there is enough concern over the issue that TIST has to listen carefully. Some small groups in Uganda have commented that they had water levels drop since the planting of eucalyptus. TIST would advise all farmers not to plant eucalyptus in wetlands, alongside streams or on productive agriculture land. However, some land may be suitable for eucalyptus and your local forester can advise you.

There is a second reason why TIST does not encourage eucalyptus. Many farmers will harvest their timber in less than twenty years and TIST will not be able to sell the carbon credits unless the tree grove lasts at least 30 years, as only live trees qualify. If TIST pays incentives for trees that will be cut down in less than 30 years, there will be less money for the groups who have planted and faithfully maintained long term trees.

Farmers may still want to have groves of eucalyptus grown specifically for firewood and timber. Grown in the right areas, these groves may help reduce pressure on natural forests. However,

groves grown for early harvest should not be counted for the TIST program.

To increase biodiversity, protect your land and encourage long-term trees that will qualify for carbon payments. We encourage groups to use an alternative to eucalyptus.

### What are good alternative trees?

The following trees are some suggestions from the Kenya TIST trainers:

*Grevillea Robusta*, also known as silky oak (in Kikuyu it is called mukima).

This fast growing tree needs fairly well drained soil spaced 4-5m and no pre-treatment needed. The seeds can be stored for up to three months or longer if refrigerated. These trees provide soil conservation, shade for tea and coffee, and plants grow well with crops if properly managed to reduce shade and an important source of dry season fodder.

*Cypress or Cupressus lusitanica*, (Kikuyu: mutarakwa; Kimeru: muthithinda)

This tree is found in seasonally moist to permanently moist climates and a dry season lasting no more than 2-3 months. It cannot withstand waterlogging but flourishes in deep, moist, well-drained, fertile loams of neutral to slightly acidic composition. Pre-treatment of seeds is not necessary and the seeds can be stored up to 6 months. Cypress provides limited protection against soil erosion and should be under planted with other suitable species. While it provides a windbreak, shade and a live fence, it is not suitable for intercropping.

### The Importance of Trees

Trees are very important for environmental and material reasons such as:

- 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.
- The tree roots help bind the soil and thereby 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.

#### B) Material and nutritional value

- Construction materials used for making furniture, posts, fences, ropes, etc.
- Fuel wood
- Medicine
- Food and fodder

#### **Weed your tree groves now!**

Now that the rains have started you should already have transplanted your seedlings into your groves. If you have not yet transplanted them, you need to do so now because seedlings need to be transplanted so they can grow strong in the rainy season and survive the drier months. By looking after our seedlings now they stand a better chance of survival to become strong trees. The most important activity during the rainy season is to weed your seedlings in your groves. Keep the area as clean as possible and pull up any weeds that are growing near your seedlings.

#### **Weeding is important!**

- Your seedlings need water, soil nutrients and light to grow strong. The weeds will compete for the soil nutrients and water that your seedlings need, making them weaker and unable to survive.
- If your area is not weeded, more pests will be attracted to the area and damage or kill your seedlings.
- The fewer weeds there are, the less chance there will be of snakes and insects.
- Trees grow faster because weeds won't rob the nutrients and water from the soil.
- Trees will become stronger and grow taller in a shorter period of time.
- Trees get sunlight they need unhindered.
- Trees are not exposed to as many diseases.
- Trees are more protected from a fire spreading.
- Clean groves indicate that all groups are maintaining them and are good examples of the TIST program. This will attract many people to come and see your work.
- Clean groves enable the quantifiers to count the trees quickly and accurately.

We encourage you to weed your groves. Remember to protect the seedlings so that animals, like goats, do not eat or trample on them. Consider fencing the grove or surrounding seedlings with thorn bushes, and if you have some days with no rain, remember to water the seedlings.

**The hard work will make a difference by making your trees stronger and healthier.**



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## Arimi ba TIST nibakurua na kuruutira kwa nthi na kugaruka kwa rera.

**A**rim ba TIST nibajukiritie itagaria kiriro kia nthi yonthe gia kurua na kuruutira kwa nthi na kugaruka kwa rera. Arimi babaingi nibacuite kwere wa gukurukira semina na moritani ja TIST na kinya micemanio ya cluster kumenya na kwere wa nkuruki kwegie kuruutira kwa nthi, uria kuruutira guku kugaruraga rera na matagaria jaria jomba kujukua nikenda tukabana na untu bubu. Nituonaga mantu jamaingi jaria jaumaniitie na kugaruka kwa rera narua. Kuejana minguanano imikai ya mantu jaja ni kurutira na kunyenyea gwa nkamia iria ituuraga iguru ria murima Kenya, rera itikumba kubangirwa niuntu ikaraga ikigarukaga na kwou igatuma imera bikathuka guntu kuria kwingi, kunyara kwa ithima na biumo biao nduuji na mantu jangi jamaingi.

Gazeti ya mweri juu ikagaana natwi mantu kuumania na uritani bwa semina nikenda twinthe tuumba kumenya kuruutira kwa nthi na kugaruka kwa rera nimbi.

Tukaambiria na kumenya o riitwa niakwa riugaga na kumenya nkuruki kuriegie na riu tuthome kwegie uria miti yaku itethagia kunyiyia mantu jaria jaumanagia na kuruutira kwa nthiguru.

### Kuruutira kwa nthi nimbi?

Kurutira kwa nthi ni kwingia kwa murutira jwa nthiguru, buria butumaga rera ikagaruka. Nthiguru irina kiruutira nkuruki no itume gukagia na kugaruka kwa uria mbura iijaga, iburutani birina inya nkuruki, gwitia kwa iria, kuthuka kwa imera na mantu jangi jamaingi kiri imera, nyomoo na antu. Riria athomi baariria kugaruka kwa rera, bethagirwa bategete mono kurutira kuria kuretagwa ni mantu jaria jathithagua ni muntu na kugaruka nainya kwa rera kuria kuretagwa ni bubu.

### Nthiguru nikurutira nkuruki?

li! Nthiguru nirutirite na 1°C ndene ya miaka igana iria ithiri. Athomi baria baingi nthigurune nibakuthugania ati mantu jaria antu bathithagia nijagutethia gutuma nthiguru igia na kiruutira nkuruki ta kuithia makara, maguta ja ngari, na gasi na kugiita miitu na kuremwa kumenyeera miunda bwega.

### Greenhouse Effect nimbi?

Greenhouse effect ni kwongereka kwa muruutira

kwa nthiguru niuntu bwa icunci bimwe bia ruugo, bigwitwa greebhouse gases, ta ruugo rwa kaboni, rwa nitrous, rwa sulphur na methane ruria rujukagia murutira kuumania na riu. Kaboni yuumaga mono kuumania na: ugiti miti, ruugo kuumania na kambuni, kuumania na ngari, kuumania na gwakiria nkuu, makara na miitu.

### Mantu jamathuku jaria jaumanagia na kuruutira kwa nthiguru ni jariku?

- Thina ya ruuji ndene ya ntuura injumu. Bububutumaga guntu gukwingi gukooma nkuruki.
- Gutamba gwa mpwi kwa rwagi. O uria ntuura ikugia murutira, nou gukabua gwa guciarirwa kwa rwagi na kwou kwingia kwa mbajua cia rwagi. Nja na cibitari inyingi nocikinyirwe, maisha jagakuia na aana babaingi bagakua.
- Kunyia gwa irio bia munda ndene ya nthiguru iria ciri na murutira na ngai, mono ndene ya East Africa. Niuntu bwa kunyia kwa ngai na kwingia kwa guciarana kwa tunyomoo niuntu bwa kwingia kwa muruutira, irio kuuma miundene no binyie na bubu bugatuma gukugia ukia na mpara ndene ya nja na ntuura.
- Uguri bubunene nkuruki bwa irio ndene ya nthiguru. O uria amemba babaingi baguketha bibikai nou irio bikaura, uguri bunene niuntu babaingi nibakubienda na nibibikai bikwoneka.
- Kugaruka gukunene kiri uciari na gukaranira kwa imera na nyomoo ndene ya mwitu kuria kurina bata mono. Naria ruuji rugwatagua ibarine na miitune gukenderea kuuma. Bububugatuma antu baremwe kuanda into bia ruuji na na kunyiyie ruuji ruria ruri miurone untu buria bugatuma biria biaki bia kugwatia ruui birega gukinyirwa niru. Bububukanyiyia stima iria ikuthithua. Kambuni cietu, cibitari na biuthurani bingi biria bitumagira stima na wingi bikaremwa gwita na mbele uria bibati. Ruuji ruria rwitaga tauni na ntuurene imwe na paipu kinyaru rukanyia.
- Antu milioni kumi ya ikumi bakarugurirwa thiina cia kuigara kwa ruuji na kugua kwa nthi, niuntu bwa kwingia kwa mbura na ndene ya ntuura iria ciri iriene, ruuji rwa iria rugaita.





## Niatia mpumba gutigithia kuruutira kwa nthiguru?

Aanda na umenyeera miti!

Ja uria twauga au iguru, ruugo rwa carbon ni rumwe rwa ruugo ruria rutumaga nthiguru iruutira. Miti nijukagia ruugo ruru kuuma kiri ruugo rungi igitene ria kuthithia irio na kuruika mutine, mirine na muthetune ja kaboni iguitwa cellulose. Indiri, riria miti yagiitwa na yaithua, niiritaga kaboni iji na kumicokia kairi ruugone.

## Niwiji ati o muti no juthithie rera inini??

Miti na irundu biayo nibikunikagira nthi igakara irina mpio. Thikira uthongi bwa kirundu kia muti. Tega woone ati muthetu juria juri rungu jurina ruuji nkuruki ya juria juri rungu ria riuu gutina kirundu. Riria nthiguru ikaraga irina mpio, nthi niikaraga na ruuji igita riraja nkuruki. Guku ni kuuga miti ndene ya muunda jwaku igagutethia kuingiyya ruuji ndene ya muthetu jwaku, na nitethagia kuruika igita riraja nkuruki. Bubu bugatethia imera biaku na kinya butethie atumiri ruuji ndene ya ntuura yaku.

# Gutura miti na kugiita mathangu ja miti yaku nikenda miti ikura bwega.

**N**dene ya TIST, nituciritagira kumenyeera miti iria tuandaga niuntu bwa TIST nikenda ikinyia miaka mirongo ithatu mbele ya kumigita. Giki nikio gitumi kimwe kurina bata mono kuthugania bwega kwegie ni miti ya muthemba juriku tukwenda kuanda ndene ya miunda yetu. Indiri, gutaura miti na kugiita mathangu nogutethie gwika miti irina thiria injega na igituejaga into bingi o uria miti iu igukura.

Na ukui, gitumi gia kunyiyia miti na gutaura matangu kiri miti ni kuthongomia thiria ya o muti amwe na thiria ya mwitu junthe. Bubu nibuthithagua gukurukira gutaara miti iria mithongi ndene ya mwitu. Kiri mithemba imingi amwe na miti imuumo, mikima, mibao na mithithinda, iji nio miti iria minene nkuruki jaria maingi, o muti jurina gitina kimwe gigitamburuku. Miti no ithirwe igitagia gutarania mwanya kuringana na mutheba, aria juri, uria juandi (kethira juandi milainine ndene ya miunda ya imera bia iro kana kunyiyia ruugo) na rera, indi mantu jamwe nijoonekanaga rionthe.

Gukuria miti iri inya na thiria injega, gutarania miti na 2m nikwendekaga. Gutarania na meter ijiiri nikuritaga ngugi kiri miti imingi ya TIST ( ta mibao, mikima na mithithinda), indi ririkana ati miti imwe niendaga gutarania gukunenene nkuruki ( miembe na mikandamia). Gutarania miti bwega nikumiejaga kanya ga gukinyirwa na ruuji na irio bing'ani, biria bitethagia miti kunenea mwanka aria ibati. Kuanda miti akui nigwitikiritue riria miti ianaki. Riria miti ikwambiria gukura, kuri na miti iria ikaneneanga na kugia inya kiri ingi. Iji niyo miti iria ibati gutigwa muundene ( Imera miti). Kiri gutara ni miti iriku ikagitwa, tega miti iji mithongi na umenyekethira nitarenie bwega. Kethira ititarenie bwega, miti iria

iri akui ikendeka kugitwa.

Warikia kumenya ni miti iriku ikugitwa, migitire nthiguru buru. Ndene ya biumia na mieri iria ikathingata, miti imingi ikaambiria kumira kairi. Nikenda miti iji itigacoke, niigitwe kana iunirwe nthiguru buru.

Njira imwe iria mbuthu buru kumenya kethira muti nijubati kugitwa ni gutega uria jung'anaugiteganagiria na miti iria iri akui ya ukuru bumwe. Ririkana ati gukura kwa muti gukaringana na muthetu, ruuji na jangi jamaingi. Antune aria anene, kethira miti yonthe iria iri amwe iri na ukuru akui bumwe, miti iria minene niyo ibati gutarwa gutigwa muundene. Gintu kingi kiria umbu gutega thiria ya muti nakio ni aria mathangu jaria maingi ja muti jou jari wateganiria na ingi. Miti iria iri mathangu jamaingi iguru ria miti ingi niumbaga kujukia weru bubwingi nkuruki ya iria iri nthiguru na kwou igakuura bwega nkuruki. Kuthiria, miti iria igutigwa no mwanka ithirwe iri imitamburuku itiumirite ingi rutere na itina mirimo kana kurota. Indi bubu ti kuuga ati miti yonthe iria itinenenei igitwe. Muntu nabati gutegeza gutarania kwa meter ijiiri ni kenda umenya miti ikunenea na yagia thiria injega buru nikenda ruugo rurwingi ruruthuku rumba kujukua.

Riria ukuthithia mantu jau jariau iguru, rikana ati gukuranga kwa muti ni mwanya mono kiri mithemb mwanya ya miti. Kethira muembe jurikuura akui na mibao imingi, muembe no jwithirwe junii mono nkuruki na jugikuraga gapori nkuruki ya mubao juria jukurangaga, indi jutibati kugitwa nontu niju munini! Kwaria mma, muti ta muembe ni muti kimera juria juri bata niuntu bwa utumiki bwaju ja kuejana irio. Kurina utumiri bungi bubwingi bwa miti, kulingana na muthemba, tutigutara kugwatia ruugo



ruruthuku. Mung’uanano, muti nojwendeke niuntu bwa kirundu kiaju. Antune aja, nubati kua muti kanya nkuruki ya ingi nikenda jukinyirwa ni riuu, riria rigatuma muti jugia biang’i bibieru kiri gitina na kiri biang’i biria biri iguru.

Ukenda gutumira miti kunyiyia ruugo, nubati kumenyeera ati miti iu iri lainine nikwianiritie, indi rita miti nteere cionthe nikenda juumba kwingiyia mathangu na biang’i amwe.

**Mitire iria miega buru riria ukunyiyia miti**

- Reka imera miti bikure buru.
- Nyinyia uria kubati (kuringana na miti iria iri ndene ya o acre). Ndene ya TIST, notuthuure

mwaka gicunci gia miti itano kiri o miti igana, nyuma ya miaka ikumi, ikinyiagua na njira ya kuthuura o uria igukura, na uria ikureta mbeca.

- Rita miti iria igukua, iajitua, ikwora na iria iti ya iguru.
- Menyeera miti yaku itikathukue riria ukugita ingi.
- Tumira njira cia kunyiyia miti iria itithukagia nainya iria ciumbika
- Ikiira uandi miti ya mithemba imingi mwanya.
- Tegeera mwitu jwaku niuntu bwa kwija gwa tunyomoo na mirimo.
- Gwatanira na kambuni cia thirikari kiri kunyiyia gutamba kwa tunyomoo na mirimo
- Rigiria mianki ya kithaka.

**UKATHITHIA UJU**



**Kugiita miti yonthe**

**THITHIA UJU**



**Gutaara muti jumwe jumwe**



## Miti iria miega ndene ya TIST: Ya kuanda antu a mibau.

**A**ntu babaingi baria bamenyagira naria gututhiurukite barina nkanja kwegie uria mubau juthithagia naria gututhiurukite. Mantu jaria jonanagia uthuuku bwa mibao ti jamothu niuntu bwa uria kuri mithemba imingi ya mibau. Athomi noobetikagia mantu jamwe ja jaja. Indi-ri, aja kurina mantu jamwe ja kuuga niki amemnyeer ba naria gututhiurukite batiendaga uandi bwa mibau:

- Miti niomagia antu na njira ya kujukia ruuji rurwingi kuuma nthiguru.
- Miti iji nijukagia irio bibingi kuuma kiri muthetu na gutuma jukarema gutumirika kiri urimi.
- Mathangu jatoraga na uuthu na kinya nijanyiagia tunyomoo turia tukaraga muthetune turia turi baita.
- Mithemba imwe ya imera na nyomoo itiumba gutuura aria kwina miti imingi ya mibau.

Antu bonthe no barege gwitikaniria kiri mantu jamaingi jaria jaandiki au, indi kurina gitumi king'ani na kwou TIST niibati kuthikira bwega. Ikundi bimwe ndene ya Uganda nibaejene ripoti ati ruuji nirwanyire kuuma bakuanda mibau. TIST nikuatha arimi bonthe kurega kuanda mibau naria kurina ruuji, nteere cia nduuj na miundene iminoru. Indi-ri, miunda imwe no ibwire mibau na mumenyeri mwitu juria juri akui no akue mawaitha.

Kurina gitumi kia jairi niki TIST itikagira inya uandi bwa mibau. Arimi babaingi bakagita miti yao itikinyitie miaka mirongoiri na TIST itiumba kwendia ruugo ruru tiga miti igakara miaka mirongo ithatu nontu ni miti iria iri mwoyo aki iriagwa. TIST yaria motisha kiri miti iria ikagitwa ndene ya miaka itigukinyia mirongo ithatu, gukethirwa kurina mbeba inkai kiri ikundi biria biandite miti na biria biikite miti iu igita ririraja.

Arimi nobende kuanda mibau miundene niuntu bwa nkuu na mpao. landi naria ibati, miti iji no itethie

kunyyia urito kiri miitu iria iumite yongwa iria irio. Indi-ri, miunda ya miti iria iandagwa nikenda ikwethwa iri imianake itibati gutarwa ndene ya TIST

Kwongera gukaraniria kwa nyomoo na imera bia mithemba mwanya, menyeera muunda jwaku na uande miti ya igita riraja iria ikoomba kuriwa niuntu bwa gwika ruugo ruruthuku. Nitwathaga ikundi kuanda muti jungi juti mubau.

### Ni miti iriku iri imiega antu a mibau?

miti iji iri aja ni imwe iria aritani ba TIST ndene ya Kenya bakuuga ni imiega:

*Grevillea Robusta*, kinya nijwitagwa silky oak (Na gikuyu jwitagwa mukima).

Muti juju jukurangaga na mpwi nijwendaga muthetu juria jutigwika ruuji, itarenie na mita inya gwita ithano na itithuranagirwa mbele ya kuanda. Mbeu noikwe mwanka mieri ithatu kana nkuruki riria iki antu kurina mpio inyingi. Miti iji nimenyagira muthetu, nikunikagira majani na kauwa, na nikuraga bwega amwe na irio yamenyerwa bwega uria itikunikira mono na ni kiumo gikiega mono kia irio bia ndithia riria kunyari.

*Cypress kana Cupressus lusitanica*, (Kikuyu: mutarakwa; Kimeru: muthithinda)

Muti juju nijwonekaga rimwe juri naria kurina ruuji rimwe na rimwe kana naria kwithagirwa kurina ruuji rionthe kana uumo butigukuraka mieri iiri gwita ithatu . jutiumiria antu ruuji rwigaraga indi nijuthongomaga antu kuri na muthetu jumwingi, jurina ruuji, jutigwika muthetu, na jumunoru na jutina acid inyingi. Mbeu itiendaga uthuraniri kinya buriku na mbeu no iikwe mwanka mieri itantatu. Muthithinda kinya nijurigagira gukamatwa kwa muthatu na nijubati kuandwa amwe na mithemba ingi ya miti. Kinya kethira ninyiagia ruugo, na gutua kirundu na rwego, jutibui jwa kuandaniria na irio.

### Niki miti irina bata

Miti irina bata mono kiri naria gututhiurukite na kiri gutua into niuntu bwa:

**A) Kuthongomia naria gututhiurukite -**

- Miti nikunikagira muthetu, na kujurigiria jutakamatwe ni ruogo kana ruuji.
- Mathangu na maang'i nijagujaga muthetune na kua muthetu irio.
- Miti niingiagia ruuji muthetune na njira ya kujukunikira na kwou kunyiyia gukamatwa kwa ruuji niuntu bwa murutira.
- Miri nitethagia kugwatia muthetu na kwou kunyiyia gukamatwa kwaju.
- Miri ya miti kinya nitethagia ruuji gutonya muthetune na kuthongomia kuthiuruka kwa ruuji nthiguru.
- Miti nithongomagia rera ya o ntuku gukurukira kwongera ruuji ruria ruri ruugone.
- Miti nithongomagia ruogo gukurukira kujukia ruogo ruruthuku na kurika ruogo rurwega kiri nyomoo. .

**B) Into na irio-**

- Into bia guaka biria bitumagirwa kuthithia into bia nyomba, ikingi, nwego, mirigi na bingi.
- Nkuu
- Ndawa
- Irio bia muntu na bia ndithia

**Kuurira iria miunda yaku ya miti nandi!**

Nandi niuntu ngai niambiritie nubati kwithirwa uthamitie miti yaku yeeta muundene. Kethira utamithamia, nubati kuthithia u nandi nikenda miti yaku ikagia inya igitene ria mbura na yumba gutuura kwooma. Gukurukira kumenyeera miti yetu nandi ikoona kanya gakega ga gutuura na kua miti irina inya. Untu buria burina bata buru mburene ni kurimira miti yaku. Ika antu au kutheri uria kuumbika na ukurire iria riria rikuuma akui na miti yaku iminini.

**Gukuurira iria kurina bata!**

- Miti yaku iminini nikwenda ruuji, irio na weru nikenda igia inya. Iria rigashindanira irio na ruuji ruria miti yaku ikwenda na gutuma iage inya na itumba gutuura.
- Kethira munda jwaku jutikuuriri iria, tunyomoo tututhuku tugakucua antu au na kuthukia kana kinya kuuraga miti yaku.
- O uria kurina iria ririkai nou kanya ga kwona njoka na tunyomoo gakanyia.
- Miti nineneaga ntuti niuntu iria ritiiya irio na ruuji kuuma kiri muthetu.
- Miti ikagia inya na ire ndene ya igita ririkai.
- Miti nikinyagirwa ni riuu riria ikwenda itikwithwa. .
- Miti itikurugurirwa mirimo imingi.
- Miti nimenyagirwa kuumani na gutamba kwa mwanki.
- Miunda itina maria nionanagia ati ikundi bionthe nibikumimenyeera na ni ming'uanano imiega ndene ya TIST. Bubu bugakucia antu babaingi kwija na kwona ngugi yenu.
- Miunda imitheru nitethagiria Atari miti gutara ntuti na gutara bwega..

Nitukubwikira moyo gukurira miunda yenu iria. Rikana kumenyeera miti yenu iminini nikenda ndithia, ja mburi, itikamirie kana iminyangia. Thuganiria gwaka rwego kuthiuruka muunda kana kwirigira miti na kithaka kia miigua na kethira urina ntuku imwe itina ruuji, rikana gwikira miti yaku iminini ruuji.

**Ngugi iu ya inya ikathithia mwanya na njira ya gutuma miti yaku igia inya na igia thiria nkuruki.**

# Mazingira Bora



# TIST

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

*Kikuyu Version*

An Environmental, Sustainable  
Development and Community Forestry  
Program.



Maironne cluster members during their Cluster meeting last month.

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## Arimi a TIST kuhurana na ugaruruku wa riera.

**A**rima a Tist nimaiyukitie ritana ria kuhurana na ugaruruku wa riera thiini wa thi. Arimi aingi nimataukiirwo ni uhoro wa ugaruruku uyu o hamwe na mathuna maria ungirehe thiini wa semina o hamwe na micemanio ya cluster. Nitwonete mathina maingi ma ugaruruku uyu umuthi. Kugweta maundu mamwe nita El Nino ya 1998 iria yatumire bururi ugie na nga'aragu nene, muiyuro wa maai wa 2004 onaguo ni thina warehirwo ni muiyuro uyu wa maai. Maundu mangi nita guthira kwa barafu ya kirima kia Mt. Kenya ohamwe na ugaruruku wa imera undu uria utumite irio ciage gukura wega miena ino, njuui kuhua na kung'ara.

Ngathiti ya mweri uyu niikuheana githomo kuma semina niguu tutaukwo ithuothe matgina maya.

Nitukwambiriria na kumenya uria miti iteithagiriria hari kunyihia mathina maya.

### Ugaruruku wa riera ni kii?

Ugaruruku wa riera ni wongerereku wa urugari thiini wa thi, uria utumaga riera ricenje. Thi iri na urugari muingi gukira githimi niutumaga imera cia mbura cicenjie, kugie na huho, maai ma iria mambatire na irio ciage gukura wega. Nyamu cia githaka nicihutagio ni mathina maya ohamwe na andu. Riria athomi a science maria maundu maya, meciria mao ni ugaruruku wa riera uria urehagwo ni maundu maria tureka turi andu.

### Ati thi ni iragia na urugari muno.

Nima! Thi niyongereire urugari na muigana wa IC gwa kahinda ka miaka 100 mihituku. Athomi marauga ati maundu mamwe ma maria twikaga nimaratuma thi yongerere urugari ta; gucina makara, petrol na gutema miti ohamwe na kwaga kumenyerera migunda iitu wega.

### Mathina ma Greenhouse nimariku?

Mathina ma greenhouse ni wongerereku wa riera uria thi yonaga tondu hari riera ritagwo greenhouse

ta carbon dioxide, nitrous oxide, sulphur dioxide na methane nicigiragiriria hinya wa riuu gukinya thi. Carbo yumaga maundu-ini maya: gutema miti, ndogo kuma iganda-ini, ndogo kuma ngari-ini ohamwe na ya ucini wa makara.

### Mogwati ma ugaruruku wa riera?

- Kwaga maai kuria kwaraga na nogutwike runyanjara.
- Gutambio kwa mirimu ta Malaria. O uria kundu kwagia na urugari muingi, noguo rwagi rwonaga handu ha guciarana na ugwati wa malaria ukongerereka. Micii miingi na thibitari nicigiaga na thina uyu na andu magakua.
- Kunyihia kwa urimi mabururi-ini maingi na makiria maria makoragwo East Africa. Na nitondu wa wongerereku wa riera na rwagi na tutambi guciarana, nikugiaga na ngaragu na ukia ukongerereka micii-ini iitu.
- Thogora wa irio ugathii iguru tondu irio ti nyingi na nicirabatarwo ni andu aingi nimaracibatara.
- Ugaruruku munene wa uciarithania wa maundu ma riera na muno thiini wa mutitu. Ihumo cia maai cikahua na mititu ikoma. Njira ino niigutuma urimi wa maai na njuui iria nini cikahua. Uruti wa thitima maai-ini niukunyiha. Iganada ciitu ohamwe na mathibitari na kundu kungi kwa bata kuria gukoragwo kwihokete thitima nicikuhitio ni thina uyu. Maai ma miberethi kwaga miciiini na thiini wa town.
- Andu 10M mari ugwati-ini wa muiyuro ya maai ohamwe na ituika maundu maria marehagwo ni mbura nene na maai kwambatira iria-ini.

### Tungigitira mathina maya atia?

Handa na umenyerere miti!





Ta uria twauga, carbon dioxide ni riera rimwe riria ritumaga kugie na ugaruruku wa riera. Miti niigucagia carbon ioxide kuma rieraini riria miti irakura na ikamiga thiini wa muti, miri na tiiri-ini iri ta cellulose carbon. On kuri o uguo, riria miti yatemwo na yacinwo niirekagiriria carbon ino igathii riera-ini.

### **Uri wa menya o muti nouthondeke riera riagu?**

Miti na mahuti maguo niuhumbagira thi. Kiiruru kia muti ni kiega. Riria tiiri uhumbiritwo niukoragwo na ugunyu na uu nikuga ati miti niiguteithia kwongerera maai tiiri-ini na ugateithia kuiga maai maya gwa kahinda karaihu. Irio nicigukura wega ohamwe na maai kuingiha.

## **Guceha na gutagania miti yaku niguo ikure wega.**

**T**hiini wa TIST, nitwirutagira guturia miti iria twahanda na tukatreke ikure miaka itanyihire 30 mebre ya gutemwo. Giki nikiyo gitumi kinene giagutuma twicirie muno mithemba ya miti iria turahanda migunda-ini iitu. No ona kuri o uguo, guceha na ggutagania miti niguteithagia miti gukura ii na hinya na kuheana umithio mwega riria irakura.

Hamwe, gitumi kia guceha na gutagania miti ni kwongerera ugima wa muti kiumbe na wa mutitu uri wothe. Uu wikikana kuhitukira gucchagura miti iria miega thiini wa mutitu. Kuri mithemba miingi, hamwe na miti iria itagwo hardwoods, grevilea na mibau na mithithinda, niyo muno ikoragwo iri minene gukira iria ingi iri mitungu wega. Miti niibataraga muigana wa mugunda ngurani kuringana na muthemba waguo, kuria uri, muhandire na riera no maundu mangi nimatumaga.

Niguo muti ukure uri na hinya, utaganu wa 2 mtrs niwagiriire. Utaganu uyu wagagirira miti miingi (ta grevilla na cypress), no uririkane miti ingi niibataraga utaganu munenanene (ta maembe, macadamia). Riria wahee miti utaganu muiganu nigutumaga miti ikinyirwo ni maai na unoru wa tiiri ni igakura wega na iri na hinya. Utaganu munini wa miti nimwitikiriku riria miti iri minini. Na riria yambiriria kugimara, miti ingi niigukorwo iri miraihu gukira iria ingi. Ino niyo miti iria yagiriirwo gutigwo mugunda. Niguo umenye miti iria ugutema, rora miti iria miraihu na wone kana niitaganitio wega na angikorwo timitaganu no uteme imwe yayo.

Thutha wa kumenya miti iria ugutema,

mitemere haria gitina-ini. Thutha wa ciumia na mieri, imwe yayo niithudukaga. Na niguo ndigakure ringi, tinia mahuti maria marathunduka kuma githuki-ini. Njira imwe ya iria huthu ya kumenya muti kana niwagiriirwo nigutemwo nikurora unene wayo uringithanitie na iria iriganitie nayo iri ya riika na mutemba umwe. Gukura kwa miti nogukorwo kuri na utiganu kuringana na tiiri na maai na mangi maingi. Angikorwo miti ya muthemba umwe mwena umwe iri na ukuru uiganaine, miti iria minene niyagiriirwo ni gucagurwo niguo ikure. Njira ingi ya kumenya ugima wa miti ni kurora mururi waguo. Miti iria iri na mururi muraihu gukira iiria ingi noihote kwamukira utheri muiganu na ikure na ihenya. Na muthia, miti yagiriirwo gukura na mwahu umwe, na itari na mirimu minene kana ironda. No ona kuri o uguo, uu tikuga ati miti yotho minii niyagiriirwo nigutemwo! Tigirira utaganu niwa 2-3mtrs niguo miti ikure iri minene niguo ihote kugucia carbon nyingi.

Ugitua matua ma gutagania, ririkana mukurirme wa muti ningurani kuringana na muthemba wa muti. Angikorwo miti ya maembe irakuranira na mibau, maembe nomakure mari manini na ikure kahora muno gukira mibau iria ikuraga na ihenya, na ndiagiriirwo nigutemwo tondu niminini! Miti ta muembe niwabata niundu wa matunda maria ukuragia na makendio.

Maembe nimakuranagira na indo ingi migunda-ini. Mibau ndirekaga muti kana mumera ungi ukure hakuhi. Niwega kuririkana uguo riria uracagura miti ya gutagania.

Miti niikoragwo na mabata maingi kuringana



na mthemba wago. Kwa muhiano, nowende muti niundu wa kiruru. Niundu wa uguo, niwagiririrwo kuhe muti mweke muiganu niguu utheremie mahuti.

Angikorwo urenda gukuria muhari wa miti niundu wa kunyihia ruhuho, tigurira miti niyakuhaniriria no wehutie iria itari mahariini niguu ndugathondeke githaka.

#### Mitaratara ya gutagania.

- Reke miti ikure nginya igimare.
- Korwo na namba ya miti iratwarana na muigana wa mugunda waku. Thiini wa TIST, noucagure

gicunji kia miti kia 5%, thutha wa miako 10, gutagania miti o igikuraga na kurehe umithio.

- Eheria miti iria irakua, iri na mirimu na itari na ugima mwega.
- Gitira miti kumana na utemi utari mwtikiriku.
- Tema miti na njira itakuhukia mutitu waku.
- Handa miti mithemba miingi.
- Rora mutitu waku ndugatharikirwo ni tutambi.
- Nyitanira na honge cia thirikari niguu kugitira mirimu.
- Gitira miaki.



**Ndugeke uu.**

**Theria guothe**

**Ikai uu**



**Single tree selection**



## Miti iria miega kuri TIST: Handu ha mibau.

**A**taalamu aingi a maria maturigiciirie nimararora muno mathina maria mararehwo ni miti ya mibau. Ndereti iria ikoretwo kuo igii miti ya mibau ni ati kuri mithemba miingi ya miti ya mibau. Athomi matiri marekira uhoro ucio mukonde. No ona kuri o uguo, maya ni maundu mamwe ma maria athomi aya metikitie hari uhandi wa miti ya mibau.

- Miti ino niibataraga unoru wa tiiri muingi muno kwa uguo ukahinja mugunda.
- Mahuti maguo matibuthaga na-ihenya kwa uguo matingiteithia tiiri.
- Mithemba miingi ya miti ndikuranagira na mibau.

Ona angikorwonmundo o wothe ndaretikania na maundu maya, kuri na kimako kiiganu uria TIST irarora uhoro uyu na kinyi. Ikundi imwe thiini wa Uganda nimaugite ati githimi kiao kia maai nigicokete thi thutha wa kuhanda miti ya mibau. TIST niirahinyiriria arimi matikahande miti ya mibau maai-ini kana mugunda-ini munoru. Ningi, migunda ingi noikorwo iri miega kuhandwo mibau na forester wa kwanyu no amutaare.

Kuri na gitumi kiiganu gia TIST kuhinyiriria arimi matikahande miti ya mibau. Arimi angi nimegwatura mbau gwa kahinda kanyihire miaka 20 na TIST ndikohota kwendia carbon credits angikorwo miti iyo ndigukura gwa kahinda gatanyihire miaka 30. TIST ingiriha njohera kuri miti iria igutemwo itakinyitie miaka 30, nigugukorwo na mbeba itari njiganu kuri ikundi aria mahotete kuiga miti yao iri muoyo.

Arimi nomende guthii na-mbere na gukorwo

na miti ya mibau niundu wa ngu na mbau no ihandwo kuria kwagiriire, miti ino noithii na-mbere na guteithia utemi wa miti ya ki-nduire. No ona nkuri o uguo, miti ino ndingitaranirio na miti ya TIST.

Niguo kwongerera biodiversity, gitira mugunda waku na uhande miti ya guikara kahinda kanene. Niturahinyiriria arimi kuhanda miti ingi tiga ya mibau.

### Miti ingi miega tiga mibau ni iriku?

Miti ino ni imwe ya iria miega icaguritwo ni TIST.

*Grevillea Robusta, (Mukima)*

Muti uyu uria ukuraga na-ihenya ubataraga kundu gutari maai maingi na utaganu wa 4-5cm na ndurabataru mbegu guthondekwo mbere ya kuhandwo. Mbegu ciaguo nocigwo gwa kahinda ka mieri 3 kana makiria cingikorwo thiini wa fridge. Miti ino niigitagira tiiri, ciiruru cia kahuwa na macani na niikuranagira wega na irio cia mugunda.

*Cypress kana Cupressus lusitanica, (Kikuyu: Mutarakwa; Kmeru: muthithinda)*

Muti uyu wonekaga kundu kugunyu kana kumu gutaraikara gutari mbura gwa kahinda ka 2-3 months. Ndukuraga wega maai-ini maingi no niwagiraga kundu kuri na tiiri munoru. Mbegu citibataraga guthondekwo na nocigwo gwa kahinda ka mieri 6. cypress niugitagira tiiri no wagiriirwo kuhandwo mthemba uria muega. Niukoragwo na rugiri, kiiruru na niukuranagira na irio cia mugunda.

### Bata wa miti.

Miti nimiega niundu wa maria maturigiciirie na maundu mangi ta;

### A) Kwagirithia maria maturigiciirie.

- miti niuhumbagira tiiri, iria imiteithagiriria kumana na ruhuho na maai.



- Mahuti ma miti nimekagira tiiri unoru.
- Miti niyongagirira ugunyu wa tiiri na igatuma tiiri uikare na maai.
- Miri ya miti niinyitaga tiiri na igatuma ndugakuu ni maai.
- Miri ya miti ningi niiteithagia maai kuingira tiiri-ini wega.
- Miti niithondekaga riera
- miti niiteithagia kugucia carbon dioxide kuma rieraini na kurekereria oxygen.

### **B) Indo cia gwaka na ciakuria.**

- Indo cia gwaka iria cihuthikaga hari indo cia nyumba, ikingi, rugiri na ingi nyingi.
- Ngu.
- Dawa.
- Irio cia mahiu.

### **Kurimira miti yaku riu!**

Riu tondu mbura niyurite, niwagiriirwo nigukorwo uhandite mimera yaku mugunda-ini. Angikorwo nduhandite, niwagiriirwo nigwika uguo tondu mimera niyagiriirwo nikuhandwo kahinda gaka ka mbura niguo ikure iri na hinya. Riria twamenyerera mimera iitu riu, niigukorwo namweke wa gukura ituike miti iri na hinya. Kaundu karia ka bata muno kahinda-ini gaka ka mbura ni kurimira miti na gutigirira niithereirwo wega.

### **Kurimira ni kwa bata!**

- Mimera yaku niirabatara maai, unoru wa tiiri na

utheri wa riu niguo ikure iri na hinya. Riia nirigucindana na mimera yaku kuona indo ici na ritume ikure itari na hinya.

- Angikorwo mugunda waku timurimire wega, tutambi tuingi nitukugumira mugunda waku na tuthukie mimera.
- O uria kuri na riia inini, noguo gutangikorwo na nyoka na tutambi tuingi.
- Miti ikuraga na-ihenya tondu riia ritirimitunya unoru na maai kuma tiiri-ini.
- Miti niikugia hinya na iraihe na-iguru gwa kahinda kanini.
- Miti niikinyagirwo ni utheri wa riu muiganu.
- Miti ndinyitagwo ni mirimu muno.
- Miti niigitagirwo kumana na gutherema kwa mwaki.
- Mugunda mutheru wa miti wonanagia gikundi nikiramenyera miti yoa wega na gigakorwo kiri kionereria kiega gia TIST. Njira ino niikuguciriria andu anigi kuingira TIST.
- Migunda mitheru niiteithagia atari a miti gutara miti na uhuthu na naihenya.

Niturakuhinyiriria utherie mugunda waku. Ririkana kugitira mimera kumana na mahiu. Na kungikorwo niguikarite gutari na mbura, ririkana kumiitiriria maai.

**Wira mwega niukwonania ngurani na kuhotithia miti gukura iri na hinya na miega.**

# Mazingira Bora



## TIST

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**Kiswahili Version**

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Maironne cluster members during their Cluster meeting last month.

### ***Ndani:***

**Wakulima katika TIST wapigana na mabadiliko ya hali ya hewa. *Ukurasa 2***

**Kupunguza na kupogoa miti kwa ukuzi mwema. *Ukurasa 3***

**Miti Bora zaidi kwa TIST : Miti badala ya Mikaratusi. *Ukurasa 5***



# Wakulima katika TIST wapigana na mabadiliko ya hali ya hewa.

**T**IST wakulima waliitikia wito wa kimataifa wa kupambana na ongezeko la joto duniani na mabadiliko ya hali ya hewa. Wakulima wengi walitaka kuelewa kupitia semina TIST / mafunzo na katika nguzo mikutano ya kujifunza na kuelewa zaidi kuhusu ongezeko la joto duniani, athari zake kwa hali ya hewa, na kukabiliana na mbinu. Tunaona wengi athari za mabadiliko ya hali ya hewa leo. Tu kuelezea matukio kadhaa ya athari, El Nino mafuriko ya 1998 kwamba uliharibu mengi ya nchi na ukame wa muda mrefu kwamba ikifuatiwa na upepo wa nguvu ya 2004 walikuwa uwezekano ulizidi kwa joto duniani. Nyengine vielelezo mashuhuri ni taratibu amevaa mbali barafu katika kilele cha Mlima. Kenya, hali ya hewa haitabiriki ambayo ilisababisha na kushindwa kwa mazao katika maeneo mengi, kukausha ya chemchem na maji ya vyanzo vya maji maeneo, miongoni mwa wengine wengi.

Jarida la mwezi huu kushiriki maelezo ya mafunzo na semina ili sote tuweze kuelewa joto duniani na mabadiliko ya hali ya hewa bora.

Tutaanza na kufafanua kila mrefu na kulielezea zaidi na kisha kujifunza jinsi ya miti yako na jukumu muhimu katika kuondokana na madhara ya ongezeko la joto duniani.

## Je, nini joto duniani?

Joto duniani inahusu ongezeko la wastani katika joto ya dunia, ambayo kwa upande husababisha mabadiliko katika hali ya hewa. Joto duniani inaweza kusababisha mabadiliko katika mwelekeo wa mvua, nguvu ya dhoruba, kupanda kwa bahari ngazi, kushindwa mazao, na mbalimbali ya athari juu ya mimea, wanyama pori, na binadamu. Wakati wanasayansi majadiliano kuhusu suala la mabadiliko ya hali ya hewa, wasiwasi wao ni kuhusu ongezeko la joto duniani husababishwa na shughuli za binadamu na mabadiliko ya hali ya hewa tofauti na hali ya hewa hii huleta juu.

## Ni kweli dunia inapata joto?

Ndiyo! Dunia inaogezeka kwa C kuhusu 1° zaidi ya miaka 100 iliyopita. Wengi wa wanasayansi duniani kuongoza hali ya hewa kufikiri kwamba mambo ya watu kufanya ni kusaidia kufanya dunia joto, kama vile kuchoma mabaki ya mafuta ikiwa ni pamoja na makaa ya mawe, petroli, na gesi asilia, na kukata misitu na kusimamia ardhi hafifu.

## Je, ni madhara ya hewa taka?

Ni athari chafu ya kuongezeka kwa joto duniani kwa sababu ya kuwepo kwa baadhi ya gesi katika anga, gesi za viwandani, kama dioksidi kaboni, oksidi nitrojeni, dioksidi sulfuri, na methane ambayo hutega nishati kutoka kwa jua. Vyanzo vikuu vya kaboni ni: ukataji wa miti, gesi inayozalishwa kutoka kwenye viwanda, gesi inayozalishwa kutoka magari, gesi inayozalishwa kutoka kuchoma ya kuni au mkaa na uchomaji wa misitu.

## Je, ni nini hatari ya joto duniani?

- Kufungua kwa maji katika maeneo kame na semiarid nchi.
- Hii inaweza kusababisha maeneo zaidi kuwa jangwa. kuongezeka kuenea kwa magonjwa kama vile malaria.
- Kama maeneo yenye joto zaidi huwa yanafaa kuzaliana kwa misingi ya mbu, na hivyo kuongeza hatari ya maambukizi ya malaria. Familia nyingi na taasisi za afya zinaweza kuathiliwa na vifo vya watoto wachanga viwango kupanda. kupungua kwa uzalishaji wa kilimo katika nchi nyingi za hari, hasa katika nchi za Afrika Mashariki.
- Kutokana na mvua kupungua na kuongezeka kuzaliana kwa wadudu kutokana na kupata joto kuongezeka, uzalishaji wa mazao ya chakula unaweza kupungua na matokeo yake ni umaskini na njaa miongoni mwa familia nyingi na jamii. Bei ghali ya bei ya vyakula duniani
- Kama zaidi wakulima kupata mavuno kidogo na chakula kuwa adimu, bei kuongezeka kwa sababu mahitaji ni ya juu na ugavi ni ya chini. mabadiliko makubwa katika tija na muundo wa mifumo muhimu ya kiikolojia hasa ya misitu.
- Maji katika vyanzo vya milima na misitu kuendelea kukauka. Hii itaathiri uwezo wa kumwagilia mazao na kupunguza mtiririko muhimu kushika mabwawa na vyombo vingine vya kushikilia maji. Hii itapunguzauzalishaji wa nguvu za kawi. Viwanda vyetu, hospitali na taasisi nyingine ambazo sana hutegemea umeme vitaadhirika sana. usambazaji wa maji ya bomba katika maeneo ya mijini kama vile maeneo na vijijini pia huathirika.
- Makumi ya mamilioni ya watu wamo katika





hatari kutokana na mafuriko na maporomoko ya ardhi, inaendeshwa na ongezeko la makadirio ya kiwango cha mvua na, katika maeneo ya pwani, kupanda viwango vya bahari.

### **Nawezaje kuzuia joto duniani?**

Panda na utuze miti?

Kama ilivyoenezwa hapo juu, dioksidi kaboni ni moja ya gesi ambayo kusababisha ongezeko la joto duniani. Miti kunyonya dioksidi kaboni kutoka hewa .. Hata hivyo, wakati miti inakatwa na kuchomwa moto, hiyo huachilia kaboni ambayo imehifadhiwa

kwenye mizizi na kuirudisha kwa hewa tena .

### **Je, unajua kila mti mmoja unaweza kujenga hali ya hewa micro?**

Miti na bima zao huifanya dunia kuwa baridi . faraja ya kivuli cha mti. Ona kwamba udongo chini ni ya miti una unyevunyevu . Hii ina maana kwamba miti kwenye ardhi yako itasaidia kuboresha kiasi cha maji katika udongo wako, na kusaidia kuhifadhi maji kwa muda mrefu. Hii itasaidia mazao yako na pia hata kuwasaidia watumiaji wa maji katika eneo lako.

## **Kupunguza na kupogoa miti kwa ukuzi mwema.**

**K**atika TIST, tumejitolea kutunza miti tunayopanda kwa ajiri ya TIST kuikua kwa miaka thelathini kabla ya kuikata. Hii ni sababu mojawapo ya ni kwa nini ni muhimu kufikiria vizuri kuhusu ni miti ya aina gani twataka kukuza katika mashamba yetu. Hata hivyo, kupunguza na kupogoa miti kwaweza kusaidia kuiweka miti yako ikiwa yenye afya na inayotupa vitu muhimu mti unapokua.

Kwa ujumla, maana ya kupunguza na kuipogoa miti ni kuboresha afya ya kila mti, pamoja na ya msitu wote. Hili litafanyika kupitia kuichagua miti iliyo bora zaidi katika msitu. Kwa aina nyingi za miti, pamoja na miti ya mbao, grevillea, mikaratusi na cypress, miti hii san asana huwa miti mikubwa zaidi, kila mti ukiwa na shina moja lililonyooka. Miti yaweza kuwa na mahitaji mbalimbali ya nafasi kulingana na aina, mahali, ilivyopandwa (miti iliyo mashambani ya mimea ya vyakula ama miti iliyopandwa ili kupunguza upepo) na tabia nchi, lakini kuna kanuni zingine za kijumla hutumika.

Kukuza miti iliyo na nguvu na afya, nafasi ya mita mbili hupendekezwa. Nafasi hii ni sawa kwa miti mingi ya TIST (grevillea na cypress), lakini kumbuka kuwa miti mingine huitaji nafasi zaidi (miembe na mikandamia, kwa mfano). Kuipa miti nafasi inayofaa husaidia kupata maji na virutubisho tosha vya kuikua hadi panapowezekana. Nafasi ndogo zaidi inaruhusiwa miti ilipo michanga. Miti inapokua, miti mingine itakuwa mikubwa kuliko majirani. Hii ndiyo miti wapaswa kuacha. Kuchhagua ni miti gani ya kukata, angalia miti iliyo bora zaidi na ujue kama ina nafasi ifaayo. Kama haina, wafaa kutoa miti mingine iliyo karibu.

Ukishachagua miti ya kutoa, ikatie chini kabisa. Katika wiki na miezi inayofuata kukata, miti mingi

itaanza kuchipua kutokana na kisiki cha mti. Ili kuzuia mti kuchipuka tena, kata au uvunje miche iyo chipukizi iliyo katika kisiki.

Njia mojawapo iliyo rahisi zaidi ya kujua kama mti wapaswa kukatwa ni kuangalia ukubwa wake ukilinganisha na miti iliyo karibu ya umri na aina moja. Ukuaji wa mti utatofautiana kulingana na udongo, maji yaliyopo na kadhalika. Kwa ujumla, ikiwa miti yote ya aina moja katika eneo Fulani ina karibu umri mmoja, miti iliyo mikubwa zaidi inaweza kuchaguliwa kuachwa kukua. Kiashiria kingine cha afya ya mti ni mahali taji la mti katika dari lilipo. Miti liyo na taji juu ya dari la kijumla la miti yaweza kunyonya mwanga zaidi ya miti iliyo na taji chini zaidi na kwa hivyo huweza kukua bora. Kumaliza, miti yafaa kuwa na shina moja, lisilo na ugonjwa mkuu au kuoza. Hata hivyo, ili halimaanishi kuwa miti yote midogo yafaa kukatwa! Langa kunafasisha kwa mita mbili ili miti iwe mikubwa ba yenye afya iwezekanavyo ili kuzidisha kunyonywa kwa kaboni.

Unapofanya uhamuzi wa kupunguza miti, kumbuka kuwa kiwango cha ukuaji hutofautiana kulingana na aina ya mti. Kama mwembe unakua karibu na mikaratusi mingi, mwembe unaweza kuwa mdogo na unaokua pole pole zaidi ya mikaratusi inayokua haraka, lakini kwa uhakika haupaswi kukatwa kwa sababu ni mdogo zaidi! Kwa kweli, mti kama mwembe ni wenye umuhimu mkubwa kwa sababu ya matumizi yake katika kupeana matunda ya kula na kuuza.

Mwembe ni bora zaidi pia kwa mimea mingine iliyo shambani. Mkaratusi waweza kufanya miti na mimea mingine iliyo karibu kukua vibaya. Ni muhimu kukumbuka hili unapochagua ni miti gani utapunguza. Kuna matumizi mengi ya miti, kulingana na aina zaidi ya kunyonya kaboni. Kwa mfano, waweza hitaji miti



ya kivuli. Hapa, wafaa kuupa mti nafasi kubwa zaidi ili kuufungulia jua zaidi. Hili litasisimua mti kutengeneza matawi mapya katika shina kuu na matawi makubwa.

Ukitaka kutumia miti ili kupunguza upepo, iache miti iyo katika mistari kuwa karibu zaidi, lakini kata miti iliyo pande hizo zingine ili kuongeza kichaka.

### Mazoezi bora unapopunguza miti

- Iruhusu miti kukua hadi ukomavu.
- Punguza hadi inavyofaa (nambari ya miti katika ekari). Katika TIST, twaweza kuchagua hadi asilimia tano ya miti yetu, baada ya miaka kumi,

kupunguza kupitia kuchagua inavyokua na kutuletea pesa.

- Kata miti inayokufa, iliyo na magonjwa, inayooza na isiyu na ubora.
- Linda miti kutokana na uharibifu kutakana na ukataji wa magogo.
- Tumia njia za ukataji magogo zenye athari chache inapowezekana.
- Himiza wingi wa aina za miti.
- Fuatilia msitu wako ili kujua kukizuka wadudu na magonjwa.
- Shirikiana na kampuni za serikali katika kudhibiti kuzuka kwa wadudu na magonjwa.
- Zuia mioto ya msitu.



**USIFANYE hivi**

**Kukata miti yote**



**FANYA hivi**

**Chagua mti mmoja mmoja**



## Miti Bora zaidi kwa TIST : Miti badala ya Mikaratusi.

**W**anamazingira wengi wana wasiwasi juu ya athari za mikaratusi kwa mazingira. Hoja dhidi ya mikaratusi ni ngumu kwa sababu kuna aina mbalimbali za mikaratusi . Wanasayansi haawna uuhakika kuhusu baadhi ya ushahidi. Hata hivyo, hapa ni baadhi ya hoja dhidi ya kupanda mikaratusi ambazo mwanamazingira wengi wanaamini :

- Miti hii inaweza kukausha ardhi na kuchukua maji mengi kutoka ardhi.
- Miti hii inaweza kutumia madini mengi yaliyo katika udongo na kuifanya ardhi kutofaa kwa kilimo.
- Majani hayaozi kwa urahisi na hata hupunguza vidudu vidogo vyenye manufaa katika udongo.
- Baadhi ya aina za mimea na wanyama haziwezi kuishi katika shamba la mikaratusi.

Hata kama si kila mtu anakubaliana na mengi wa masuala haya, kuna ushahidi wa kutosha na wasiwasi juu ya suala hili na TIST inahitajika kusikiliza kwa makini. Baadhi ya vikundi vidogo nchini Uganda wamepeana maoni kwamba walkuwa na kiwango cha maji kilishuka tangu upandaji wa mikaratusi. TIST ingewashauri wakulima wote wasipande mikaratusi katika maeneo oevu , pamoja na kando ya mito au juu ya ardhi yenye uzalishaji wa kilimo. Hata hivyo, kuna ardhi inayofaa mikaratusi na mchungu msitu wako anaweza kukushauri .

Kuna sababu ya pili ya TIST kutotia nguvu upandaji wa mikaratusi. Wakulima wengi watawuna mbao zao katika chini ya miaka ishirini na TIST haitaweza kuuza kaboni isipokuwa miti iwe hai angalau miaka thelathini kwani ni miti iliyo hai huhitimu. Kama TIST inalipa motisha kwa ajili ya miti ambayo itakatwa katika chini ya miaka thelathini , kutakuwa na fedha kidogo kwa ajili ya vikundi vya watu ambao wamepanda na uaminifu iimarishwe miti ya muda mrefu.

Wakulima bado wanaweza taka kuwa na

mashamba ya mikaratusi yanayolimwa hasa kwa ajili ya kuni na mbao. Mashamba haya yakiwa katika maeneo yanayofaa , wanaweza kusaidia kupunguza shinikizo juu ya misitu ya kiasili. Hata hivyo , mashamba yaliyolimwa miti kwa ajili ya mavuno ya mapema hayapaswi kuhesabiwa kwa ajili ya mpango wa TIST.

Kuongeza viumbe hai, kulinda nchi yako na kuhimiza miti ya muda mrefu ambayo itafuzu kupata malipo ya kaboni. Sisi tunahimiza vikundi kulima miti mingine badala ya mikaratusi.

### Je, ni miti ipi iliyo bora kupanda badala ya mikaratusi?

Miti zifuatazo ni baadhi ya mapendekezo kutoka wakufunzi wa TIST katika Kenya:

*Grevillea robusta* , pia unajulikana kama Silky oak (katika Kikuyu huitwa mukima ).

Mti huu hukua kwa haraka na uhitaji udongo unaopoteza maji kwa haraka, nafasi kati ya miti iwe mita nne au tano, na hakuna matibabu kabla yanahitajika. Mbegu zaweza kuhifadhiwa kwa hadi miezi mitatu au zaidi inapowekwa kwenye friji. Miti hii huhifadhi wa udongo , kivuli kwa ajili ya chai na kahawa, na mimea hukua vizuri ikipandwa pamoja na vyakula inaposimamiwa vizuri hupunguza kivuli na ni chanzo muhimu cha lishe wakati wa kiangazi. *Cypress au Cupressus lusitanica* , ( Kikuyu : mutarakwa ; Kimeru : muthithinda )

Mti huu hupatikana katika maeneo yenye misimu yenye unyevu na hali ya kudumu ya unyevu na msimu wa kiangazi unaodumu miezi isiyozidi miwili au mitatu. Haiwezi kuhimili mafuriko lakini hukua katika udongo wenye kina kirefu , unyevu, pamoja na udongo wenye rutuba wenye asidi kidogo au usiokuwa nayo . Matibabu ya kabla ya mbegu sio lazima na mbegu zaweza kuhifadhiwa hadi miezi sita. Mti huu inatoa ulinzi mdogo dhidi ya mmomonyoko wa udongo na unapaswa kupandwa pamoja na aina nyingine za miti. Ingawa inazuia upepo , na kutupa kivuli na uzio hai , siyo mzuri kwa ajili ya mseto .

### Umuhimu wa Miti

Miti ni muhimu sana kwa sababu za kimazingira na nyenzo kama vile:



- A) Uboreshaji wa Mazingira -
- Miti hufunika udongo , jambo ambalo huulinda kutokana na mmomonyoko wa udongo kupitia upepo na maji.
  - Majani na matawi huanguka chini na kuongeza virutubisho kwenye udongo .
  - Miti huongeza unyevu katika udongo kwa kufunika udongo na hivyo kupunguza kupotea kwa maji.
  - Mizizi ya miti inasaidia kushikanisha udongo na hivyo kupunguza mmomonyoko wa udongo.
  - Mizizi ya miti pia inasaidia maji kuingia udongoni na kuboresha mzunguko wa maji ardhini.
  - Miti kuboresha hali ya hewa ya kila siku na kuongeza kiasi cha mvuke wa maji katika hewa (kuongeza unyevu).
  - Miti huboresha hewa kwa kufyonza kaboni na kutoa oksijeni.
- B) Nyenzo na thamani ya lishe -
- Vifaa vya ujenzi vinavyotumika kwa ajili ya kufanya samani, ua , kamba , na kadhalika
  - Kuni
  - Dawa
  - Chakula na lishe

### **Palilia miti yako sasa!**

Sasa kwa kuwa mvua imeanza unapaswa kuwa ushapandikiza miche yako shambani mwako .Kama bado kuyafanya haya , unahitaji kufanya hivyo sasa kwa sababu miche inahitaji kupandikizwa ili iweze kukua kinguvu katika msimu wa mvua ili kuweza kuishi wakati wa miezi kame. Kwa kuichunga miche yetu sasa, ina nafasi bora zaidi ya kuishi na kuwa na nguvu. Shughuli muhimu zaidi wakati wa msimu wa mvua ni kupalilia miche yako katika mashamba yako. Weka mazingira ya miche yako safi kama

iwezekanavyo na hutoe magugu yoyote yanayomea karibu miche yako.

### **Kupalilia ni muhimu !**

- Miche yako inahitaji maji, virutubisho na mwangaza ili kukua. Magugu yatashindana ili kupata virutubisho vilivyo katika udongo na maji ambayo miche yako inahitaji , na kuifanya kuwa dhaifu na kushindwa kuishi.
- Kama eneo lako halijapaliwa , wadudu zaidi wavutwa eneo hilo na kuharibu au kuua miche yako.
- Jinsi magugu yalivyo machache ndivyo kuna nafasi ndogo ya nyoka na wadudu.
- Miti hukua haraka kwa sababu magugu hayaibi virutubisho na maji kutoka kwenye udongo.
- Miti itakuwa imara na itarefuka kwa kipindi kifupi .
- Miti itapata mwanga inayohitaji bila kuzuiwa.
- Miti haipo wazi kwa magonjwa mengi.
- Miti inakuwa imelindwa kutokana nakuenea kwa moto.
- Mashamba safi yanaonyesha kwamba makundi yote yanayalinda na ni mifano mizuri katika mpango wa TIST. Hili litawavutia watu wengi kuja na kuona kazi yenu.
- Mashamba safi yanasaidia wahesabu miti kuhesabu miti kwa haraka na kwa usahihi. Tunawahimiza kupalilia mashamba yenu. Kumbuka kulinda miche ili wanyama , kama mbuzi , wasije wakaila au kuikanyaga . Fikiria kujenga uzio au uzungushe miti ya miiba , na kama mna siku sizizo na mvua , kumbuka kuwekea miche maji.

**Kazi ya bidii italetu tofauti kwa kuifanya miti yako kuwa na nguvu na afya njema .**

# Mazingira Bora



# TIST

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

*Kikamba Version*

An Environmental, Sustainable  
Development and Community Forestry  
Program.



Maironne cluster members during their Cluster meeting last month.

## *Inside:*

Aimi ma TIST kukitana na uvinduku wa nzeve na uvyuvu wa nthi yonthe. Page 2

Kunzea na kwenga kutaanisa miti kwa kwiana kuseo. Page 3

Miti miseo kwa TIST: Vandu va musanduku (Eucalyptus). Page 5



# Aimi ma TIST kukitana na uvinduku wa nzeve na uvyuvu wa nthi yonthe.

**A**imi ma TIST nimeew'ie witano wa kukitana na ualyuku wa nzeve vamwe na uvyuvu. Aimi aingi nimandee kwenda kumanya kwa nzia ya movundisyo na semina sya TIST na yila mena mbumbano sya ngwatanio syoo iulu wa uvyuvu na uvinduku wa nzeve nthi yonthe, mauvindu ma uvyuvu na mothuku maw'o nthini wa nzeve na undu tutonya kwika kuete uvinduku munini. Nitukwona movinduku manene nthini wa nzeve umunthi. kwa ngelekany'o El-nino sya mwaka wa 1998 ila syaetie wanangiko munene nthini wa nthi yitu Kenya na yaatiiwa nimunyao munene, kinzeve kinene kya hurricane kya mwaka wa 2004 ithi syothe ietetwe ni uvinduku wa uvyuvu wa nthi. Kingi ni kwina ia ya kiima kya mt. Kenya kwoneka yiendee na kuoleka, na ivinda ya mbua kana thano itekueleeka nokithia mundu ndatonya umanya ni indii ukuvanda na aiketha, mbusi na nthongo mbingi sya kiw'u kung'ala na maundu angi maingi.

Mwai uyu ithangu yielesya iulu wa semona nikana tuelewe iulu wa uvyuvu wa nthi na uvinduku w nzeve nesa.

Twiambiia kwa kueleesya ndeto na na kwimanyisya undu miti ithukumaa kilio kinene kukitana na uvyuvu uyu wa nthi.

## Nikyau kitawa uvyuvu wa nthi (Global Warming)

Uvyuvu wa nthi withiawa uyonany'a wongeleku wa uvyuvu nthini wa nzeve ula uetae uvinduku nthini wa nzeve ukethia niya vyuva kwiundu itwie. Nthi mbyu ni ietae uvinduku wa undu mbua ikua, iutanti syina vinya, ukanga kwambata, mimea kulea usyaa, miti kuma, na movindu maingi kwa nyamu na andu. Yila andu ma science me kuneenea iulu wa uvinduku wa nzeve , kimako kyoo kinene ni uvyuvu ula uetetwe ni meko ma mundu na undu mena uthuku mwingi kwa kila kindu.

## Kwa w'o nthi ni yiendee na uvyuva?

ii! niw'o nthi niyongelekete uvyuvu wa kwa ndikilii imwe (10c) nthini wa myaka iana yimwe (100yrs). Aingi ma ala matongoety'e kw autalamu na utuika wa nzeve nimekwisilya kana maundu ala andu mekwika nimatumite nthi iendee na uvyuva kwa ngelekany'o Kuvivya mauta, mavia ma Coal, ngasi ya kuma nthi, kutemanga mititu na kulea unzuvia muthanga.

## Nyumba sya ngilini (Greenhouse) syinthiawa na uthuku mwau?

Uthuku wa greenhouse ni kwithiniwa uvyuvu wa nthini utuma ngasi imwe ila syitawa greenhouse gases ta Carbon dioxide, Nitrous oxide, Sulphur dioxide na methene nikwataa vinya kuma suani. Nzeve itavisaa (carbon) ni kuma kwa miti ila yatemwa, ngasi kuma kambunini, ngalini na ngasi ya miti yavivya kana kuvivya makaa kana mititu.

## Ni muisyo mwau uetawe ni uvyuvu wa nthi?

- Manthina ma kiw'u kaingi kundu kula kumu na kwi mang'alata nakuituma kutwika weu.
- Kwongeleka kwa uyaaiku wa uwau ta malaria. Yila kundu kwa vyuva kutukaa kundu kuseo kwa umuu kuyaia na kuituma uwau wa malaria wongeleka. kwoou iyiete uvindu kwa misyi na masivitali ona uyivu wa andu kwikala thayu na ikw'u sya syana iyongeleka.
- Kuoleka kwa liu kuma miundani ta isioni imwe sya Africa ya wumiloni wa sua. Nundu wa mbua kunyiva na kusyaia kwa kutamu kwingiva mimea ya liu iieka kwika nesa na unyivu wa liu uiete ungya na nzaa nthini w amisi mingi na mbai mbingi.
- Liu kwambata vei. Oundu aimi aingi maendee na ukwata liu munini kuma miundani now'o uendeeaa na kwinthiwa wimunini sokoni na nundu andu naingi ala meuwenda nthooa naw'o uyambata.
- Uvinduku munene nthini wa usyao na kila kyonthe kyumea kithekani na mitituni. Mbumo sya mbusi nta iima na mititu niendee ma kuma. Kii kikaete ualyuku nthini wa kungithya miunda, kususya nasukasya silanga na tulusi kwikala tuvitye kiw'u. Ingi kiw'u kyanyiva onakwo kusevya sitima kwa nzia ya kiw'u kuiyiva na kwoou uvindu uyu masivitali, industry, na kungi kula sitima utumikaa muno uyithia nakw'o nikwavikiwa nima uvinduku aya. Ingi kiw'u kiinyiva ola kula kitwaitwe na mivaivo ta mataoni na misyi imwe kiilea uvika kana kiivika kinini.
- Andu aingi vya mine nthina wa kwithiwa matonya uvikiwa ni mavuliko, kutheewa ni muthanga na kungi ta utee wa ukanga kiw'u kwambata iulu wa vala kitwie.





## Nata ndonya usiia nathi kuvyua?

Vanda miti na uimisuvia.

Tondu tuwetete vaa iulu, nzeve itavisaa ni imwe kati wa ila ietae uvyuvu wa nathi. Miti ninyusaa nzeve itavisaa ila ikusevya liu wayo na kumia mithambani, miini na muthangani ta cellulose carbon. Onavala miti yatwemwa na kuvivya niyumasya nzeve isu itavisa na iilika ingi nzeveni.

## Niwisi kana kila muti no uete uvinduku wa nzeve?

Miti na uthui wayo nivyikaa na kunthithya nathi. Niwiw'aa mimwianie ulyi muuthini wa muti. Syisya wone kana ungu wa muti vala vena miinyi kiw'u kyavo kivakuvi kwi vala vena sua. Yi la muthanga wekala wi muthithu now'o ukwatiia kimeu kwa ivinda iasa. Kii kimaanisa kana miti ila yi kithekani kwaku nikutetheesya kwikalya kiw'u muthangani kwa ivinda iasanga kute kula kutemiti. Kii niutetheesya mimea ya muundani kwika nesa na kutethya ala matumiaa kiw'u kisioi kyaku.

## Kunzea na kwenga kutaanisa miti kwa kwiana kuseo.

**N**thini wa Tist, nitweeyumisye kusuvia na kuvanda miti vandu va ivinda ya yinyiva myaka mingi itatu (30 years) nambee wa kumiketha. Kii nikitumi kimwe kya vata kyaile utuma mundu amba kwisilya muthemba na muvai wa miti ila ukuvanda muundani wake. Onakau kusea vamwe na kwenga nikutonya kutuma miti iseuva na yiana yina usyao museo.

Kwa vamwe, Kitumi kya kusea na kwengea miti ni kutuma imea yina onou ula waile kwa kila muti na kwa mutitu w'othe. Uu wikawa kwa kunyuva miti ila miseo nthini wa mutitu. Kwa mithemba mingi ta miti ila myumu, Mikuvulya, misanduku na minyoonyoo ila miyo minene na ikuaa mwanya munene na yi muthamba mulungalu ute mbonge. Miti niyithiawa na mawendi kivathukany'o ta ma uthei/mwanya kulingana na muthemba/ muvai wa muti, vala uvaandwa, wivandiwa ki? ( wivandwa muundani na liu, niwausiiia nzeve) na nzeve ya kisio kiu, onakau mawendi amwe ma miti nimavwanene.

Kuvanda miti yina vinya, na mianie niyaile ithiwa na utaaniu wa matambya eli mainyiv. Utaaniu uyu niw'o tuthukumaa naw'o kaingi kwa miti mingi thini wa Tist ta mikuvulya na minyoonyoo, lilikana kana miti ingi niyendaa mwanya munenange ta iembe na makandania. Kunenga miti mwanya ula waile nitumaa ikwata kiw'u kya kwiana na unou wa munyanga ula waile. Miti ithengeanie ndithiawa na nthina kwa miti yiminini. Mitiyambiiia kuneneva imwe niyithiawa yi minene kwi ingi, ino niyo miti ila yaile utiwa. uisisya miti ila ukuveta niwaile usisya ila itaendee nesa na itena vinya ukavta yo utite ila ikwonana kwina nesa kwianana na utaaniu ula ukwenda kunenge miti yaku. Veta miti ila ithungity'e ila ingi.

Wamina usakua miti ila uuveta mitilile vaaya

nthi vya, itina wa syumwa kana myai itina yii noyambiie uthongooa, ndukaeke thongoo ithi syokale iteme unasyo kuma kitinani.

Nzia imwe ya mituki na yilaisi kumanya miti ila uuveta nukisisya unenene wa muti uisianisya na miti ila ya muthemba umwe ila yavandiwe ivinda yimwe. Kwiana kwa miti kwithiawa kivathukany'o kwianana na muthanga, muthemba wa muti, na kiw'u. Kwa vamwe ethiwa miti ila uvandite nimuvai umwe na niyaivinda yimwe miti ila minou na yianite mituki niyo yaile utiwa. Kingi waile usisya ni muunyi kana ngava sya muti undu siyaiikite. Miti ila Ngava syayo yi yiulu kwi sya miti ila ingi nisyosaa kyeni kya sua kwi miti ila yinthi na kwoou miti ino ni useo ikatiwa eyo yianite. Muthya ni kana muti waile ithiwa na muthamba umwe ute na kiinyi na utemw'ou kana utena uwau . Eleelya utaaniu wa matambya eli kwa miti nikana miti ineneve na itonye kwosa nzeve itavisaa kwa wingi.

Yila usakua miti ila uutia lilikana kana miti mithemba/mivai kivathukany'o yianaa kivathukany'o. Ethywa muti wa kiembe nukwiana vakuvi na misanduku ukeethiwa wi munini muno wasianisya na musanduku nundu misanduku yianaa na mituki kwi miembe, na kii ti kitumi kya kutila muembe usu nundu ndwianite undumwe na misanduku. Kwa w'o muembe niwavata muno kwi musanduku nundu nutunengae matunda na liu wa uta.

Ingi muembe nduthuanaa na mimea ingi muundani. Musanduku nutonya utuma mimea ingi iteka nesa muundani mavandaniw'a vamwe, ingi niuseo kulilikana uuu yila uusea na kuola miti. Kwi nzia mbingi sya utumia miti kulingana na muvai wa kila muti. Kwa ngelekany'o ethiwa wienda miti ya muunyi, miti ino niyendaa mwanya munene nikana



ikwte kyeni kay sua kingi itonye kimya mbonge mbingi.

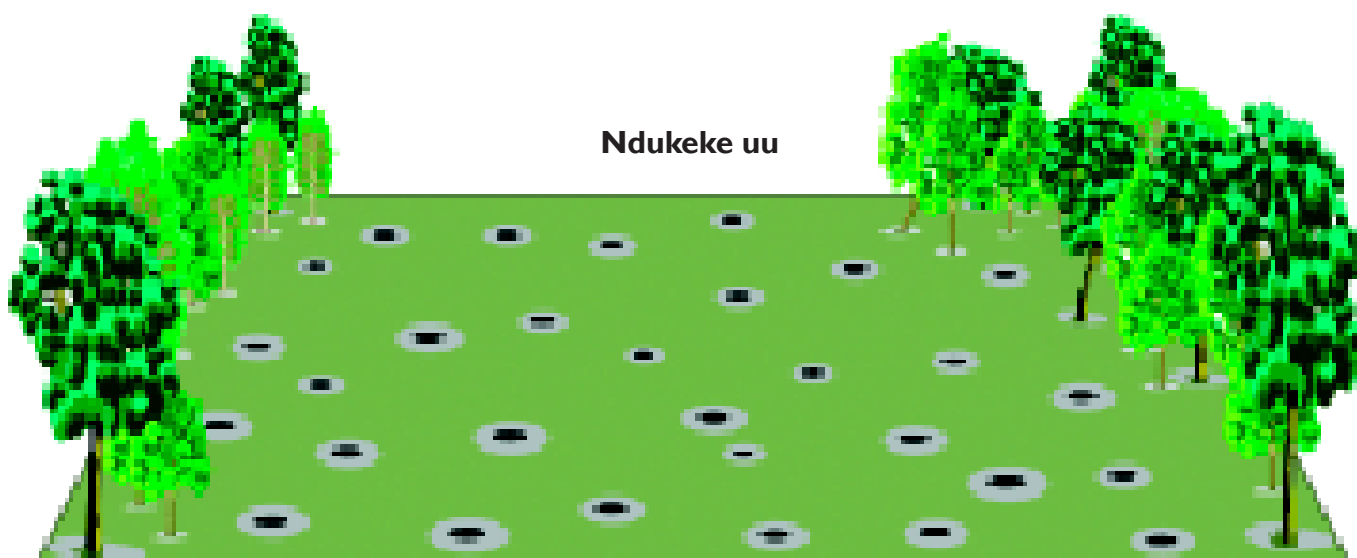
Ethiwa wienda utumia miti kusia nzeve, ikiithya miti isu yi musitalini imwe na ni ithengeanie kwongela uthungu.

**Nzia nzeo sya kuatiia yila ukuola/kutaanisy miti.**

- Eteela muti wiane utwike muima.
- Ola miti kuvika numba ila yaile kwa eka umwe. Nthini wa Tist notunyivi kuvikia kilungu kya 5% kya miti yitu itina wa myaka ikumi, Kuola

miti o yianite na kuseuvya ueti.

- Kuveta miti ila miwau, iendee na kuma, yina muinyu, ikwoa kana ila itaendee nesa.
- Siia miti kwanangwa ni kiw'u kutuumana
- Tumia nzia itena uvinduku munene kuola kutuumana kwa kiw'u.
- Nzuvia mithemba ya miti
- Syaisya uwau na tusamu tula tutonya uvithukia mutitu waku.
- Kwatana na ikundi sya silikali kuola uwau na uvithukii wa tusamu
- Siia mwaki.



Ndukeke uu

kwenga vyu

**IKA UU**



ola miti ukilila.



## Miti miseo kwa TIST: Vandu va musanduku (Eucalyptus).

**A**ndu aingi ala masiasya mawithyululuko mena thina wa undu muti uyu wa musanduku uetae wanangiko kwa mawithyululuko. Nthina woo iulu wa miti ya misanduku nimusaanu nundu mithemba ya misanduku ni mingi. Akunikili ma nzeve (Scientist) mena nzika iulu wa uw'o wa miti ino. Onakau vaa ve amwe kati wa mathina ala meawa maetawe ni kuvanda muti uyu kwianana na ala masiasya mawithyululuko makiie kana:-

- Miti ino nitumaa vandu vatwika ing'alata nundu inyusaa kiw'u kingi kuma muthangani
- Miti ino nitumiaa unou mwingi wa muthanga kwoou ukethia ndivandaniw'a na kindu kingi.
- Matu maw'o mayoaa na mituki na kwoou kuaa tusamu tula twikalaa muthangani na kuune nzeve
- Mithemba imwe ya miti ila ya kikwitu nditonya kwikalany'a kisioni kimwe nayo nundu ikitaa kuma.

Onakau ti kila mundu witikilanaa na maundu aa vena undu nundu TIST yeethukiisya nonginya yithiwe metho/ngunuu iulu wa undu uu. Kingi muti uyu wavandwa ni muimi wa Tist ndwiithiwa na vaita munonundu muti uu utonya ukethwa utavikitye myaka miongo itatu (30) nundu kaingi andu nimaukethaa wina myaka miongo ili (20) kana myaka minini kwi isu. Nikana kukwata ndivi undu vaile nthini wa soko wa nzeve itavisaa miti niyaile ikala iiyiva myaka miongo itatu na ingi TIST nditonya kwitikila kuiva ndivi ya uthuthio kwa miti yisi ndiikala ivinda yila yaile nundu ikeka uu vayithiwa mbesa mbianu kuiva ala maatii mwiao wa TIST wa kuvanda miti ya kwikala myaka 30.

Aimi nomethiwe mayenda kwithiwa na miti ino ya misanduku/minyoonyoo kwondu wa kukwata ngu na miti ya kwaka. Miti ino ivanditwe vala yaile

ndiundu muno nundu noiole utumiku wa miti ya kwimesya, onakau miti ila ivanditwe kwondu wa kukethwa ivinda ikuvi ndikatalwa ta ya ndivi nthini wa walany'o wa TIST.

Kwongeleela unyaiiku wa miti ya kiene na kusuvia itheka na kuthuthia aimi kuvanda miti ya kwikala ivinda iasa nikana ivitukithw'e sokoni wa nzeve itavisaa. Nituuthuthya ikundi ivande miti ingi vandu va misanduku/minyoonyoo.

### Ni miti ingi yiva miseo vandu va misanduku?

Miti ino ni imwe tunengetwe ni amanyisya matist ta miseo:-

*Mukuvulya: Silky Oak (Grevillea Robusta) (Kikuyu - Mukima)*

Muti uyu ni umeaa na kwiana na mituki. Niwendaa muthanga uteiliva vala kiw'u kitopnya uthi na mituki, uvandawa utaaniu wa matambya 4-5 na ngii/mbindi syaw'o iyendaa kuiitwa. Ngii ithi no syikale vandu va ivinda ya myai itatu kana ivinda iasa syi mbalavuni. Miti ino ni usuviaa muthanga, ikeka muuyi kwa maiani ka kaawa na niyikaa nesa ona ivandaniw'e na liu yasewa nesa kuola muunyi na ni unenganae uithyo wa indo ivindani ya sua.

*Cypress or Cupressus Lusitanica (kikuyu: Mutarakwa; Kimeru: Muthithinda)*

Muti uyu withiawa kaingi kundu kwiu na kula kute kumu muno kana kutayaa vandu va ivinda iasa kwi mya

2-3. Muti uyu ndumiiisya ilimba/ilivi niwendaa muthanga wa kituni kana nthangathi ila itena ngaati mbingi.

Mbindi/ngii syaw'o iyendaa kuiitwa mbee wa kuvandwa indi nosiwe vandu va ivinda ya myai thathatu (6).

Muti uyu nusiiiaa muthanga kukuwa na nouvandwe na mivai ingi ya miti indi ti museo kwa kuvandaniw'a na liu. nusiiiaa kiseve, ukanengane muunyi na ni museo kwa w'iiio.

**Vaita wa Miti**

Miti niyithiawa ya vata kwa mawithy'ululuko na utumiku ungi kwa itumi ithi:-

**A) Useo kwa Mawithyululuko:-**

- Miti nivwikaa na kusuvia muthanga kumana na kukuwa ni kiseve kana kiw'u
- Matu na tuukava twavaluka nitwoaa na kunenge muthanga unou
- Miti niyongelaa kimeu muthangani nundu niyikiaa muuyi na kuola kiw'u kuny'aa na mituki
- Mii ya miti niyovaa muthanga na kusiiia kukuwa kwa w'o ni kiw'u
- Mii ya miti nitetheeasya kiw'u kulika muthangani
- Ni niseuvasya Nzeve ya vandu kwa kwongela kiw'u kila kikiseveni. (humidity)
- Miti ni seuvasya nzeve kwa kwosa nzeve ila itavisaa (Carbon Dioxide) na kumya nzeve ila ivisaa (Oxygen).

**B) Vata wa miti ta liu na syindu sya utumnia-**

- Miti ya kwaka, mbwau sya kwaka na kuseuvya miio ya nyumba vamwe na makanda.
- Ngu na makaa
- Ndawa
- Liu na uithyo

**Kuimia miti yaku yu!**

Nundu yu mbua niyambiie niuseo wambiie uthamya mbeu ila syi kivuioni ethiwa ndwaa ambiia na kutwaa kithekani nikana ikwate na iimea nesa yu kwi mbua nikana itonye kumiisya myaini ya sua. Kingi kya vata nikana niwaile uimia miti yaku yu nikana yike nesa nundu kwi mbua. ikiithya vala uvandite miti nivekala ve

vatheu undu vatonyeka.

**Kuimia ni kwa vata!**

- Miti yaku nikwenda kiw'u, unou wa muthanga, na kyeni nikana yiane yina vinya. Ethywa ve yiia nisikwambiia kuania kiw'u kyeni na iituma miti yaku yiana yimyonzu.
- Ethywa kisio kyaku nduimite, tusamu tula twanangaa nitukuka na kwananga/kuaa miti yaku.
- Oundu vena yiia inini now'o tusamu na nzoka itethiwa vo.
- Vate yiia miti niyianaa na mituki nundu vai kindu mekuaniia liu na kiw'u.
- Vate yiia miti niyianaa na kuasava na mituki kwa ivinda inini
- Miti nikwataa kyeni kila ikwenda vate kusiiwa.
- Miti ndivikiwa ni mowau maingi
- Miti nisiwe kuma mwaki kuyaiika kwa mituki.
- Miti mitheu yionany'a kana ngwatanio yenyu niyithiitwe iyika undu vaile kwianana na walany'o wa TIST na ii ni ikwendeesya andu aingi na mayendeewa nikuka kuthukuna nenyu.
- Miti mitheu nitetheeasya muthuimi na muvitukithya kumitala namituki na kwa w'o.

Nituu kuthuthya uimie miti yaku. Lilkana kusuvia indo kwananga miti yaku. nowikiie wiio vala vena miti

minini kumisuvia na ethiwa kunamba kua ngithya na uyikia muuyi ungu.

**Kuthukuma na kithito nikuu ete kivathukanyo kwa kutuma miti yaku yithiwa yina vinya na yiminou.**

# Mazingira Bora



# TIST

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

*Kipsigis Version*

An Environmental, Sustainable  
Development and Community Forestry  
Program.



Maironne cluster members during their Cluster meeting last month.

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# Temik ab' TIST kokoker ng'alek ab Global Warming ak wallet nebo Climate.

**T**emik 'ab TIST konaam koker ng'alek 'ab gobaal warming ak climate change. Temik che chang' kokocheng' konetutik en seminars chebo TIST ak en tuyoshek chebo cluster konai che chang' agobo gobaal warming (burgeyet nebo ng'wondut), ole kokowalda ngwandet, ak ole kimuche keistoito. Raaini kekere wolutik che kikoib climate change. En koborutyet kou, El Nino floods nekibo kenyit 'ab 1998 nekiwech emet nenyon ak kemeut ne kiisubu, ak hurricane nikikim ochei en kenyit 2004 kokiibu ngalek 'ab global warming. Alak che imuche kobor kole kokoet global warming ko istoet 'ab glaciers en mt. Kenya, wallet 'ab weather nebo emet, inoniton kokobos rurutik en minutik en Kenya, yamet 'ab oinoshek ak taboitishek, ak alak che chang'.

En newsletter nebo arawaniton keyome keker kele kakinetishe agobo ngalek 'ab global warming ak ole kikoorondo climate nebo emet nyon.

Kinomen keororu maana chebo ngalek ak koborutik kwai ak ole toretito ketik guk kobos global warming en emet.

## Global warming ko ne?

Global warming komaanishoni kole teset 'ab burgeyet en ng'wandet, ne en let koyoe climate en emet kowalak. Yon burgei emet kotesa robta en emet, storms che kimen, teset 'ab ke en sea level, kokoyomso minutik, ak tuguk alak che kikoweche minutik, tyong'ik, ak kimugul met. Yon kangalal kipsomaninik agobo climate change, ko orogenet nywai akobo global warming ko angamun en tuguk che yoe kimugul-met ak tuguk che yachen che ibu global warming ak wallet 'ab ole tebto emet.

## Tesok sei burgeyet en ng'wondut?

Wou noton! Kogoyet burgeyet en ng'wondut en 1°C en kenyishek 100 che kokobata. Che cheng' en kipsomanik chebo science en ng'wondut koite kole tuguk che yoe bik ko choton che kokotes burgeyet en ng'owondut, kou belet 'ab fossils cheu coal, mwanik, ak koriswek che kilolen maat, ak tilet 'ab ketik ak osnoshek ak ole-kiboishoitoen imbarenik chok.

## Ne Greenhouse Effect ?

Greenhouse effect ko teset 'ab burgeyet en ngwony angamun en koriswek che miten en angani, chekibore greenhouse gases, cheu carbon dioxide, nitrous oxide, sulphur dioxide, ak methane trap energy chebunu asita. tuguk che ibu carbon kou : tilet 'ab osnshek, koriswek chebunu factories, koriswek chebunu karishek, koriswek chebunu kwenik yon kakibel anan ko makaa ak belset 'ab osnoshek.

## Ne hatari chebo global warming?

- Tesoksei betet 'ab bek en emet ak kotesa imbarenik che yomyotin.
- Tesoksei mionwokik en emet, cheu malaria. Yon katesta emet koburgeit, koigu ole menye mosquitoes, aka en let kotes mionwokik chebo malaria. Familia che chang' ak institutions che chang' komuche ko affectenak, kora kobosoksei kenyishek che kipkosobei, ak kotesak mionwokik en logok.
- Boset 'ab rurutik en komoswek 'ab tropical ak subtropical countries, sanasana ko en emotinwek che miten en east Africa. angamun en robta ne koktesak ak tyongik che ibu mionwikik che kokochang'a, komuche kobosok omitwokik en emet ak en let kotesak pananda ak rubetnen families ak kokwotinwek.
- Teset 'ab ke en beishek 'ab omitwokik. Angoteseta kobosoksei rurutik en imbarenik ak kotutukinegitun omitwokik, kotesoksie beit 'ab omitwokik en ngwondut ko mugul.
- Wolutik che yechen en productivity ak composition nebo ecological systems sanasana en osnoshek. Komoswek che ilibu bek sanasana osnoshek ak tulonok kotesa ta koyomdos. Inoniton kobose bek che katakiboishen en irrigation ak che katokiboishen en dams ak reservoirs. Inoniton kobose hydroelectric power en emet. Industries che choket, sipitalishek ak institutions alak che boishen sitimet koigu affected saidi. Bek kora che kiibe ak pipushek koba townishek ak resob kobosoksei.
- Bik Millionishek komiten en hatai nebo flooding ak landslides, ne ibu robwek chechang',





en coastal areas, ak teset 'ab levelit 'ab sea.

### Otertoi ona global warming'?

Min ak irib ketik!

Kou ye kakemwa en barak yu, carbon dioxide ko agenge en koriswek che sababishoni global warming. Ketik kogule carbon dioxide yon yoe photosynthesis ak kokonor en tigitik, temenoik ak ng'ung'unyek ko cellulose carbon. Lakini yon kakibel ketik koisto carbon ichukaniton koba hewani kora.

### Kiingen ile imuche ketit kochob micro climate?

Ketik ak sokekwei kotere ngwony asi' kokaititit. Koibu uronok. Kora uronok'chuton kotere bek che miten en ng'weny komala asista. Yon kakaititit ng'weny kotere bek komaistoge en ngweny'. Inoniton komaanishani kole ketik che miten en koreng'ung kotese bek che miten en ng'ungunyek, ak kotoret kotagobur bechoton en ngungunyek.

## Thinning ak pruning nebo ketikuk asi ibor saidi.

**E**n TIST, kogikegonu ge' kemin ketik chebo TIST age kebogochi ketichuton koyechegitun got koiit kenyishek 30 asi gekese. Niton ne iborwech maana nebo lewenet 'ab ketik che kimine en imbarenikchok. Lakini, thinning ak pruning kootoreti ketik kogororongitun ak kkonoyor afya ne tala.

En tugul, maana nebo thinning ak pruning en ketik kokotoret afya nebo age' tugul en ketik, ak afya nebo osnet kotugul. Niton kimuche keyai yon kogilewen ketik che'gororon en osnet. Chebo species che agetugul, kou, hardwood, grevillea, eucalyptus ak cheborus, ichochuton ko ketik che yechen sanasana, ne tinye age tugul stem ageng'e ne tetayat. ketik komuch kotinye mogutik che terterchin yon koit ngalek 'ab spacing, ole kiminen, ole kimindo (woodlot, nen kakimnichi kwenet en minutik, anan ko'windbreak), ak climate, lakini kisubi oratinwek alak en general.

Asi kemin ketik che kimen ago tinye afya, koyoche gikochin ketik spacing nebo 2 meters. Spacing initon konomege ak ketik chechang' chebo TIST (kou. grevillea ak cypress), lakini ibwat ile ketik alak komogchinge spacing newon (ketik cheu mango ak macadamia,). Kokochinet 'ab spacing ne kararan en ketik kotoretik icheget konyor bek ak omitwogik asi koyechegitun koit olenyounot. Yon tagomengechen ketik kimuche gikochi spacing ne korig'chige. Kotese ta ketik koyechegitun, koyechegitun alak kosir alak, chuton ketik che nyolu kekonor. Yon kiamuoni ketig che kemine keger che kororon ak angot kogigikochi spacing ne kararan. angot komogikochi spacing koyoche icheru alak en ketik che minotin.

Yon kariaamuan ketik che kiisto, itil ketichuton en ng'weny. En wikishek ak orowek

che isubu tilet 'ab ketik, konome ketik chechang' korute en ngweny. Asi iter ketikchuton komorut kora keirie sprouts en ngweny'.

Oret ne nyumnyum ne kimuche kegere angot koyomege ketil ketit, iroo woindonyin ak ketik ch rubege. Yetunet 'ab ketik kotieenge ng'ung'unyek, ak bek, etc. Tugul en tugul yon bo keyit agenge ketik chebo species ageng'e, koyolu kebogochi ketik che yechen korut. Oret age negi kimuche kenaen angot kogararan ketit kegere crown nebo ketit angot komi kwenet en canopy. Ketik chemiten barak crowns en canopy level komuche konyor asista kosir chemiten ng'weny, ago imuche koyechegitun. En let, konyolu kotinye ketik stem ageng'e, ago motinye miondo agetugul. lakini, inonito komoimaanishoni kole nyolu kicher ketik tugul che meng'echen! Nyolu iger ile kenyoru spacing nebo 2 meters en ketik tugul asi konyor ketik afya negararan.

Yon iyoe uchaguzi nebo thinning, ibwaat ile yetunet 'ab ketik kotieenge species nenyin. Angot kkorutu ketit 'ab mango en ole ube ge ak ole miten eucalyptus, komuche komingin ak komochogu mango kosir eucalyptus, lakini komoiboru kole nyolu ketil anngamun mingin! Ketit 'ab mango kobo maana saidi angamun konech omitwogik ak kimuche kialden.

Mango kora kobo maana en minutik alak chemiten en imbarenik. Eucalyptus komuche koyai minutik alak chemiten imbaret komorut komye. Niton kobo maana ibwaat yon ichaguoni ketik chebo thining.

Ketik kotinye manufaa chechang', kotieenge species netinye kotabala borotet nebo carbon. Kou, imuche inyuru urwet en ketik. en yuton konyolu igochi ketik space newon asi koyechegitun ago



konyor asista. Inotin koyoe ketik kosich braches che chang' .

Yon imoche iboishen ketik koik windbreak, imin ketik en rowit noton ak igochi spacing ne noton, lakini min ketik en komoswek tuaan nebo imbaret asi inyoru 'windbreak' nekararan.

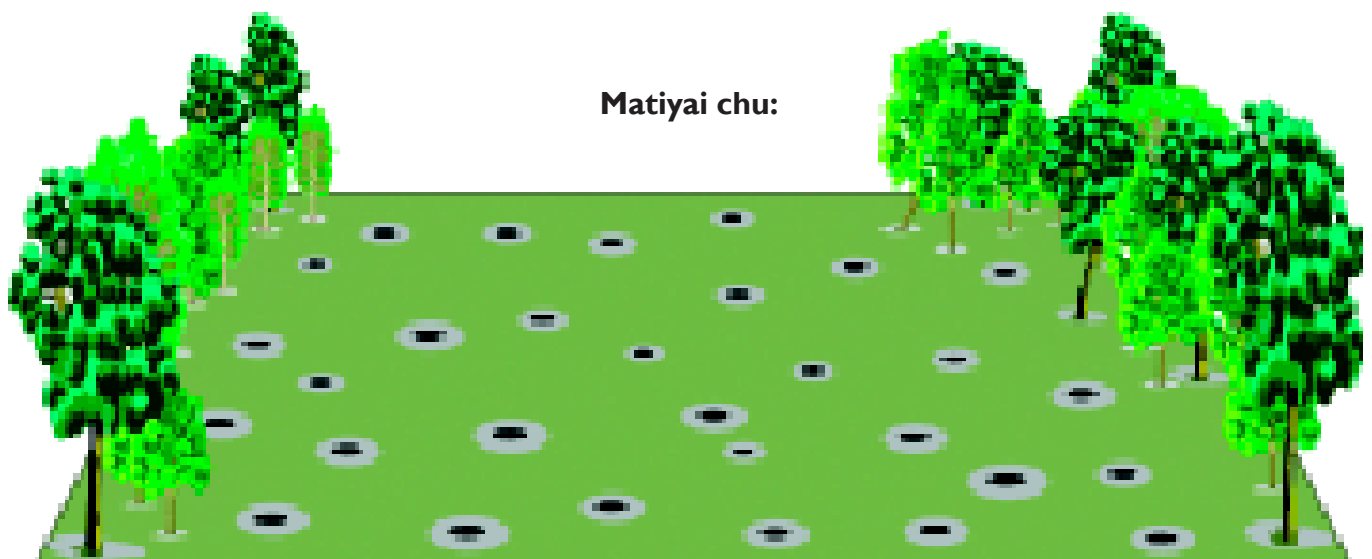
**Che kororon yo iyoe thinning**

- Chomchin ketik koyechegitun koit maturity.
- Thinen kotinyoru stocking negararan en kila acres. En TIST, kimuche kelewen 5% en ketik chechog'et, yon kagobata kenyishek 10, thinning

yon tese ta koyechegitun ak kenyoru income.

- Icherun cho kigomeyo ,chon miandos ,chon nundos , ak chebo quality neya.
- Rib ketik komonyor shida nebo logging .
- Boishen oratinwek chebo low-impact logging yon imugogse.
- Endelesan species che terterchin en imbar.
- Rib osnet ngung komanam mianwogik anan ko insects.
- Otoretge ak agencies chebo serikali keter insect chebo osnet ak mianwigik.
- Ter maat koma nam osnet .

**Matiyai chu:**



**Clear cutting**

**YAI KOU NI.**



**Chaguanet 'ab ketit agenge.**



## Ketik chegorororon en TIST; Chegata chebkokutgei.

**M**iten kweretabgei en niguni ngomutik che tononchin itonwekab emet en agobo (chepkogutgei) miten kesuek alagei chechang mising chebo chepkogutgei, miten kochenge komutik agobo chuton kora komiten kerutik chegonu yon kagimin ketichuton chemuche koyan ngomutik:

- Ketichu koyomse emet amun eebeek chechang
- Keti kwome oguwoindo nebo emet ne mogimuche kegol tuguk alagei
- Moginyorunen sogegik aguwoindo
- Ole miten keti komokinyorunen kiinedobei

Biik chechang komotinye koyan agobo niton amun chome akobo mungaret en tist kotinye kasetab iit agobo nitin, kurubusiek chebo uganda komwoe kole kibosok beek yengigemin chepkogutgei, tist kenya komwochin temik tugul go mamin chepkogutgei en nyanchosiek en oinosiek anan ko ole miten oguwoindo nebo emet, miten imbarenik chegimunche kegolen ketiton imuchi inyoru ngomotiok tab timwek asi kongololul.

Amunee nebo o'eng komoiyono tist kegol ketichuton, temik chechang komuchi koges ketichuton en kasartab kenyisiek (20) komoimuchi tist koyanda koristo ago kimoche ketil kokatar kenyisiek (30) komonyoru kelut biik chegamin iyonotin katikap kaa mising.

Temik chechang kotinye mget kogol chebo kwenik ak bogoinik, ye kiyai kouni ko kogibos kimnotetab timwek, agot konyor tist imbarenik chetinye ketichuton komoiyoni, ogetes minetab ketik ak gerib imbarenik kiyok ak kemin ketigab kaa nito koyanat en mungaretab koristo, omin ketik alagei chemo chepkogutgei

### Nee ketit alagei chegororon

Cheisubu ko ketik chegigolewen temikab kenyatist *Gravillea robusta*, ketitab usisiek (kikuyu – mukima, kipsigis sepesepe).

Keti konyone komie en ole kararan kwoutik go (4 – 5m) motinye konyoset kesuwek kegonori en kasarta negoi keti kogonu teretab ngungunyek, kimine ak minutik alak olemi kogochi minutik komoyomio.

*Cypress or cupressus- kikuyu mutarakwa, kimeru muthithinda, kipsigis- cheborus.*

keti kenyorchi ole kaitit emetab robta, ak ole yamat, keti komomoche ole chang beek mising kesuwetik kimuche kegonor orowek 6 tere kora ngungunyek ago mosing, kimuche kemin ak keti alak, tere koristo, uruwet mogimine ak rurutik.

### Miyeitab ketik

Miyeitab ketik kogochin emet itondo ne kararan ak tuguk cheginyorunen kou;

#### A. Itondab emet

- Ketik kotere ngungunyek, komoib koristo anan ko beek.



- Sogek kotoreti ngungunyek kogochin oguwoindo.
- Igochin ngungunyek konyor beek ak koter beek.
- Igochin tigitik konam ngungunyek asi moib beek.
- Igochin tigitik beek kochut ngungunyek.
- Igochin ketik itondo konyor beek.
- Igochin ketik kounetab koristo.

#### **B. Tuguk che kiboisien ak omitwokik**

- Kinyorunen ketik tuguk chegitegsen.
  - Kwenik.
  - Kerichek.
  - Omitwokik ak che tuga.
- beek ketik ago monyoru itondo ketik.
  - Agot komagisember imbaret koibu susurik che imuchi kwam ketik.
  - Yon tilili imbar komobwone tiyongik cheu ndorok ak susurik.
  - Bwone ketik kochogu.
  - En kasarta ne nuach koegitu ketik.
  - Nyoru asista ketik.
  - Monyoru ketik miyouwek.
  - Itabitu mat komololtose ketik amun momiten timndo.
  - Imberet netilil koboru koribotin tuguk tugul chemiten yoton ago iboru koborunet ne kararan agobo TIST.
  - Imbaret ne karan kogochin koitindet koit ketik en choginet ak en imanit.
  - Ngot imbarenguk asi mochut tuga, nego asi komowech ketikk.

#### **Sember ketiguk en iguni**

Kotomo konyo robta iger ile kemin ketik en imbarenguk kotom iya inguni iyai amun asi konyor robta kominotin sigochon ak kogime kitun amun kosich beek kit nebo komonut ko isember ketik en imbarenguk, chob imbaret kotililit.

#### **Semberet kobo komonut.**

Ketik komoche beek, moche omitwokik, moche lobiyetasi konyo koet, akot komesember kotorer

**Kogiletabgei en boisionik kogonu besiet en igochin ketik kogimegitun ak konyor itondo ne kararan.**