

# Mazingira Bora



# TIST

The International Small Group & Tree Planting Program

www.tist.org

*English Version*

An Environmental, Sustainable  
Development and Community Forestry  
Program.



**Limuru TIST Cluster members after Cluster meeting last month.**

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## Seed Storage & Pre-treatment.

### Seed Storage

- Make sure that if you are transporting fruit from the site of seed collection that you keep them dry, shaded and well ventilated so that the seeds inside the fruit do not spoil.
- Transport your fruit and seeds in woven sacks or baskets. Do not transport them in plastic bags or tins which have no ventilation and can cause the moisture to collect and spoil the items.
- Make sure you have sorted the good quality seed first (see unit 2) and that the seed is clean and dry before being stored. Dry seed rustles and cracks when you shake it. Most seeds need to have been dried in the sun for 2-3 days before they are ready.
- Store your seeds in a dry, shaded place. Use storage material such as cloth sacks or clay pots to reduce the chances of mould. Use airtight containers or jars for high-value seeds, filling your containers completely to reduce air space.
- If you do not have enough seed to fill your containers, fill the gaps with material such as charcoal, rice husks, or crumpled newspaper. These will absorb air moisture.
- Use wooden pallets or poles to make sure the seed containers do not touch the ground (this can make them more susceptible to changes in temperature, damp, pests etc.). If you are using sacks or bags, you can hang them.
- Obtain advice from your nearby small groups and local extension workers to know if you need to use a pesticide or fungicide to protect your particular seeds from pests. For example, neem oil or leaves, gliricidia leaves and soap may offer some protection.
- Remember to check your seeds regularly to ensure they are not being damaged.
- Obtain local information on how long your seeds can be stored for. This is dependent on the species. Many species, if stored properly, can be kept for a year or more.
- You can experiment at different time periods to check the germination rate of your seeds. Pick a small sample of seeds (for example, 100), record the number of seeds chosen, sow them and count how many germinate. If you do this every month, for example, you will be able to see when the seed quality is starting to deteriorate. Share your findings with your cluster.
- The cooler the storage environment, the longer your seeds can be stored for. Ensure the seeds are not exposed to light. If the storage area is too humid the seeds will spoil more quickly.
- Note there is one category of seed called 'recalcitrant seed'. These seeds ideally need to be sown straight away after collection and extraction because they require high moisture content. If they are wrapped in damp cloths they can be stored for a few days up to a week. Recalcitrant seed dies once it is dry. Tree species which are examples of recalcitrant seeds include: *Artocarpus heterophyllus* (jackfruit), *Azadirachta indica* (neem), *Calamus* species (rattans), *Durio zibethinus* (durian), *Eusideroxylon zwageri*



(ulin), *Theobroma cacao* (cacao) and many dipterocarps (*Shorea*, *Hopea*, *Palaquium*, etc).

- Finally, when you are transporting your seeds to the nursery, remember to keep them dry and covered.

### **What kind of pre-treatment might be needed?**

- Sow some seeds and see how long they take to germinate. If they take longer than one week, consider pre-treatment.
- If you are not sure which of the following advice is best, do an experiment and try different pre-treatment techniques and share your findings with your cluster leader to share the best practices.
- If the seeds have a very small or thin coat often no treatment will be needed e.g. *Croton megalocarpus*, *Neem*, *Cassia* species and *Kei apple* can be sown directly into a pot.
- If you have collected fruit, you can soak the fruit for 1-2 days, then get a wire mesh and squeeze the fruit against it to release the seed using water to wash away the fruit pulp e.g. for *Syzium cuminii*, *Dovyalis caffra*, *Trichilia emetica*, *Vitellaria paradoxa*, *Prunus Africana*, *Gmelina arborea* (*gmelina*), *Azadirachta indica* (*neem*) and *Tamarindus indica* (*tamarind*).
- Some fruit just needs the outer layer removing by rubbing together e.g. *Tectona grandis* (*teak*) and *Calamus* species (*rattans*).
- Some fruits have seeds that need to be pounded. After soaking the fruit for 1-2 days, pound the fruit with a pestle and mortar e.g. for *Melia volkensii*, *Melia azedarach*, *Sclerocarya birrea*, *Cordia Africana*.

- Some pods need to dry for 3-5 days (in the semi-shade) and then be threshed to extract the seed e.g. *Leucana* species, *Calliandra calothyrsus*, *Acacia* species, *Sesbania sesban*, *Grevillea robusta*, *Casuarina* species and *Eucalyptus* species.

- Seeds that have thick coats will need some form of pre-treatment. Some need to have their seed coat cracked with a hammer or a stone after drying for 3-5 days to allow water to enter the seed for germination. Seeds should be planted immediately after cracking. Species that may need cracking include *Melia* (*mukau*), *Podo* species, *Croton megalocarpus*, *Adansonia digitata*, *Swietenia macrophylla*, *Delonix regia*. For small, hard seeds place them in a jar lined with sand paper and shake hard, enough to scratch the surface.

- Some seeds just require a small cut in the seed coat to help water infiltrate (*nicking*). Do not cut the part that was attached to the pod or capsule as this part contains the baby plant.

- Some seeds respond well to soaking in hot water e.g. *Calliandra*, most *Acacias*, *Tamarind*, *Leucaena* and *Albizia*. Put the seeds in a container, boil the water and pour it over the seeds. Allow the water to cool remove the seeds from the water after they look swollen.

- Some seeds can be soaked in normal (cold) water for 12-24 hours e.g. *Sesbania*, *Tephrosia*, *Dalbergia* species, *Gmelina*, *Gliricidia* and *Acacia augustissima*. Put the seeds in a container and add the cold water (roughly double the volume of the seeds). Remove any seeds which are floating.

- All seeds, once pre-treated, need to be planted straight away.



# TIST: Seed Collection.

## Seed Collection Questions and Answers

### 1. Which tree species should we grow in our area?

The best ones are those growing naturally in the area. TIST particularly encourages fruit and indigenous trees, and others that will remain in the ground for 20 years or more.

### 2. Are all trees good?

Not necessarily! Some may be difficult to control, be poisonous to your animals or use too much water. Choose ones you know will benefit your area. TIST discourages eucalyptus, for example, because planting these trees can reduce the water table.

### 3. Do trees produce seeds every year?

Most trees do, but observe your local trees to be sure. Some may only produce good quality seeds every 2-3 years.

### 4. Which is a good mother tree to collect seeds from?

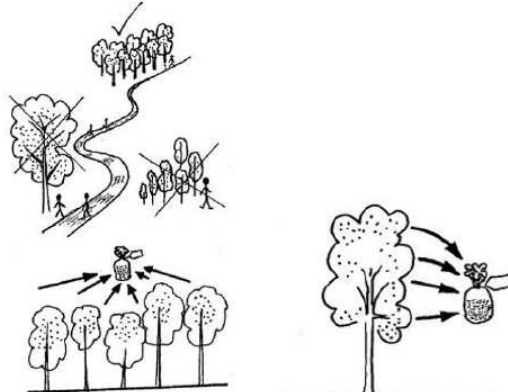
- o Collect seeds from healthy trees that are good seed producers.
- o Avoid isolated trees - in this case the seed is likely to have been self-pollinated which leads to poorer quality seeds.
- o Avoid unproductive trees and ones with a bad shape.
- o It is better to choose a tree in the middle of a healthy group of trees of the same species. Seeds will be higher quality from trees with flowers that are spread out rather than packed closely together.
- o Collect the seed from different places in the crown of the mother tree to ensure more genetic variation.



Selecting a good mother tree for seeds

- o It is a good idea to collect seeds from at least 30 trees of the same species. This helps ensure there is sufficient genetic diversity. Seed trees should be 50m-100m apart to help get more genetic variation.
- o The exact type of tree depends on what you want to use the tree for.
  - For example, good trees for timber are straight, few branches, fast growing, above average height and diameter, resistant to pests.
  - Good trees for fodder should be fast-growing, many branches with multiple stems, and fast growing leaves with the ability to recover after being pruned.
  - Good fruit trees should obviously have good quantities of healthy fruit, a uniform crown with low branches, fast growing.
- o Try to choose seeds from a tree growing at the same altitude, climate and soil type as where you want to plant.
- o Choose a mature tree, not a young one. Mature trees tend to have more seeds and younger trees may produce poorer quality seed.

Source: Robbins, 2004.



### 5. When do we collect the seeds?

- o Learn the time of the year when the seeds are ripe.
- o Ask other local people or observe the tree yourself.
- o Sometimes seeds are ripe when the fruit or pods change color, become dry, or break easily from the branch. Sometimes cones are ready when they change from green to brown. See table at end of the document for examples.



- o Most seeds are ready for collection when they fall from the tree naturally.
- o Remember to ensure you have permission to collect the seeds from the tree owners!
- o When you collect the seeds remember to label your bags and containers with the species name, date of collection and location.

**6. How do we collect the seeds?**

- o It is helpful to clear the area around the bottom of the tree first. Many seeds can be collected from the ground. However, wait for the more mature seeds to fall. Seeds left too long on the ground may perish. Inspect the seeds for insect damage. Seed of *Tectona grandis* (teak), *Gmelina arborea* (gmelina) and *Aleurites moluccana* (candlenut) are commonly collected by this method.
- o The tree can be climbed to collect the seeds, but take care!
- o Some fruit dry, open and disperse their seeds without falling to the ground. These are hard to collect if the seeds are small. Collect the fruit or pods after they are ripe but before they have split or fallen to the ground. Then dry the fruit or pod in a clean, sheltered place to obtain the seeds.
- o Some seeds can be knocked from the tree with a long stick.
- o Try putting a sheet under the tree and gently shaking the tree.
- o For tall trees a simple tool can be made by attaching one end of a pair of shears to a long, strong stick. The other handle can be attached to a rope.
- o Note that some seed species cannot be collected from the ground and have to be collected as wildlings. These are newly germinated seedlings found growing under mature trees. These can be transplanted to pots in your nursery. This is often the best method for trees that are hard to grow in a nursery or whose seeds are hard to collect.
- o All seeds must be removed from their fruit or pods. This can be done by hand, or by putting the fruit/pod in the sun and waiting for it to dry and split.

Collection of *Sesbania sesban* with telescopic shears at Muguga site, Kenya



**7. How can we tell if the seed is good?**

- o Firstly look at the seed and discard ones that are smaller, lighter or a different color than the others. Insects may have damaged some of the seeds.
- o Take a sample of seeds to cut into and inspect the inside for maturity and pest damage.
- o For some hard-coated species floating in water is a good test. Normally the good seed sinks and the bad seed floats (since dead embryos and insect damage causes air pockets).
- o With some seeds you can separate by blowing/ winnowing/sieving to remove the lighter ones.

*Sesbania sesban* – cleaning seed by blowing



*Tephrosia vogelii* – cleaning seed by flotation





- o You can do a simple germination test. Take a small counted number of seeds (20-100). Do any pre-treatment needed. Put the seeds on a damp cloth in a bowl. Cover with another fold of the cloth, moisten it thoroughly and put in a warm (not hot) place. Check the seeds daily for signs of germination and keep the cloth moist. When germination begins keep a record of the day and number. The test usually lasts about two weeks depending on the species. Germination of over 50% means you have good seed. Small-seeded species having only 5% germination are still worth keeping.

**8. Do we plant or store the seeds?**

- o Some seeds do not store well and should be planted straight away (especially soft, fleshy seeds, fruit tree seeds or seeds with high oil content). For seeds with harder coats, the basic rule is to keep the seed clean, dry and cool.
- o Seeds should be removed from the fruit/cone and dried thoroughly. To dry the seeds put them in the sun for 2-3 days.
- o Storing in a paper bag or metal container out of the sun is good (avoid plastic bags as this makes the seed sweat and rot). Make sure the container is clean and airtight.
- o Label the container with the name of the seeds and the collection date and location.
- o Remember that the germination ability of the seeds will decrease with time. If seeds have been stored for too long they may expire.

**9. Do all seeds germinate?**

- o The percentage of seeds, which germinate, varies greatly between species. Some seeds require some form of pre-treatment. This will be covered in the February MB.
- o When you are collecting seeds remember that some die in storage, some die in the nursery, and some die when transplanted. So factor this into your planning when considering the number of seeds your group needs to collect.

**10. How do we plant the seeds?**

- o Some seeds that germinate readily can be sown directly into the field or into pots. Species that require special conditions to germinate are sown into a seedbed first.

- o The time taken for germination depends on the seed type, the temperature, the amount of water available and the age of the seed.
- o Generally sowing is done just before the rainy season starts.
- o As a general guide for direct sowing, seeds should be planted at a depth of two to three times their diameter and should be covered firmly with soil. The soil should then be kept moist.
- o Details on seedbeds are given in a separate training unit.

**11. Do seedlings grow only from seeds?**

- o Some tree species produce root suckers (young plants growing from the mother plant's roots). These can be cut and transplanted.
- o Cuttings can be taken off a young tree branch with at least three nodes or buds. Choose a long, healthy branch and make a clean, angled cut. Strip off the leaves. Plant the cutting into soil at least two nodal lengths deep, with at least one exposed. Keep it watered until sprouting occurs. Seedlings grown in this way will have the same characteristics as the parent tree and can be useful for making sure a productive fruit tree is grown.

**Cluster Meeting Exercise**

At your Cluster Meeting, split the participants into groups of 6-10 people. Ask each group to pick a tree species that is good for TIST – long-term and beneficial to the environment. Remind the groups to pick a leader and co-leader.

The task is to get the following information for each tree species:

- Name of tree
- Description of seeds
- A good local place to find the seeds
- Method of collecting the seeds
- Method of storage
- Method of pre-treatment
- Method of sowing

Give people ten minutes to do the task, then ask each group to report back.

Please record the information in your exercise book and bring it to the next training session.

You may find it helpful to use a table like this:

Cluster Name:						
Tree Name	Seed Description	Local collection point	Collection method	Storage method	Pre-treatment method	Sowing method

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**Kimereu Version**

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**Wanachama wa Limuru TIST Cluster baada ya mkutano wao wa Cluster mwezi uliopita.**

**Inside:** Gwika mbeu na kwithuranira niuntu bwa kuanda. Page 2

TIST: Kuuthurania mbeu. Page 4



# Gwika mbeu na kwithuranira niuntu bwa kuanda.

## Gwika Mbeu.

- Menyeera ati kethira nugukamata matunda kuuma antu aria ukuuthurania mbeu, jeke janyaari na antu kurina kirundu na kuwi na ruugo nikenda mpindi iria iri ndene ya ntunda itithuka.
  - Kamata itunda riaaku na mpindi iri nkuniene kana gikabune. Ugaikamatira kiratasine kia nailoni gitina antu a gukurukia ruugo na aria gugatuma ruuji ruuthurane amwe na kuthukia ntunda na mbeu iu.
  - Menyeera ati ukuathurana mbeu injaga mbele na ati mbeu nitheri na niumi mbele ya gwika. Mpindi injumu niciritaga sauti na kuunika wainania. Mpindi iria nyingi niciendaga kuumua riuene ntuku ijiri gwita ithatu mbele ya cibua cia gwika.
  - Ika mbeu yaku antu gukuumo na kurina kirundu. Ikira nkuniene kana nyongune ya muthetu nikenda uniyia kanya ga kuthuuka. Tuumira mikebe itigutonyithia ruugo riria ugwika mbeu ya goro na ujurie mikebe iu buru nikenda uniyia kanya ka ruugo.
  - Kethira utina mbeu ing'ani kuujiuria mikebe yaku, ujuriria na gintu ja makara, mati ja mucere kana maratasi ja ngazeti. Bibi bikajukia ruuji ruria ruri ruugone.
  - Tuumira mpau kana mbito kumenyeera ati mikebe iu irina mbeu itigutonga nthiguru (guku nigutumaga mbeu ikathukua ni kugaruka kwa murutira, ruuji, na tunyomoo). Kethira uritumira nkunia kana mibuko, curia.
  - Uria kirira kuumania na ikundi bingi biria bigukuiritie na ariti ba ngugi ya gutetheria arimi nikenda umenya uria ugutumira dawa cia tunyomoo na cia iria nikenda umenyeera mbeu yaku kuumania na tunyomoo.
- Mung'uanano, maguta kuumania na muarubaine kana mathangu, mathangu ja muti jugwitwa gliricidia na sabuni imwe nocikue utethio.
- Rikana gutega mbeu yaku o nyuma ya igita ririkai nikenda umenyeera ati itirathuka.
  - Cuaa umenyo kwegie ni igita ring'ana mbeu yaku iumba wikwa. Bubu bukaringana na mthemba jwacio. Mithemba imingi, igekwa bwega, noikare mwaka kana nkuruki.
  - No ugerie gwika igita ria uraja mwanya nikenda utegera ni ririku ritumaga mbeu ikaumanga na mpwi. Jukia mpindi inkai (mung'uanano igana), andika ni ing'ana wathuura, ciumithie na utare ni ing'ana ikauma. Ukaththia uju o mweri, mung'uanani, ukomba kwona riria uthongi bwa mbeu bukambiria kuthira. Gaana jaria ukoona na cluster yaku.
  - O uria antu aria wikite mbeu yaku kurina mpio nou igakara igita riraja nkuruki. Menyeera ati mpindi iu itiki werune. Kethira antu aria ugwika kurina ruugo rurina ruuji rurwingi, mbeu ikathukanga na mpwi nkuruki.
  - Rikana ati kurina mithemba imwe ya mbeu ciitagwa 'recalcitrant' mbeu iji niciendaga kuandwa orio ciothuranua kuuma mitine na ciaritwa ntundene niuntu niciendaga ruuji rurwingi. Cikaogwa na nguo irina ruuji no cikare ntuku inkai mwanka kiumia kimwe. Mpindi iji nicikujaga ciaga cioma. Mithemba ya miti iria iri mthemba juju jwa mbeu ni amwe na *Artocarpus heterophyllus* (jackfruit), *Azadirachta indica* (muarubaine), *Calamus species* (rattans), *Durio zibethinus* (durian), *Eusideroxylon zwageri* (ulin), *Theobroma cacao* (cacao) na mithemba inyingi ya dipterocarps (*Shorea*, *Hopea*, *Palaquium*, na nkuruki).





- Muthia, ukithamia mbeu yaku wikia munandene rikana guciika itina ruuji na cikunikiri.

**Ni uthuraniri bwiku buumba kwendeka?**

- Umithia mbeu imwe na woone ni igita ring'ana ikujukia kuuma. Ciajukia nkuruki ya kiumia, tugania kwithuranira.
- Kethira utikumenya bwega ni uthuraniri buriku kiri njira iji ubati gutumira, geria na njira mwanya na ugaana jaria ukoona na mutongerira wa cluster yaku nikenda ugaana nawe njira iria njega buru.
- Kethira mpindi niinini mono kana irina gikonde gigiceke jaria maingi guti uthuraniri bwendekaga ja mithemba ya *Croton megalocarpus*, *muarubaini*, *Cassia* na *Kei apple* no iandwe mukebene o rimwe.
- Kethira nuuthuranitie matunda, no urinde matunda jau ruujini ntuku imwe gwita ijiri, riu ujukie nkunju uinye matunda nacio nikenda urita mbeu ugitumagira ruuji kurita itunda mung'uanano kiri *Syzium cuminii*, *Dovyalis caffra*, *Trichilia emetica*, *Vitellaria paradoxa*, *Prunus Africana*, *Gmelina arborea* (gmelina), *Azadirachta indica* (neem) na *Tamarindus indica* (tamarind).
- Matunda jamwe nijendaga gikonde kia iguru kiriti na njira ya *gukirithania* matunda jairi mung'uanano mithemba ya *Tectona grandis* (teak) na *Calamus* (rattans).
- Mithemba imwe ya matunda iri mpindi iria ciendaga gukaburwa nainya. Warikia kurinda ntuku imwe kana ijiri, kabura na muti na ntiri mung'uanano *Melia volkensii*, *Melia azedarach*, *Sclerocarya birrea*, *Cordia Africana* .

- Mithemba ingi niendaga kuumua ntuku ithatu gwita ithano (kirundune kirina riu ririkai) riu ikaurwa nikenda mbeu iitwa mung'uanano *Leucana*, *Calliandra calothyrsus*, *Acacia*, *Sesbania sesban*, *Grevillea robusta*, *Casuarina* na mithemba ya mibau.
- Mpindi iria ciri makonde jamanene niciendaga muthemba jwa uthuraniri. Imwe niciendaga gikonde gikaringwa na nondo kana iiga nikenda kiunika ciarikia kuumua ntuku ithatu gwita ithani nikenda ruuji rumba gutonya mbeune nikenda iuma. Mbeu nibati kuandwa orio warikia kuuma gikonde. Mithemba iria yendaga kuunwa ni ta *Melia* (mukau), *Podo* , *Croton megalocarpus*, *Adansonia digitata*, *Swietenia macrophylla*, *Delonix regia*. Mpindi inini cirina gikonde gikiumu niibati gwikwa mukebene juthiuruki na sand paper ndene na jukainainua nainya, mkanka mbeu ikang'arangwa.
- Mbeu imwe niciendaga kugitwa antu anini gikondene nikenda ruuji rumba gutonya. Ukagita aria mpindi iu iragwatene na gicau niuntu aja niu gukaumira.
- Mpindi imwe niciendaga kurindwa ruujine rwa mwanki ja *Calliandra*, *Acacia* iria nyingi, *Tamarind*, *Leucaena* na *Albizia*. Ikira mbeu mukebene na ucamukie ruuji riu witurire mpindi iu. Eteera ruuji rwore riu wite mpindi ruujine ciakara jaka ciimbi.
- Mpindi imwe no cirindwe ruujine rwa mpio mathaa ikumi na jairi gwita mirongo iiri na janna mung'uanano *Sesbania*, *Tephrosia*, *Dalbergia*, *Gmelina*, *Gliricidia* na *Acacia augustissima*. Ikira mpindi iu mukebene na wongeere ruuji rwa mpio mwanka rukinye maita jairi aria mpindi ikinyi. Rita mpindi iria cikwerera.
- Mpindi cionthe, ciarikia kuthuranirwa, niciendaga kuandwa orio



# TIST: Kuuthurania mbeu.

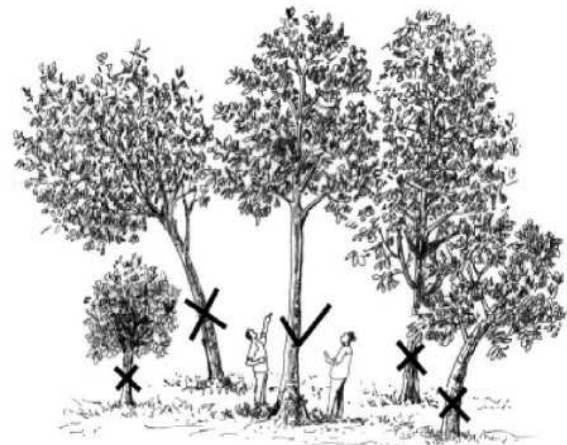
**Biuria na macokio kwegie kuuthurania mbeu.**

**1. Ni miti mithemba iriku tubati kuanda ndene yaa ntuura yetu?**

Miti iria miega buru ni iria ikuraga yongwa ndene ya ntuura iu. TIST niikagira inya mono uandi bwa mitunda na miti ya gintwire, na ingi iria igakara muthetune miaka mirongo iri kana nkuruki.

**2. Miti yonthe ni imiega?**

Ti mwanka! Miti imwe no igie inya gwika iria ukwenda niuntu bwa guciarana, no ithirwe iri sumu kiri ndithia ciaku kana igatumira ruuji rurwingi. Taara iria wiji ikaleta baita kiri ntuura yaku. Kujukia mung'uanano, TIST niregaga mibau, niuntu uandi bwa miti iji nobunyiye ruuji ruria ruri nthiguru ya muthetu.



*Kuthuura muti jumwega jwa gwita mbeu*

**3. Miti nithagirwa irina mbeu o mwaka?**

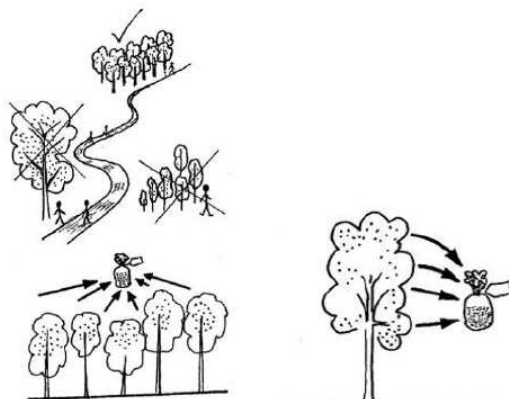
Miti iria mingi niciraga mbeu o mwaka, indi tegera miti iria iandi akui nagwe nikenda umenya na mma. Imwe ithagirwa irina mbeu injega rimwe o miaka iri kana ithatu.

**4. Ni muti juriku juri jumwega jwa kurita mbeu yaku?**

- Uthurania mbeu kuumania na miti iria irina thiria injega iria iciraga mbeu inthongi.
- Ebera miti iria iri yonka – kiri miti iji mbeu yomba mono kwithira yuumanitie na muti gwiciarithia, untu buria buumba gutuma mbeu ikwethirwa citi injega mono.
- Ebera miti itiguciara na iria ikari bubuthuku.
- Ni kaba gutara muti juri gatigati ka miti iri amwe imingi ya muthemba jumwe irina thiria. Mbeu ikethirwa ibui nkuruki kethira niumenie na miti irina maua jaria jatamburuki nkuruki ya jaria jaikonderete amwe.
- Uthurania mbeu kuuma guntu mwanya mutine nikenda umenyeera ati kurina mwanya jwa mantu jaria igakamata kiri muti juju.

- Ni ithuganio ririega kuuthurania miti kuumania na miti nkuruki ya mirongo ithatu mwanya ya muthemba jumwe. Bubu nibutethagia kumenyeera ati kurina mwanya kiri miti iria ikaumania na mbeu iu. Miti ya kurita mbeu nithirwe itaarenie mita mirongo itano kana igana nikenda umenyeera ati kurina mwanya.
- Muti juria jungwa ukathuura jukalingana na niatia ukwenda kujutumira.
- Mung'uanano, miti imiega ya mpau ni imitamburuku, irina biang'i bibikai, igukura ntuti, irina uraja na warie bwa miti ya kawaida, ikuumba gukabana na tunyomoo turia tuthukagia imera.
- Miti imiega ya kuriwa ni ndithia nibati kuuma na ntuti, irina biang'i bibingi na mathangu jagukuranga na jakumba kuumanga jagitwa.
- Mitunda imiega nibati kwithirwa irina matunda jamaingi jari na thiria, muti jurina mathangujang'anene kuunthe na biang'i biri nthiguru, ikuumanga na mpwi.
- Geria kuthuura mbeu kuumania na miti iumite antu kung'uanene, kurina rera ing'uanene na muthetu jumwe na aria ukwenda kuanda muti jwaku.
- Taara muti jukuri, ti jumwithi. Miti ikuri niithagirwa irina mbeu inyingi na miti iminini noiciare mbeu itiuma muti juthongi ja ng'ina.

**Kiumo: Robbins, 2004.**



**5. Niri tuuthuranagia mbeu?**

- Menya igita ria mwaka riria mbeu ithagirwa igundi.
- Uria antu bangi ba ntuura iu kana utege muti gwengwa.
- Rimwe mbeu nigundi riria gitunda kana giti kiagarura rangi, kioma kana kiaunika na uthu kuuma kiang'ine. Rimwe, makonde jari tayari



riria jagarura rangi kuuma green gwita brown. Tega mantu jaria jaandiki aja nthi kenda wona mung'uanano

- Mbeu iria nyingi ciri tayari kuuthuranua riria yagwa yongwa kuuma mutine.
- Rikana kumenyeera ati urina rutha rwa kuuthurania mbeu kuumania na eene miti!
- Warikia kwoja mbeu rikana kuandika miuko yaku riitwa ria muthemba jwa muti, tariki ya kwoja na guntu kuria woja.

**6. Niatia tuuthuranagia mbeu?**

- Nibutethagia kutheria akui na rungu rwa muti mbele. Mbeu inyingi no yojwe kuuma muthetune. Indi, etera mbeu iria ikuri bwega cigwe mbele. Mbeu igatigwa muthetune igita riraja nithukaga. Tega mbeu bwega itikethirwe ithukitue ni tunyomoo. Mbeu cia *Tectona grandis* (teak), *Gmelina arborea* (gmelina) na *Aleurites moluccana* (candlenut), niuthuranagua mono na njira iji.
- Nowitie muti kuuthurania mbeu, indi menyeera!
- SoMatunda jamwe nijoomaga, jakaruguka na kunyagia mbeu jatigwite muthetune. Mbeu iji ciri inya kuuthurania mneu ikethirwa inyii. Uuthurania matunda na macau jaria jagundi indi mbele ya jaruguka na jagwaa nthiguru. Riu uumie gitunda kana gicau antu atheru na arina kirundu kurita mbeu.
- Mbeu imwe no ciringwe kuuma mutine ugitumagira muti jumuraja.
- Geria gwita gitambaa rungu rwa muti riu winainie muti mpaari.
- Kiri miti imiraja gantu ga kurita no kathithue na uthu gukurukira kuugera rutere rumwe rwa muti jumuraja na jwina inya magasi ja kugita. Rutere rungi noruogerwe kiri murigi.
- Menya ati mbeu mithemba imwe itiojwa nthiguru na no mwanka yiuthuranue iumite yongwa. Mbeu iji ciumaga ikaa tumiti tutunini rungu rwa muti juria iumenie naju. Iji noithamirue mibukone ndene ya munanda jwaku. Iji niyo njira iria njega buru kiri miti iria iri inya kuumithia munandene kana iria mbeu itiuthuranagua na uuthu.
- Mbeu cionthe no mwanka ciritwe matundene kana macaune. Bubu nobuthithue na njara, kana gwika riuene na gwetere jauma na gwatuka.

Collection of *Sesbania sesban* with telescopic shears at Muguga site, Kenya



**7. Niatia tumba kumenya kethira mbeu nibui?**

- Mbele tega mbeu na ute iria cinyii, ciuthi kana cirina rangi mwanya na ingi. Tunyomoo twomba kwithirwa tuthukitie mbeu imwe.
- Juukia mbeu inkai na ugite riu utege ndene kethira niikuri na kethirwa niriitwe ni tunyomoo.
- Kiri mithemba imwe iria irina gikonde gikiumo, kuerera ruujine ni kithimi gikiega. Kawaida, mbeu injega niinamaga nthi na inthuku niereraga (niuntu mbeu inkuo na kurumua ni tunyomoo nikuretaga mibuko ya ruugo).
- Mbeu imwe no uuge/ ukeera/ugachunka nikenda wita mbeu iria mbuthu.

*Sesbania sesban* – cleaning seed by blowing



*Tephrosia vogelii* – cleaning seed by flotation





- No uthithie kithimi gikiuthu gia kumenya kethira mbeu ikauma. Jukia namba intare ya mbeu (mirongo iiri giwta igana).Thithiria mantu ja kuthuranira jaria ubati. Ikira mbeu gitambaene kirina ruuji na wikira mbakuline. Kunikira na gitambaa kingi, giake ruuji bwega na wike antu kuri na kutira (ti mwanki).Tegera mbeu ntuku cionthe nikenda woona kethira niikuma na wike gitambaa kirina ruuji rionhte. Riria mbeu ikaambiria kuuma, ika rekondi ya ntuku na namba. Kithimi giki nikia igita ria biumia biiri kulingana na muthemba. Kuuma gwa nkuruki ya gicunci kimwe kiri biiri ni kuuga urina mbeu injega. Mithemba ya mbeu inini irina gicunci kia mbeu ithano kiri igana niibati gwikwa.

**8 Tuike kana tuande mbeu?**

- Mbeu imwe itikaraga bwega na niibati kuandwa orio (mono mbeu iria iri imbuthu na irina matunda, mbeu ya mitunda kana mbeu irina maguta jamaingi. Kiri mbeu iria cirina gikonde gikiumo, watho ni gwika mbeu itheri, iumi na irina mpio.
- Mbeu niibati kuritwa kuumania na gitunda na cikomua bwega. Kuumia mbeu, miike riuene ntuku ijiri kana ithatu.
- Gwika mbeu karatasine kana gikebene gia cuuma kuraja na riuu ni gukwega (ebera maratasi ja nyoni niuntu jaja nijatumaga mbeu ikathithina na ikoora). Menyeera ati mukebe juri jumutheru na jutigutonyithia ruugo.
- Andika mukebe muthemba jwa mbeu na ntuku na antu a kwojana.
- Rikana ati kuumba kwa mbeu kuuma gukanyia o uria igita rigwita na mbele. Kethira mbeu niiki igita riraja, no ithuuke.

**9. Mbeu cionthe niciumaga?**

- Gicunci kia mbeu, kiria kiumaga, nikiringanaga na muthemba. Mbeu imwe niciendagwa kwamba kuthuranirwa. Jaja jakethirwa jari kiri Mazingira Bora ya mweri jwa liiri.
- Riria ukuuthurania mbeu rikana ati imwe nikujaga igitene ria gwika, ingi ndene ya munanda, na ingi igitene ria kuthamiria muundene. Kwou, ikira jaja mubangone riria ukwenda kumenya ni mpindi ing'ana gikundi giaku kibati kuuthurania.

**10. Niatia tukaanda mbeu iu?**

- Mbeu imwe iria iumaga na uuthu no iandwe muundene kana mibukone o rimwe. Mithemba iria iendaga mantu mwanya nikenda iuma niandagwa munandene mbele.

- Igita riria rijukagua kuuma niriringanaga na muthemba jwa mbeu, murutira, ruuji ruria rurio na ukuru bwa mbeu.
- Mbeu iandagwa mwambirio jwa mbura.
- Ja mwongozo riria ukuanda muundene o rimwe, mbeu nibati kuandwa nthiguru maita jairi kana jathatu warie bwa mbeu na niibati gukunikirwa bwega na muthetu. Muthetu riu nijubati gwikwa jurina ruuji.
- Mantu jegie minanda jakaejanwa kiri uritani bungi.

**II. Miti yumithagua aki kuumania na mpindi?**

- Mithemba imwe ya miti niumaga miti ingi kuumania na miri ya muti jou ng'ina. Iji no igitwe na ikathamua.
- Gicunci nokigitwe kuumania na kiang'i gitikuri aria kurina ndungu ithatu kana nkuruki. Taara kiang'i gikiraja, kirina thiria na ugite o rimwe. Rita mathangu jonthe. Anda gicunci giki muthetune ndungo ijiri kana nkuruki ciri nthiguru ya muthetu , kuri na imwe kana nkuruki itigi iguru. Menyeera ati kurina ruuji rionthe mwanka woone jukiauma. Miti iria iumithitua na njira iji ikethirwa ikari umwe ja miti Iria iumenie nayo na njira cionthe na nioitethie mono riria ukwenda kumenyeera ati mutunda juguciara bwega jukuuma.

**Ngugu iri cluster ibati kuthithia mucemanione**

Mucemanione jwenu jwa cluster, gaania amemba ikundine birina antu batantatu gwita ikumi. Uria o gikundi kuthuura muthemba jwa muti juria jubui kiri TIST- jwa igita riraja na jurina baita kiri naria kubuthiurukite. Rikania ikundi kuthuura mutongerira na mutetheria wawe.

Ngugi ni kuuthurania umenyo kwegie o muthemba jwa muti:

Riitwa ria muti-Mbeu uria ikari - Antu aega akui aria mbeu iu yumba kuuma-Njira ya kuuthurania mbeu - Njira ya gwika mbeu-Uthuraniri buria mbeu igwitia- Njira ya kuumithia

Nenkanira ndaika ikumi cia kuthithia ngugi, riu uurie o gikundi kureta macokio.

Aandikeni mantu jaja ndene iukune rienu na burete mucemanione jou jungi jwa uritani.

No bwone bugitethia kuandika na njira iji:

Riitwa ria Cluster:						
Riitwa ria muti	Mbeuuria ikari	Aria mbeu iriti	Njira ya kuuthurania mbeu	Njira ya gwika mbeu	Uthuraniri buria mbeu igwitia	Njira ya kuumithia

# Mazingira Bora



# TIST

The International Small Group & Tree Planting Program

www.tist.org

**Kikuyu Version**

An Environmental, Sustainable  
Development and Community Forestry  
Program.



**Wanachama wa Limuru TIST Cluster baada ya mkutano wao wa Cluster mwezi uliopita.**

**Inside:** Uigi mwega wa mbegu na guthondeka. Page 2

**TIST:** Ungania wa mbegu. Page 4



# Uigi mwega wa mbegu na guthondeka.

## Uigi wa mbegu.

- Tigirira ati angikorwo niurathamia matunda kuma kuria uronganiria niwagiriirwo ni kwamba kumomithia na kumaiga kiiruruini na makorwo na riera ria kuigana na ndukamathukie.
- Kuaa matunda maku na makonia ma gutumwo kana ikabu. Ndumamakuue na makonia ma plastic kana mikebe iria itari na kundu gwa kuingiriria riera na gutuma magie na ugunyu muingi na mathuke.
- Tigiriira niwacagura matunda maria mega mbere na makorwo mari matheru na makomithio mbere ya gukuuo. Umithia matunda na miatuka riria ukuinainia. Mbegu nyingi citibataraga kumithio riuaini gwa kahinda ka 2-days mbere ya gukorwo cirri njega..
- Iga mbegu cirri nyumu na cirri hehu. Huthira indo njega cia kuiga ta itambaya kana nyungu cia ndoro niguo unyihie kuguma. Huthira indo citangiingiria riera kana mikebe ya kuiga mbegu, na uihurie mikebe biu niguo gutikagie na mwanya wa riera.
- Angikorwo nduri na mbegu njiganu cia kuihuria mukebe, huthira indo ingi ta makara, mahuti ma mucere kanamaratathi ma ngathiti niguo cihote kunina ugunyu.
- Huthira turubau kuigirira niguo gutigirira mikebe ndiikarite thi niguo citikanyitwo ni tutambi kana mirimu na ugaruruku wa riera. Angikorwo urahuthira makonia noumacurie iguru.
- Geria gwetha utaari kuma kuri ikundi iria cirri kwanyu niguo umenye kana niukuhuthira dawa cia kuingata tutambi niguo ugitire mbegu ciaku. Kwa muhiano, maguta kana mahuti ma neem, mahuti ma gliricidia na thabuni nocihuthikekugitira
- Ririkana kurora mbegu ciaku maita maingi niguo gutigirira citirathukio.
- Geria gwetha uhoro wa kuria uri wigii kahinda karia mbegu cingiigwo. Uu nikuringana na muthemba wa mbegu. Mithemba miingi ingiigwo wega niikaraga miaka miingi.
- Nougérie kurora mahinda maingi niguo umenye cimera na njira iriku. Cagura mbegu cia kugeria ta 100, andika muigana uria woya, handa na ucitare na wone nicigana cikumera na ungika uu o mweri kwa muhiano niukwona riria na uria mbegu ciaku cingimera na uheane uhoro uyu thiini wa cluster yanyu.
- O uria haria uigite mbegu hari hahehu noguo mbegu ciaku ciguikara na utigirire mbegu ciaku citinanyitwo ni riuu. Angikorwo kuria uigite nikugunyu niciguthuka naihenya.
- Ririkana kuri na mithemba iiri ya mbegu, “recalcitrant seed”. Mbegu ici ciagiriirwo ni kuhandwo marimaini thutha wa kunganio tondu cibataraga ugunyu muingi. Cingikunjwo na gikuo kigunyu nocikare ta wiki kana mieri.
- Recalcitrant cikuaga riria cioma. Mithemba ya miti iria ni ya recalcitrant ni *Artocarpus heterophyllus* (jackfruit), *Azadirachta indica* (neem), *Calamus species* (rattans), *Durio*



zibethinus (durian), *Eusideroxylon zwageri* (ulin), *Theobroma cacao* (cacao) and many dipterocarps (*Shorea*, *Hopea*, *Palaquium*, etc).

- Muthia, riria urakuua mbegu nginya nathariini ririkana guciiga cirri ngunike wega.

### **Ni njira iriku cia guthondeka mbegu ciagiriire?**

- Amba uhande mbegu imwe niguu wone kahinda karia cikwoya kumera. Angikorwo nicikwoya kahinda kanene niwagiriirwo ni gucithondeka. Angikorwo nduri na uuma ni njira iriku njega geria njira ngurani na wone niiriku njega ya guthondeka na uheane uhoru ucio kuri cluster yanyu.
- Angikorwo mbegu cirri nangothi huthu nikuuga ndurabatara guthondeka kwa muhiano *Croton megalocarpus*, neem *Cassia* na Kei apple nocihandwo imwe kwa imwe marimaini.
- Angikorwo niunganitie mbegu, nourinde maaiini gwa kahinda ka 1-2 days thutha ucoke wethe waya ya gicungina wanike mbegu ho na uhihinye niguu ciime wega ucoke uhuthire maai gucithambia ta *Syzium cuminii*, *Dovyalis caffra*, *Trichilia emetica*, *Vitellaria paradoxa*, *Prunus Africana*, *Gmelina arborea* (gmelina), *Azadirachta indica* (neem) and *Tamarindus indica* (tamarind).
- Matunda mangi mabataraga o gukumuthwo niguu mambegu ciime ta *Tectona grandis* (teak) and *Calamus species* (rattans).
- Mangi nimakoragwo na ngothi ibataraga kunurwo thutha wa kurinda maai-ini gwa kahinda ka 1-2 days, uraga makoni na ndiri ta *Melia volkensii*, *Melia azedarach*, *Sclerocarya birrea*, *Cordia Africana*.

- Makoni mamwe nimagiriirwo ni kumithio 3-5 days kiiruruini na ningi marutanio niguu mbegu ciime ta *Leucana species*, *Calliandra calothyrsus*, *Acacia species*, *Sesbania sesban*, *Grevillea robusta*, *Casuarina species* and *Eucalyptus species*.
- Mbegu iria cirri namakoni momu niciagiriirwo guthondekwo. Imwe ciagiriirwo kuragwo na nyundo kana ihiga thutha wa kurindwo maai-ini thiku 3-5 niguu maai maingire wega na cihote kumera wega. Mbegu ciagiriirwo nikuhandwo imwe kwa imwe irimaini thutha wa kuragwo na mithemba iria yagiriirwo ni gwikwo uguo ni (mukau), *Podo species*, *Croton megalocarpus*, *Adansonia digitata*, *Swietenia macrophylla*, *Delonix regia*. Niundu wa mbegu iria nyumu na ni nini, ciikire mukebeini na uthuke nginya cikue.
- Mbegu ingi cibataraga o gutinio hanini. Ndugatinie mwena uria uri na kamera tondu hau niho mbegu imeragira.
- Mbegu ingi nicikoragwo cirri njega riria warinda maaiini mahiu ta *Calliandra*, most *Acacias*, *Tamarind*, *Leucaena* and *Albizia*. Ikira mbegu mukebeini, therukia maai na uitiririe mbeguini. Eterera maai mahore na urute mbegu thutha wa kuimba.
- Mbegu ingi nociikirwo maaiini mahehu mathaa 12-24 ta *Sesbania*, *Tephrosia*, *Dalbergia species*, *Gmelina*, *Gliricidia* and *Acacia augustissima*. Ikira mbegu mukebeini na wikire maai mahehu na wongerere mangi tamo ucoke wehuti mbegu iria cikureera.
- Mbegu ciothe, riria ciathondekwo ciagiriirwo ni kuhandwo orio.



# TIST: Ungania wa mbegu.

*Ciuria na macokio ci unganiam wa mbegu.*

## 1. Ni mithemba iriku ya mitiingikura kwanyu?

Mithemba iria miega ni iria ikuragia na njira cia kiimerera. TIS makiria ni hinyagiriria uhandi wa miti ya matunda nay a kinduire na ingi iria ingihota guikara gwa kahinda gakirite miaka 20.

## 2. Miti yoothe ni miega?

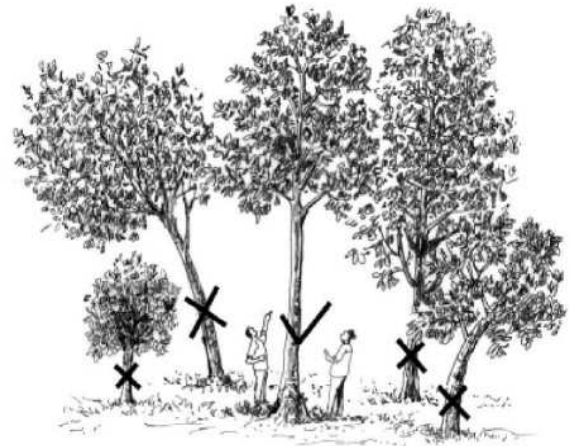
To muhaka! Miti ingi niiremaga gutungatika na ingi igakorwo na thumu kuri nyamu na ingi ikahuthira maai maingi. Thuura miti iria ingiteithia kwanyu. TIST niigiritie miti ya mibau kwa muhiano tondu niinyihagia maai tiiri-ini

## 3. Miti niirutaga matunda o mwaka?

Miti miingi niguu iikaga, no geria kurora kwanyu na miti ya kuu niguu umenye wega. Miti ingi ibataraga miaka 2-3 niguu irute mbegu njega.

## 4. Ni muti uriku mwega wa kunganiria mbegu?

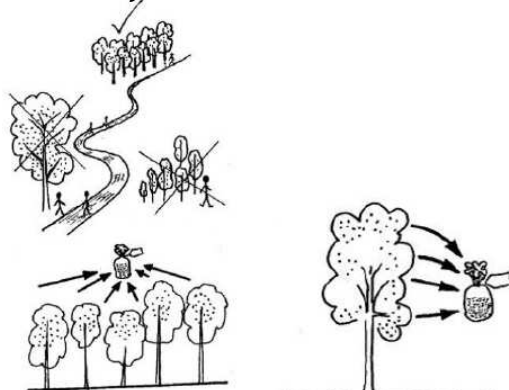
- Ungania mbegu kuma mitiini iria iri na hinya mwega na iria iri na mbegu njega
- Ndukonganie kuma kuri miti iri iika handu hamwe tondu mbegu ciaguo nocikorwo citaciarithanitio
- Ndukonganie kuma kuri miti itari na ugima mwega
- Ungania kuma kuri miti iria iri gatagati-ini ka iria ingi ya muthemba umwe. Mbegu nicikoragwo cirri njega makiria riria mahua mayo mariruka wega
- Ungania mbegu kuma miena ngurani niguu ugie na mithemba miingi



*Guthura muti mwega wa kugetha mbegu*

- Niwega kungania mbegu kuma kuri mithemba 30 na makiria ya miti niguu ukorwo na rurira rwega, miti ya mbegu yariirwo nigukorwo na utaganu wa 50m-100m niguu ikure wega
- Muti uria mwega uringanaga nakiria urenda kuhuthira muti ucio nakio
- Kwa muhiano, miti miega ya mbau yagiriirwo nigukorwo iri mirungaru, ikorwo na honge nini na ikure naihenya na utungu muigananiru ohamwe na uraihu na iingate tutambi
- Miti miega ya mahuti ma mahiu yagiriirwo ni gukura naihenya na honge nyingi na mahuti makorwo magikura naihenya thutha wa gucehwo
- Miti miega ya matunda yagiriirwo nigukorwo iri miega na mawega ma miti ya matunda
- Geria guthuura mbegu kuma mitiini iria ikurite na riera rimwe na muthemba umwe wa tiiri na kuria urathii kuhanda.
- Thuura miti iria ikinyitie ugima iria itari miithi. Miti migimaru niikoragwo na mbegu nyingi na miti mithi ikaruta mbegu nini.

Source: Robbins, 2004.



## 5. Twagiriirwo ni kungania mbegu ri?

- o Rora ihinda ria mwaka riria mbegu cirri nguru
- o Uria andua nagi kana wirorere miti.





- Maita maingi mbegu cikoragwo cirri nguru riria matunda merua na macenja rangi, moma na magua thi. Maita mangi cikoragwo cirri njega riria makoni mavenjia kuma green nginya brown. Roar maandiko muico wa ngathitimbegu nyingi cikoragwo cirri njega riria ciagua kuma mutiini
- Ririkana gutigirira ati uri na rutha rwa kungania mbegu kuma kuri mwene miti
- Riria wongania mbegu ririkana kwandika haria wekira na ritwa, muthenya na kuria wongania

**6. Twagiriirwo nikungania mbegu atia?**

- Gutheria haria uronganiria mbegu niguteithagia. Mbegu nyingi nociunganio kuma thi. No ningi, eterera mbegu iria cigimarite cigue. Mbegu iria cिकारिते muno thi nicithukaga. Roar wega kana mbegu nithukie ni tutambi. Mbegu cia *Tectona grandis* (teak), *Gmelina arborea* (gmelina) and *Aleurites moluccana* (candlenut) ciunganagio na njira ino.
- No uhaice muti iguru utue mbegu no wimenyerere!
- M atunda mangi momaga, magathanduka mbegu ona matakugua thi. Mbegu ici nicikoragwo na hinya kunganika angikorwo mbegu ni nini. Ungania mbegu kana makoni riria cirri njiru no mbere ya cirekanitie na cikagua thi. Umithia makoni niguo uhote guthandura mbegu
- Matunda mangi nouringe kuma thin a muti muraihu
- Geria kwara kinndu gitinaini kia muti ucoke uinainie
- Kuri miti iria miraihu, nouhuthire muti muraihu wohereire kindu
- Ririkana ati mithemba ingi ya mbegu ndingiunganio kuma thi na yagiriirwo ni kunganio wega. Ici ni mbegu iria cimeraga wega iria cimerete na igakura rungu rwa miti minene. Ici nnocimunywo na cihandwo migundaini. Nira ino niyo njega kuri miti iria ikoragwo itagukura wega nathariini kana iria mbegu ciagua cikoragwo na hinya kunganika.
- Mbegu ciothe niciagiriirwo ni kurutwo kuma makoniini. Undu uyu nowikwo na moko kana kwanika makoni riuaini niguo mome.

Collection of *Sesbania sesban* with telescopic shears at Muguga site, Kenya



**7. Tungimenya atia ati mbegu ni njega?**

- Wambere roar mbegu na wehutie iria nini na huthu kana cirri na ngurani ya rangi kumana na iria ingi. Tutambi notukorwo tuthukitie mbegu.
- Oya muhiano wa mbegu na utinie na urore kana nicikinyitie ugima na kana nicithukitio ni tutambi
- Kuri mbegu iria cikoragwo na ngothi nyumu, cikie maaiini niguo ucigeria. Mbegu njega nicirikaga maaini na iria thuku cikareera.
- Kuri mbegu iwe nouganyanie na kuhuhana gucunga niguo wehutie iria huthu

*Sesbania sesban* – cleaning seed by blowing



*Tephrosia vogelii* – cleaning seed by flotation





- No wike magerio manini ma kumerithia. Oya mbegu nini (20-100). Cithondeke wega uria kwagiriire na wikire mbegu nguoini hehu thiini wa bakuri. Humbira na nguo ingi na ureke hakorwo na urugari(ti maai mahiu). Roar mbegu o muthenya kana cirri na dalili cia kumera. Riria ciambiriria kumera,iga namba ya muthenya na namba. Kigerio giki giikaraga gwa kahinda ka ciumia 2 kuringana na muthemba. Kumera gwa gicunji kia 50% mikuuga uri na mbegu njega. Mithemba ya iria ikoragwo na mbegu nini iria iri na kumera gwa gicunji kia 5% no kiega.

**8. Nikuhanda tuhandaga mbegu kana ni kuiga?**

- Mbegu nyingi citikaraga gwa kahinda kanene na ciagiriirwo ni kuhandwo orio(namakiria cirri njigu, iria huthu, cia matunda kana iria cikoragwo na maguta maingi). Mbegu iria cikoragwo na ngothi nyumu, watho ni kuiga mbegu icio cirri theru, nyumu na cirri na riera riega.

**9. Ni mbegu ciothe cimeraga?**

- Gicunjikia mbegu kiria kimeraga kiringanaga na muthemba wa muti. Mbegu imwe nicibataraga guthindekwo mbere ya kuhandwo. Maundu maya nitukamona ngathitiini ya February.
- Riria urongania mbegu ririkana imwe nicikuaga riria ciigitwo, ingi igakua cirri nathariini na ingi cigakua riria urathamia kuma nathari nginya mugundaini. Kwa uguo ikira maundu maya riria urabanga muigana wa mbegu uria ukuhanda

**10. Tuhandaga mbegu atia?**

- Mbegu imwe iria cimeraga naihenya nocihandwo mugundaini. Mithemba iria ibataraga maundu ma mwanya niguu imere ciambaga kuhandwo tutaini mbere.
- Kahinda karia mbegu cioyaga ga kumera karinganaga na muthemba wa, urugari na muigana wa maai na kahinda ka mbegu.

- Uhandi wa mbegu wikagwo mbere ya mbura yambiriirie.
- Ta wato wa kuhanda mbegu, ciagiriirwo ni kuhandwo na uriku wa maita matatu ma utungu wacio na cihumbirwo wega ni tiiri. Tiiri ucio wagiriirwo nigukorwo uri mugunyu.
- Uhoro wa tuta niuheanitwo githomoini kingi.

**11. Mimera ikuraga kuma kuri o mbegu?**

- Mithemba imwe ya miti niiciaraga njahirira na nocitinio na cihandwo ta muti.
- Guceha nogwikwo kuri muti uteri mukuru muno uria uri na marungo matanyihiiire matatu. Thuura karuhonge karaihu na karia kari na hinya na utinie na njira njega. Hurura mahuti na uhande tiiriini na uriku wa marungo meri na iringo rimwe utigitie. Itiriria maai nginya uthunduke. Mimera iria ikuratio na njira ino niikoragwo na mauthi ma muti uria waumite kuriguo na nimwega gutigirira matunda mega nimonekana

**Maundu ma Micemanio ya cluster.**

Thiini wa mucemanio wa cluster, gayania arimi na ikundi 6-10. Uria o gikundi kioye muthemba wa muti uria niwitikiritwi thiini wa TIST uri wa gutuura miaka miingi na ungitethia maria maturigiciriiie. Uria gikundu githuure mutongoria na munini wake.

**Wira ni kungania uhoro wa o muthemba wa miti:**

Ritwa ria muti / uhoro makiria wa mbegu – kuria kwega ungonia muti ucio – njira cia kungania mbegu ciaguo – njira cia kuuiga mbegu – njira ciaguthondeka mbegu na njira cia kuhanda.

Mahe ndagika 10 niguu marikie uguo na ucoke umorie makurehere macokio.

Andika uhoro ucio thiini wa ibuku na ugoka naguo mucemanio-ini ucio ungi

Niwega kuhuthira table tai no.

Riitwa ria cluster:						
Riitwa ria muti	Uhoro makiria wa mbegu	Kuria ungiungania	Njira cia kungania	Njira cia kuiga	Njira cia guthondeka	Njira cia kuhanda

# Mazingira Bora



# TIST

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

**Kiswahili Version**

An Environmental, Sustainable  
Development and Community Forestry  
Program.



**Wanachama wa Limuru TIST Cluster baada ya mkutano wao wa Cluster mwezi uliopita.**

**Inside:** Kuhifadhi na kutibu mbegu kabla ya kupanda. Page 2

TIST: Ukusanyaji wa mbegu. Page 4



# Kuhifadhi na kutibu mbegu kabla ya kupanda.

## Kuhifadhi mbegu.

- Hakikisha ikiwa unahamisha matunda kutoka pahali pa kukusanya mbegu uyaweke yakiwa pakavu, yamefunikwa na kufikiwa na hewa vilivyo ili mbegu zilizo ndani ya matunda ziziharibike.
- Beba matunda na mbegu zako zikiwa katika magunia au vikapu. Usizibebe katika makaratasi ya plastiki au mikebe isiyo na hewa na ambayo inaweza kufanya unyevu kukusanya na kuharibu mbegu hizi.
- Hakikisha umechagua mbegu nzuri zaidi kwanza na kuwa mbegu hiyo ni safi na kavu unapohifadhi. Mbegu kavu hupiga kelele na kuvunjika unapotikiza. Mbegu nyingi huhitaji kukaushwa juani kwa muda wa siku mbili kufika tatu kabla ya kuwa tayari.
- Hifadhi mbegu yako pahali pakavu na penye kivuli. Tumia kifaa cha kuhifadhia kama gunia au chungu cha udongo ili kupunguza uwezekano wa mbegu kuharibika. Tumia mikebe isiyoruhusu hewa kuingia au kutoka unapohifadhi mbegu zenye thamani ya juu, na ujaze mikebe yako kabisa ili kupunguza pahali pa hewa.
- Ikiwa hauna mbegu tosha kujaza mikebe yako, jaza ukitumia kitu kama makaa, maganda ya mchele au magazeti yaliyokunjana. Haya yatanyonya unyevu ulio katika hewa.
- Tumia mbao au fito kuhakikisha mikebe haiguzi chini (jambo hili laweza kuzifanya mbegu kushambuliwa na mabadiliko ya hewa, unyevu, wadudu na kadhalika kwa urahisi. Iwapo unatumia magunia au mifuko, waweza kuining'iniza.
- Uliza mawaidha kutoka kwa vikundi jirani au wafanyikazi wa kilimo kujua ikiwa unahitaji matumizi ya dawa za wadudu kulinda mbegu zako kutokana na wadudu. Kwa mfano. Mafuta au majani ya muarubaini, majani ya gliricidia na sabuni zaweza kukupa ulinzi.
- Kumbuka kuangalia mbegu zako kila baada ya siku chache kuhakikisha hazijaharibika.
- Tafuta ujuzi kuhusu muda mbegu yako yaweza hifadhika. Muda huu hulingana na aina. Aina nyingi, zikihifadhiwa vizuri zaweza kukaa mwaka au zaidi.
- Waweza jaribu muda wenye upana mbali mbali kujua ni mbegu ngapi zinaota. Chukua mbegu chache (kwa mfano, mia moja), andika nambari uliochagua, zioneshe halafu uhesabu nambari iliyoota. Ukifanya jambo hili kila mwezi, kwa mfano, utaweza kujua ni lini thamani ya mbegu yako inaanza kudhoofika. Gawana matokeo yako na cluster yako.
- Jinsi pahali pa kuhifadhi kupo baridi ndivyo muda ambao mbegu yako yaweza kuhifadhiwa huongezeka. Hakikisha mbegu yako haijawekwa palipo na mwangaza. Ikiwa pahali pa kuhifadhi pana unyevu mwingi mbegu itaharibika kwa haraka zaidi.
- Jua kuwa kuna kikundi kimoja cha mbegu kinachoitwa “mbegu kaidi”. Mbegu hizi kwa kawaida huhitaji kuoteshwa mara moja baada ya kukusanywa na kutolewa kwa tunda kwani huwa zinahitaji unyevu mwingi sana. Zikifungwa kwa nguo zenye unyevu, zaweza kuhifadhiwa siku chache ata kufika wiki moja. Mbegu hizi hufa zinapokauka. Aina za miti zilizo mfano wenye mbegu hizi ni pamoja na: *Artocarpus heterophyllus* (jackfruit), *Azadirachta indica* (neem), *Calamus* (rattans), *Durio zibethinus* (durian), *Eusideroxylon zwageri* (ulin), *Theobroma cacao* (cacao) na aina nyingi za aina zinazoitwa ‘dipterocarps’ (*Shorea*, *Hopea*, *Palaquium*, na kadhalika).



- Hatimaye, unapohamisha mbegu kuzipeleka kitaluni, kumbuka kuziweka zikiwa kavu na zimefunikwa.

### **Ni matibabu gani yaweza kuhitajika kabla ya kupanda mbegu?**

- Otesha baadhi ya mbegu ili huoneni muda gani zinachukua kuota. Iwapo zitachukua saidi ya wiki fikiria kuzitibu.
- Ikiwa hauna uhakika ni mawaidha gani hapa ni bora zaidi, jaribu njia mbali mbali za kutibu na ugawane matokeo yako na kiongozi wa cluster yako kuhusu njia bora zaidi.
- Ikiwa mbegu ni ndogo sana au ina ganda nyembamba mara nyingi haihitaji matibabu yoyote kwa mfano aina za *Croton megalocarpus*, *Neem*, *Cassia* na *Kei apple* zaweza kuoteshwa moja kwa moja mikebeni.
- Ikiwa umekusanya matunda, unaweza kuyalowesha majini kwa muda wa siku moja au mbili, halafu uchukue waya na kuitumia kufinya tunda na kutoa sehemu majimaji ili kutoa mbegu ukitumia maji kuosha hayo mabaki ya tunda kwa mfano katika mbegu za *Syzium cuminii*, *Dovyalis caffra*, *Trichilia emetica*, *Vitellaria paradoxa*, *Prunus Africana*, *Gmelina arborea* (gmelina), *Azadirachta indica* (neem) na *Tamarindus indica* (tamarind).
- Baadhi ya matunda huhitaji tu maganda ya juu kabisa kutolewa kwa kuyagwaruzana kwa mfano matunda ya *Tectona grandis* (teak) na *Calamus species* (rattans).
- Baadhi ya matunda huwa na mbegu inayoitaji kugonwa kwa nguvu. Baada ya kulowesha tunda katika maji kwa muda wa siku moja au mbili, bonda tunda kwa mchi na chokaa kwa mfano matunda ya *Melia volkensii*, *Melia azedarach*, *Sclerocarya birrea*, *Cordia Africana*.
- Maganda mengine huhitaji kukaushwa kwa siku tatu kufika tano (chini ya jua lenye kivuli) halafu kufinya kwa kutumia waya ili kutoa mbegu kwa mfano maganda ya *Leucana*, *Calliandra calothyrsus*, *Acacia*, *Sesbania sesban*, *Grevillea robusta*, *Casuarina* na mikaratusi.
- Mbegu zilizo na maganda manono huhitaji matibabu ya aina maalum. Baadhi huhitaji maganda yake kuvunjwa kwa kutumia nyundo au jiwe baada ya kukaushwa ka siku tatu kufika tano ili kuruhusu maji kuingia ili mbegu iweze kuota. Mbegu zafaa kupanda mara moja baada ya kuvunja maganda. Aina ambazo huhitaji kuvunjwa ni kama *Melia* (mukau), *Podo*, *Croton megalocarpus*, *Adansonia digitata*, *Swietenia macrophylla*, *Delonix regia*. Mbegu zilizo ndogo na ngumu ziwekwe katika mkebe uliowekwa karatasi ya mchanga ndani na mkebe utikizwe kwa nguvu hadi ganda likwaruzwe.
- Baadhi ya mbegu huhitaji kukatwa kidogo tu ili kusaidia maji kuingia. Usikate ambapo mbegu ilishikana na ganda kwani sehemu hii ndio iliyo na mmea utakaokua.
- Baadhi ya mbegu hutibika vizuri zinapoloweshwa kwa maji moto kwa mfano *Calliandra*, most *Acacias*, *Tamarind*, *Leucaena* na *Albizia*. Weka mbegu katika mkebe, chemsha maji na uzimwagilie mbegu. Ruhusu maji yapoe halafu utoe mbegu kutoka kwa maji baada yakuona kuwa zimefura.
- Baadhi ya mbegu zaweza kuloweshwa kwa maji baridi kwa masaa kumi na mawili kufika ishirini na manne kwa mfano *Sesbania*, *Tephrosia*, *Dalbergia*, *Gmelina*, *Gliricidia* na *Acacia augustissima*. Weka mbegu katika mkebe na uongeze maji baridi (mara mbili mbegu zilipofika kwa mkebe). Toa mbegu zinazoelea.
- Mbegu zote, baada ya kutibiwa, zahitaji kupandwa mara moja.



# TIST: Ukusanyaji wa mbegu.

**Maswali na majibu kuhusu ukusanyaji wa mbegu.**

**1. Ni aina ipi ya miti tunafaa kukuza katika eneo letu?**

Iliyo bora zaidi mi ile inayokua yenyewe katika eneo hilo, kwa hivyo chagua miti itakayokidhi mahitai yako. TIST sanasana hupendekeza mitunda na miti ya kiasili. Kumbuka kuwa unajitolea kuweka miti yako ikiwa hai kwa muda wa miaka thelathini au zaidi. Chagua ambayo itakupa faida unazohitaji kwa wakati huu; matunda, chakula cha mifugo, udongo bora kutokana na kupunguza mmomonyoko wa udongo au naitrojeni kutokana na miti ya familia ya kunde, kuni kutokana na matawi yaliyopuguzwa na faida nyinginezo.



*Kuchagua mti mzuri wa kutoa mbegu.*

**2. Miti yote ni mizuri?**

Si lazima! Mingine yaweza kuwa migumu kudhibiti, yaweza kuwa na sumu kwa mifugo yako au kutumia maji mengi sana. Chagua unayojua itafaidi inapopandwa.

**3. Ni miti yote uzalisha mbegu kila mwaka?**

Miti mingi huzalisha, lakini angalia miti iliyo hapo ili kupata uhakika. Mingine huzalisha mbegu nzuri tu baada ya miaka miwili kufika mitatu.

**4. Ni mti upi ulio mzuri wa kukusanya mbegu?**

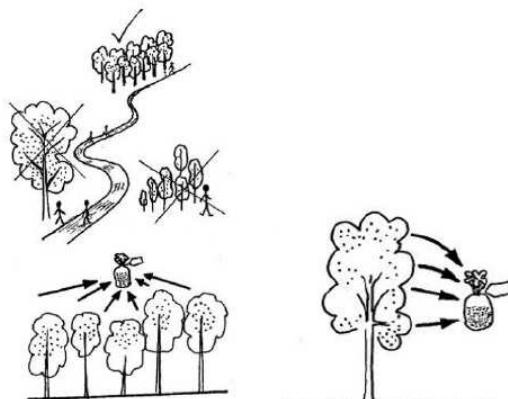
- Kusanya mbegu kutoka kwa miti iliyo na afya ambayo huzalisha mbegu nzuri
- Epuka miti iliyosimama kipweke kwa sababu mbegu yake inauwezekano wa kuwa na mbelewele yakujitegemea ambayo inapelekea mbegu ya hali ya chini.
- Epuka miti isiyozalisha na yenye sura mbaya
- Chagua mti ulio katikati ya mingine yenye afya naya aina moja
- Mbegu kutoka kwa miti iliyo na maua yanayoenea nje itakuwa yenye ubora wa juu badala ya yenye maua yaliyojikusanya pamoja.

- Fikiria unavyotaka kuutumia mti kabla ya kuchagua aina ya mti. Kwa mfano, miti mizuri ya mbao ni iliyonyooka, iliyo na matawi machache na inayokua kwa upesi. Miti mizuri kama lisho kwa mifugo ni inayokua kwa upesi, yenye matawi yenye mashina kadha, na majani yenye kukua haraka yenye uwezo wa kujitibu haraka baada ya kupuguzwa. Miti mizuri ya matunda kwaudhahiri inafaa kuwa na matunda mengi yenye afya!
- Chagua mbegu kutoka kwa mti unaokua katika eneo lililo katika muinuko na udongo sawa na unapotaka kupanda.
- Chagua mti uliokomaa, si ulio mchanga.

**5. Tukusanye mbegu lini?**

- Jua wakati wa mwaka mbegu zinapokuwa zimeiva na uwauliza wengine wanaoishi hapo au kuuangalia mti wewe mwenyewe.
- Mara nyingine mbegu huiva matunda au maganda ya mbegu yanapogeuzwa rangi, kukauka, au kuvunjika kwa urahisi kutoka kwa tawi.
- Mbegu nyingi huwa tayari kukusanywa zinapoanguka kutoka mtini zenyewe.

**Source: Robbins, 2004.**





6. Tukusanye mbegu vipi?

- Kuwazisha eneo lililozunguka mti kwanza husaidia sana. Mbegu nyingi zaweza kukusanywa kutoka kwa ardhi, lakini kwanza angalia mbegu kama imeumwa na wadudu.
- Mtu aweza kupanda mti na kuchukua mbegu, lakini jichunge!
- Matunda mengine huvunjika na kutawanya mbegu bila kuangusha chini yanapokauka. Haya ni vigumu kukusanya kama mbegu ni ndogo. Kusanya matunda au magi kupata mbegu.anda yanapoiva lakini kabla ya kuvunjika na kuanguka ardhini. Halafu ukaushe tunda au ganda mahali palipo pasafi na penye kivuli i
- Jaribu kuangusha mbegu zingine kutoka kwa mti kwa kugonga kwa mti mrefu.
- Jaribu kuweka shuka chini ya mti na kuutingiza mti kwa upole.
- Kwa miti mirefu, kifaa rahisi chaweza kutengenezwa kwa kufungilia upande mmoja wa jozi la makasi kwa kijiti kirefu na chenye nguvu. Upande mwingine waweza kufungiliwa kamba.
- Jua kuwa baadhi ya aina za mbegu haziwezi kukusanya kutoka kwa ardhi na ni lazima zikusanywe zikiwa zimemea kiasili. Miche hii ni iliyoota hivi karibuni na inayopatikana chini ya miti iliyokomaa. Miche hii yaweza kupandikizwa hadi kwa mikebe katika kitalu chako. Hii ni njia iliyo nzuri zaidi kwa miti inayoleta ugumu kuotesha katika kitalu na iliyo na mbegu zenye ugumu kukusanya.
- Mbegu lazima zitolewe kutoka kwa matunda au maganda yake. Toa kwa kutumia mikono au kwa kuweka tunda au ganda kwa jua na kulingoja kukauka na kuvunjika husaidia.

Collection of *Sesbania sesban* with telescopic shears at Muguga site, Kenya



7. Tunawezaje kujua kama mbegu ni nzuri?

- Kwanza angalia mbegu na utupe yoyote iliyomwa na wadudu, ni ndogo zaidi, nyepesi zaidi au ya rangi tofauti na rangi ya mbegu zilizo na afya bora.
- Kwa mbegu zilizo na ngozi ngumu, kuelea kwa maji ni jaribio zuri. Kwa kawaida, mbegu nzuri huzama kwa maji na mbegu mbaya huelea.
- Unaweza fanya jaribio lenye urahisi la kuota. Chukua mbegu chache zilizohesabiwa (ishirini hadi mia moja). Fanyia matayarisho yoyote yanayohitajika. Weka mbegu katika nguo yenye unyevu katika bakuli. Funika kwa kipande kingine cha nguo, tia unyevu vizuri na uiweke mahali penye joto (si moto). Angalia mbegu kila siku ili kuona dalili za kuota na uweke

*Sesbania sesban* – cleaning seed by blowing



*Tephrosia vogelii* – cleaning seed by flotation





nguo ikiwa yenye unyevu kila wakati. Kuota kunapoanza, weka rekodi ya siku na nambari ya mbegu zinazoota. Kuota kwa zaidi ya asilimia hamsini humaanisha una mbegu nzuri, lakini upesi ya kuota waweza kutofautiana sana kulingana na aina ya mti. Aina yenye mbegu ndogo ambapo asilimia tano pekee inaota bado ni nzuri ya kuweka.

### 8. Tupande au tuweke mbegu?

- Mbegu zingine hazikai kwa muda mrefu na lazima zipandwe mara moja (san asana mbegu nyororo na zilizo ndani ya matunda yenye maji maji, mbegu za miti ya matunda ama mbegu zenye mafuta mengi).
- Kwa mbegu zenye ngozi ngumu zaidi, mwongozo wa kimsingi ni kuziweka mbegu zikiwa safi, zilizokauka na penye baridi.
- Mbegu zitolewe kutoka kwa tunda na kukaushwa vizuri. Kukausha mbegu, ziweke kwenye jua kwa siku mbili au tatu.
- Kuziweka katika karatasi au mkebe nje kwenye jua ni vizuri (epuka makaratasi ya mipira kwani huzifanya mbegu kutoa jasho na kuoza). Hakikisha mkebe ni safi na usioingiza hewa.
- Andika mkebe jina la mbegu na tarehe ya kukusanya.
- Kumbuka kuwa uwezo wa mbegu wa kuota hupungua wakati unapopita. Kama mbegu imewekwa kwa muda mrefu sana, inaweza kuharibika. Baadhi ya aina hupoteza uwezo wa kuota kwa haraka zaidi ya aina zingine.

### 9. Mbegu zote huota?

Asilimia ya mbegu zinazoota hutofautiana sana kati ya aina. Mbegu zingine huhitaji aina ya maandalizi ya kabla.

### 10. Tutapandaje mbegu?

- Mbegu zingine zinazoota kwa urahisi zaweza kuoteshwa moja kwa moja shambani au mifukoni. Aina zinanahitaji hali maalum ili kuota huoteshwa katika kitalu kwanza.
- Kumbuka kuwa mbegu zingine zitahitaji matayarisho ya kabla.
- Muda unaotumika na mbegu kuota hulingana na aina ya mbegu, joto, kiasi cha maji kilichopo na umri wa mbegu.
- Kwa ujumla, kupanda hufanyika kabla ya msimu wa mvua kuanza.

- Kama mwongozo wa kijumla, kama mbegu zinapandwa moja kwa moja shambani, zinafaa kupandwa kina mara mbili au tatu upana wake na zafaa kufunikwa ilara kwa udongo. Udongo lazima ubaki wenye unyevu baada ya kupanda.
- Maelekezo kuhusu vbitalu yanafuata.

### 11. Je, miche hukua tu kutoka kwa mbegu?

Baadhi ya aina za miti hutoa vioteo (yaami mimea change kukua kutokana na mizizi ya mmea mzazi). Hivi vyaweza kukatwa na kupandikizwa,

Chukua kitawi kutoka kwa mti mchanga kilichona pingili na utumie vipandikizi hivi. Chagua tawi refu lenye afya na ukate mara moja kwa upande na kutoa majani. Panda kipandikizi udongoni angalau kina cha pingili mbili, na ngalau tumba moja likionekana juu ya udongo na ukiweke kipandikizi hiki kikiwa chenye maji hadi kuchipuka kuonekane. Miti inayokuzwa kwa nia hii itakuwa na sifa sawa na zile za mmea mzazi na yaweza kuwa saidifu wakati unahitaji kuhakikisha kuwa mti wa matunda wenye uzalishaji umekuzwa.

### Kazi ya kufanywa na wanacluster katika mkutano

Katika mkutano wa cluster yako, gawa washirika katika vikundi vya watu tano kufika kumi. Uliza kila kikundi kuchagua aina ya mti iliyo nzuri kwa TIST-mti hutakaokaa muda mrefu na ulio wenye faida kwa mazingira. Wakumbushe kuchagua kiongozi na msaidizi wake.

Kazi hii ni kutafuta ujuzi ufuatao kuhusu kila aina ya mti:

Jina la mti—Maelezo kuhusu mbegu - Mahali karibu pazuri pa kupata mbegu hiyo- Ukusanyaji wa mbegu- Njia ya kuweka—Njia ya kutayarisha mbegu—Njia ya kukuza

Wape dakika kumi za kufanya kazi hiyo, halafu huwaulize kila kikundi kuleta ripoti.

Tafadhali andika ujuzi huu katika kitabu chako na uje nacho katika mkutano huo mwingine wa mafunzo.

Waweza kuona njia iliyo hapa ya kunakiri haya ikiwa mwafaka:

Cluster Name:						
Jina la mti	Maelezo kuhusu mbegu	Mahali karibu pazuri pa kupata mbegu hiyo	Ukusanyaji wa mbegu	Njia ya kuweka	Njia ya kutayarisha mbegu	Njia ya kukuza



# Mazingira Bora



# TIST

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**Kikamba Version**

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**Wanachama wa Limuru TIST Cluster baada ya mkutano wao wa Cluster mwezi uliopita.**

**Inside:** Kwia Mbeu na undu wa kuiita mbee wa uvanda. Page 2

**TIST: Kukolany'a Mbeu.** Page 4



# **Kwia Mbeu na undu wa kuiita mbee wa uvanda.**

## **Kwia Mbeu**

- Ikiithya ethiwa wiumya matunda kuma kisioni kii kuthi kingi niwamekalya me many'au, memuunyini na vandu vena nzeve nesa nikana ngii ila syi nthini iikanangike.
- Kua matunda maku na kyondo kya ikanga kana ikunia. ndukakue na mathangu ma nailoni maikanyale na ukosa nzeve na mayanangika.
- Ikiithya niwanzakua matunda ala maseo (unit 2) na ni manyau na matheu mbee wa kumaia. Mbindi na ngii mbingi syendaa kwanikwa suani vandu va mithenya ili kana itatu iny'ae nesa.
- Ila mbeu yaku vandu vany'au , ve muunyi na ve nzeve nesa. Tumia makunia ma ikonge, mbisu nikana uole ivuso ya mbeu kuunda. Kunika na nguniko nesa wusuity'e mbeu nesa kuola nzeve nthini wa kikuu, mbisu kana ikunia yila wiite mbeu.
- Ethiwa ndwithiawa na mbeu ya kususya vala ukwenda kwikia ususya na makaa kana makanzeti nikana makanyusaa nzeve ila yina kiw'u.
- Tumia miti kuseuvya makumbi kana utaa wi yiulu kwa kwia mbeu nundu waia nthi mbeu nitonya kuunda kana kwanangwa ni uvyuvu na tusamu kuma muthangani. Ethiwa witumia makunia kana syondu no ususye mitini nyumba.
- Kulya mawoni kivathukany'o kuma kakundini kaku kala ke vakuvi naku kana kwa athukumi ma ndilikasa iulu wa utumia ndawa sya kuaa mitutu na mauwau kusuvia mbeu yaku. Ngelekany'o Matu ma Neem kana mauta, matu ma Gliricidia, savuni nisuvia mbeu.
- Lilikana Kususya mbeu yaku kaingi kuikiithya ti mbanangiku.
- Umbany'a uvoo iulu wa mbeu ino na undu wa kumia kuma kisioni kyaku kulingana na ni muvai wiva nundu kwi imwe itaiawa kwa ivinda iasa.
- No utatithye kusianisya ivinda ya kumea kwa kwosa ngii ta 100 na kwia lekoti ya ivinda yilaiutumia kumea kwa kutala nisiana imeete kwa ivinda yiana ata. Weeka uu kila mwai ukeethiwa utonya umanya kwa ngelekany'o undu siekete kwithiwa na vinya wa kumea na wamanya tavya ala ma ngwatanio yenyu undu usomete iulu wa mbeu isu na kumanya.
- Oundu vala wiite mbeu yaku vathithite now'o itonya kwikala kwa ivinda iasa. Ikiithya mbeu ndinalika kyenini muno na ethiwa vala wiite vena uthithu muvituku nilaisi mbeu kwanangwa ni mbuka.
- Manaya kana vena mbeu syitawa recalcitrant (ila syi vinya kuvinduwa). Mbeu sya muthemba uyu nila itendaa kwiwa syendaa ukethwa ivanditwe nundu syendaa wiu mwingi. Kwa kwia kwa ivinda inini ta kyumwa waile ulinga na makula meu. Mbeu muthemba uu utavinduwa nikusaa yany'aa. Mithemba ya miti ila mbeu yasyo iilye uu nita:- Artocarpus Heterophyllus (Jackfruit), Azadirachta Indica (Neem), Calamus Species (Rattans), Durio zibethinus (Durian), Eusideroxylon zwageri (Ulin), Theobroma cacao (Cacao) na ingi ta Dipterocarps (Shorea, Hopea, paolaquiquium etc)
- Na muthya, yia uukua mbeu kuma kivuioni lilikana kumya na kuvwika.

**Ni Uiiti wau utonya kwendeka mbee wa mbeu kuvandwa?**

- Vand mbeu imwe na uisisya syikua ivinda yiana ata kumea. Ethiwa syikua ivinda iasa kwi kyumwa kimwe nuseo kwamba kuiita mbee wa kuvanda.
- Ethiwa ndwina muikiio na mawoni ala unengetwe iulu wa mbeeu ino ni useo kwamba kutatithya kwa nzia kivathukanyoo na uitavya amemba ma ngwatanio yenyu undu wonete itina wa kutumia nzia isu ethiwa ni nzeo.
- Ethiwa mbeu ii ni tungili tuniini kana twiona ikonde yumu ni useo kwamba kuiita ngelekany'o ya mivai ya ngii ila yithiawa na ikonde yumu nita Croton Megalocarpus, Neem, Cassia Species na kei appel ila syaile amaba uvandwa mukeveni.
- Ethiwa ukolanitye matunda amba uinde vandu va mithenya ili kana umwe, osa kisungi kya waya uvinyianisye na kusunga utiwe na iongii na kiw'u na nyama sya itunda iisungwa sume. Mithemba ya miti ila yikawa uu nita Syzium cuminii, Dovyalis Cffra, Trichilia Emitica, Vitellaria Paradoxa, Prunus Africana, Gmelina Arborea (gmelina), Azadirachta indica (neem) na Tamarindus Indica (Tamarind).
- Matunda amwe nimendaa kwamba kumwa kikonde kya nza na kutitianwa vamwe ngelekany'o Tectona grandis (Teak) na Calmus species (Rattans).
- Matunda angi methiawa na ngii ila syendaa uthiwa. Itina wa kuinda itunda vandu va muthenya kana mithenya ili, kima itunda na ndii na mwithi mithemba ino nita Melia volkensii, Melia Azedarach, Sclerocarya birrea, Cordia Africana.
- Mikea imwe niyendaa kwanikwa suani kwa mithenya 3kana 5( vandu vatena sua nyingi) na itina kutuangwa kumya mbindi/ngii. negelekany'o ni Laucana Species, Calliandra calothyrsus, Acacia species, Sesbania Sesban, Grevillea robusta, Casuarina Species na Eucalyptus species.
- Mbeu imwe syithiawa na ikonde yumu na syendaa kwamba kuiitwa. Imwe nisyendaa ona ikonde yasyo kwamba kwatuwa na yundo kana ivia itina wa kwanikwa vandu va mithenya 3 - 5 nikana kiw'u kilike na kutuma imea. Mbindi ii nisyendaa uvandwa mituki undu vatonyeka itina wa kwatuwa ila nita Melia(mukau), podo species, Croton megalocarpus, Adansnia digitata, Swietenia macrophylla,, Delonix regia. kwa ngii iola ninin na syendaa kwatuwa ikia mukeveni wina ngunikio na uyikia kithangathi na uikusakusya kwa vinya nikana syatuke.
- Mbindi imwe nisyendaa utilwa o vanini kutitheesya kiw'u kulika. Ndukatile muno ndukatile munguthe.
- Mbeu imwe nisyikaa nesa kwa kuindwa kiw'uni kimuutia kana kivyuu ila nita:- Calliandwa, most acacias, Tamarind, Leucaena na Albizia. ikia mbeu mukeveni, na uyitiia kiw'u kitheukite. Eteela kiw'u kivoe na uyumya mbey ila ukwithia syaimba.
- Mbeu imwe syendaa kuindwa kiw'uni o kithithy kwa masaa ta 12-24 ila nita Sesbania, Tephrosia, Dalbergia Species, Gmelina, Gliricidia na Acacia augustissima. Ikia mbeu mukeveni ongela kiw'u kithithu kila kyaile ithiwa kundu kwili kwa imbindi, umya ila itonya kwithiwa ithambalalite.
- Mbeu yoothe yamina uitwa niyaile utwawa muundani kana kivuioni na kuvandwa.



# TIST: Kukolany'a Mbeu.

**Makulyo undu wa kumbany'a na kukolany'ambeu na mausungio.**

**1. Ni muthemba wiva wa muti waile umea kisioni kyaku?**

Mithemba miseo ya miti ni miti ila itonya umea kisioni vate mundu kulikiliila. Ala methiwa nthini wa TIST nimathuthaw'a kaingi kuvanda miti ila itonya kwimesya isioni syoo kana miti ya kiene na mithemba ingi na kwikala iteutemwa vandu va ilungu ya myaka miongo ili kana mbeange.

**2. Ni miti yoonthe miseo?**

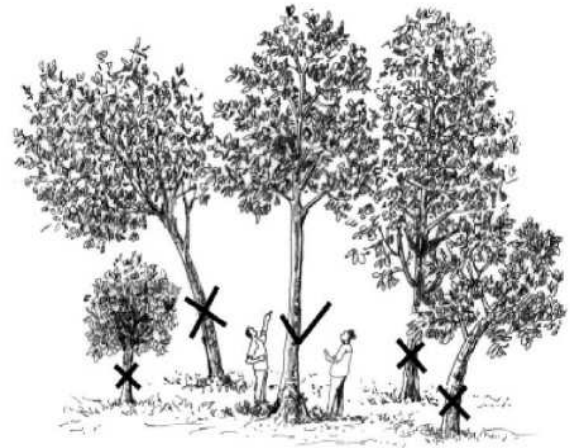
Ti lasima kila muti withiwe wi museo! mithemba imwe noyithiwe yi vinya kumiea, ingi ukethia ni sumu kwa indo, kana kwa kiw'u. Sakua miti ila wisi niya vaita kwa kisio kyaku. TIST ndyendeeawa ni aimi kuvanda misanduku nundu kuvanda miti ino nikuolaa kiw'u kila kimuthangani.

**3. Miti nuyumasya mbindi/ mbei kila mwaka?**

Miti mingi kwaw'o nisyaa na kunengane mbeu kila mwaka, Indi niwaile usyaaisya miti ila yi kisioni kyaku nikana umanye nesa. Miti imwe no ithiwa yumasya mbeu /mbindi nzeo itina wa myaka ili kana itatu.

**4. Ni miti yiva yina usya museo wa kwa kwosa mbeu?**

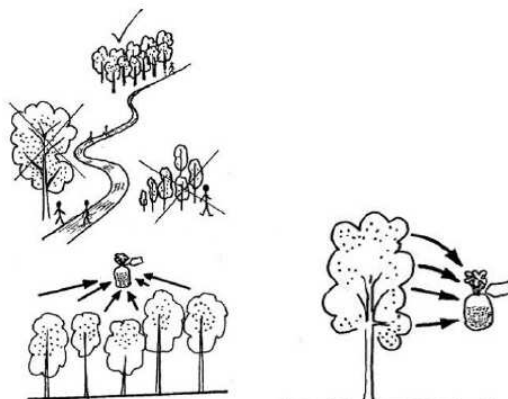
- Kolany'a mbeu kuma miti ila yina uima museo
- Ndukendeew'e ni mbeu sya miti ila imeete vandu yiyoka
- Ndukendeew'e ni miti ila itasyaa nesa na yina mbeu syina umbo muthuku.
- Nikaa kuyuva muti ula ukwosany'a mbeu wi katikati wa miti ingi miseo ya muthemba umwe nundu ninenganae mbeu nzeo ya muthemba usu wa muti.
- Umbany'a mbeu kuma ngavani kivathukany'o sya muti ula wa sakua.



**Nzakua muti mbeu kuma mutini musyai museo.**

- Ni useo kwosany'a mbeu kuma mitini inyiva mithemba 30. Kii kitetheeasya kwithiwa na mithemba mingi. Osany'a mbeu kuma mitini yina utaaniu wa 50m - 100m nikana ukwate mbeu kivathukany'o na syaile.
- Muthemba wa muti kaingi uamuawa ni vata wa muti ula ukwenda.
  - Ngelekany'o, kwi miti minzeo kwa mbau nayo ni ila imeaa ukethia ni miasa na ndina ngava mbingi na yanaa kwa mituki na ndithuthawa.
  - Miti miseo kwa uithyo wa indo nayo yaile ithiwa yi miti ikwiana mituki, yina uthui na ngava mbingi, na itonnya kuthongooa na mituki.
  - Miti miseo ya matunda yaile ithiwa yina usyao museo wa matunda, ngava syi nthi kana syi vakuvi, na itonya kwiana na mituki.
- Tata usakue mbeu kuma mitini ila yanaa na mituki muthangani, nzeveni, na utuluni umwe na vala ukwenda uvanda.
- Nzakua miti miimu na ti ila yesanga. Miti miviku yithiawa na mbeu /mbindi mbingi kwi muti munini.

**Kuma: Robbins, 2004**



**5. Ni indii tukolanasya mbeu?**

- Ivundisye kuwosany'a mbeu yitunda yeew'a
- Kulya andu ma kisio/atui maku kana usyaiisye muti we mwene. Ingi mbindi/ngii nisyithiawa syeew'a yila ikonde yavindua langi, syooma kana itonya utilika mituki kuma ngavani. Ingi nzuu nisyiw'aa kwa kuvindu ikonde kuma langi wa kisusuni (ngilini) kutwika langi wa kaki/ muthanga. Syisya musolo itina ithanguni yii wone ngelekany'o.



- Mbindi mbingi syithiawa tayali syavaluka kuma mutini
- Lilikana kuvoya mwanya wakwosa mbeu/mbindi / ngii kuma kwa mwene muti
- Wa mina kumbanya mbeu weekia vala weekia lilikana kuandika isyitwa ya muti, matuku ma kumivuua na niva wamyumya.

**6. Nata tukolanasya mbeu?**

- Nuseo kuthesya ungu wa muti ula tukwosany'a mbeu. Mbindi/Ngii mbingi nitonya kwosyanw'a ungu wa muti sya valuka. Onakau niwaile eteela ila ukwo syi mbiku nesa ukethe syo sya valuka. Ndukaeke syikale muno vau uthi nundu nitonya kwaa. Syisya kana ni ndonye, syina uwau kana ni mbanangiku mbee wa kusyosania. Ngii/mbindi ta sya Tectona grandis (teak), Gmelina arborea(gmelina) Aleurites moluccana (candlenut) nikolanaw'a kwa nzia ino.
- Mundu no kulisa mutini kwuvuua mbeu lakini wisuvia kuvaluka!
- Matunda amwe ma miti momaa na kwatuka na kunyaiikya mbeu nthi. Kwosany'a mbeu ino yavaluka kwivinya muno ethiwa ngii/mbindi syayo ni nini. Osany'a mika kana matunda ma miti taino meew'a vandu va kweteela yatuke na kuyaiikya mbeu. Anika vandu vaseo vatheu wisi syaatuka ii nutonya kumbania na kwosa mbeu.
- Mbeu imwe nutonya ukuna na muti muasa ivaluke.
- Tata wie kyandalua ungu wa muti ula ukumia mbeu na uithingithya o kavola wite mbindi/ngii.
- Kwa miti ila miasa nutonya umiseuvisya mboloi uitumia muti muasa kwa kuwoveea mukasi kwokoni kumwe na ikanda kula kungi.
- Manya mithemba imwe ya mbeu nditonya ukolany'a yavaluka indi no yeemesya ungu wa muti usu. Niwithiaa tumiti tumeete ungu wa muti uyu na vaa nivo waile usakua tula tuseo na kutwaa kivuioni na tuvisu. Ino niyo nzia ila nzeo muno kwa mithemba ya miti ila yi vinya kumea kana mbeu syayo syi vinya kukolany'a.
- Mbeu syoothe nisyaiile umwa mikaeni kana matundani. uu nutonya kwikwa na kw'oko kana kwanikia sua syiatue.

Collection of *Sesbania sesban* with telescopic shears at Muguga site, Kenya



**7. Nata utonya umanya mbeu ni nzeo?**

- Mbee ni kwa kusisya na kuveta ila nini kwi ila ingi, ila syina langi utailye ta iingi, ila mbanange ni tusamu.
- Osa mbeu imwe watue usisye nthini kana ni mbiku na kana niyithiwa na muiinyu.
- Kwa ngii/mbindi imwe ila syina kikonde kyumu no uivathukany'e kwa kwikia kiw'uni nundu ila nthuku nithambalalaa (Nundu maima ma ngulu na itema ya ngii ino enthiwa ti iviku niyitiaa maima ma nzeve)
- Kwa mbeu imwe nuvathukanasya kwa kusunga kana kuulukya na nzele kuveta ila mbuthu.

*Sesbania sesban* – cleaning seed by blowing



*Tephrosia vogelii* – cleaning seed by flotation





- Nutonya kusyimithya mbeu umanye kana nitonya umea. Osa namba nini ya mbeu ila ukolanitye ya ngii ta (20-100) ethiwa nisyaille kuitwa siiite na syikie ikulani yiu na uilinga, ia vandu vena muutia na tivavyu na uyikalya ikula yii yi yiu kila ivinda na uisiasya kila muthenya wone kana nikumya minguthe. Syambiia umya minguthe ia lekoti ya undu imeete kila muthenya. Iseso yii ya kusyimithya mbeu yaile ikala vandu va ilungu ya syumwa ili kwianana na muthemba wa muti. Ethiwa 50% ya mbeu ila uusyimithasya niyaumya minguthi nuumanya wina mbeu nzeo. Mbeu yina mbindi/ngii nini yina kumea kwa 5% ve vata wa kwiwa.

**8. Nituuwanda kana twikita kwia mbeu?**

- Mithemba imwe ya mbeu ndiakaa yendaa kukethwa ivanditwe (mithemba ila yi na matunda moaa na mituki na ngii ila mbololo, na mbindi/ngii sya miti ya matunda muna muno ila yina mauta maingi). Kwa mbindi ngii ila syina mbindi nyumu mwio wasyo ni ia syi theu, vandu vomu na vathithu.
- Mbeu niyaile kumwa ikondeni na kwanikwa inyae nesa. Kwanika mbeu syanike suani vandu va mithenya ili kana itatu.
- Kwia ithanguni kana mukeve wa kyuma vandu vate sua (nuseo kuleikia ithanguni ya nailoni nundu syanyala nikwoa) Ikkithya vala weekia ni vatheu na niwakunika nesa.
- Vandika kathangu kena isyitwa ya mbeu, matuku ala woosanisyeye na niva wamyumisye.
- Lilikana utonyi wa kumea wa mbeu uendaa uolekete kwianana na ivinda yila uendee na kwia mbeu ino.

**9. Ni mbeu syoothe sumasya ming'uthe kana kumea?**

- Kilio kya mbeu/ngii/mbindi ila iume muno iamuwawa ni muthemba wa muti ula syumite. Imwe nisyendaa kuitwa be na uu ukalew'a ithanguni ya mwaini w keli.
- Yila uukolany'a mbeu lilikana imwe waia nikusaa, imwe nikwiiiaa kivuioni, na ingi iithamwa kuma kivuioni. Kwoou uyu nundu wa ikia maanani yila uuvanda kana kikundi kyenyu kiuvuia kina kieleelo kya kwithiwa na miti kiasi kina nonginya mongele mbeu ila meuvuiia na yila meukolanya mbeu.

**10. Nata tutonya uvanda mbeu?**

- Mbeu ila imeaa vate thina no ivamwe imwe vala yaile. Mithemba ila yendaa kusesengwa niyaile uvuiwa kivuioni mbee wa utwawa kithekani.

- Ivinda yila mbeu ikukua kumea yitengemea muthemba wa mbeu, uvyuvu, kiw'u na ivinda yila mbeu yiithiitwe yiitwe.
- Uvandi niwambiia oyila mbua yambiia.
- Kwoondu wa ukutongoesya kwa uvandi ni vanda ngii uliku wa kundu kwili kana kutatu kwa uthathau wa ngii/mbindi na ikalya muthanga wi mwiu.
- Umanisyo iulu wa kuseuvya ivuio ukanenganwe ivinda ya uvundisyo ungi.

**II. Niw'o mbeu ya mbindi/ngii noyo itonya utune tumiti?**

- Mithemba imwe niyumasya nthongoo ila (nthongoo ithi syithiawa imeete kuma miini ya miti ila iisyaite) itumiawa ta mbeu kwa kutemwe kana kukuwa na kuvandwa vandu vangi.
- Matilo ma miti ni mosawa kuma ngavani sya miti na methiawa na metho kana kundu kwa kuthongooola kuinyiva kutatu. Usakua itilo sisya ukava ula utena kitau, uwau na mutheu tila ta usavite. veta matu vanda itilo yii muthangani metho eli me ungu wa muthanga na yimwe yisa. Endeea na ungithya nginya wone niyakwata na yambiia kuthongooa. Muti wa uvanda uu withiawa uilyi ta muti ula waumisye mbeu na nundu utonya utuma uvanda muti museo wa matunda.

**Umbano wa ngwatanio**

Yila mwina umbano wa kila mwai aanai ikundi sya andu 6-10. Kulya kila kikundi kisakue muthemba wa muti ula museo kwa TIST kwa ivinda iasa nawina vaita kwa mawithyululuko. Lilikanya kila amwe masakue mutongoi na munini wake. kii nikutetheesya kwosa uvoo uu iulu wa kila muthemba wa muti:

Isyitwa ya muti, uelesyo wa mbeu yaw'o, vandu ve vau vakuvi utonya kwosa mbeu, Nzia ya kukolanya I mbeu, Undu wa kumia, undu wa kumiiita na nzia ya kuvanda. Manenge ivinda ya ndatika ikumi kwika undu uu na uikulya kila kikundi kitunge livoti.

Andika livoti ino ivukuni na uyuuka nayo ivindani yila yingi kwina umanyisyo. Nowone yui useo kuvanga ta uu

Isyitwa ya ngwatanio:						
Isyitwa ya muti	Uelesyo wa mbeu	Vala utonya umikwata ukuvini	Nzia ya ukolany'a	Nzia taKwia	Kuitta mbee wa uvanda	Nzia ya uvanda

# Mazingira Bora



# TIST

The International Small Group & Tree Planting Program

www.tist.org

**Kipsigis Version**

An Environmental, Sustainable  
Development and Community Forestry  
Program.



**Wanachama wa Limuru TIST Cluster baada ya mkutano wao wa Cluster mwezi uliopita.**

**Inside:** Konoretab keswek ak ribet. Page 2

TIST: Kayumetab kesuwek. Page 4



## Konoretab keswek ak ribet.

### Konoretab kesuek

- Ibuat ine yon imoche iib logoek kongeten olekebuten komising iyamsi
- Koyomio. ko kararan iur ak kosich koristo ne ome asi mowech kesuot en orit.kararan ingeboisien kuniok chemotinye kongik chebo asi konyor logoek ak keswek koristo
- Maiyanat keboisien tukuk kou sebebeisiek anan plastikisiek amun motinye konyik chebo koristo komuche kowechob tuguk.
- Ibwat ile cheta ko chekororonen ko choton chesib kekonori,amun tililen kiyamsi ak kekonor.
- Amun keswek che yomnyotin ko ngebor koboroksei keswek chechang kemoe en betusiek 2-3 en asistab . kotomo kochobok .
- konor anyun keswek en ole tinye urwet ago yamat. Boisien tuguk kou kuniet ne tinye ole chute koristo ak teretab kipkaa asi momunyok. Konoren tuguk che kororonen asi mowechok keswek ak irib komochut koristo.
- Ago kend lolet keswek ago yemanyi imuchi itesi tuguk kou nesek metetekab muchelek
- ak alak Cheyomyotin niiton kotoreti koyamsi kititindab koristo ne mi orit.
- Ingoteben anyun bogoyot asi mutiny ng'wony keswek amun imuche kowalak konamak anan kochut susurik ak alak tugul che imuch koiti.
- Chang kabwatet en bik alak en kurubit anan ng'omotik asi iteben ngo kimuchi keboisien Kerichek keteren susurik, korokut kou neemol gliricidia leave ak sobunit komuche kotoret.
- Ibwat igergere keswek en abogora asi mowechok, tiny kora ile toss tore betusiek chetian Keswek asi mowechok . niiton kotiyenge koimbot keswek anan korikab keswek amun miiten Chetebie kasarta negoi kou kenyit agenge .
- Imuche iyai korokut en kosorwek che terotin asi iguiye ile ibe keswot agetugul kasarta
- Netyan en rutunet . Inemun keswek 100 ak inde kabeti asi inai ile ata chekorut ak chemorut
- Niiton koboru kimnotet nebo keswek. Obchei ak biik alak en kurubisiekab kilasta.





- Ingotebi keswek ole kaitit asi kokochi kotebi kogagei. Mokimoe keswek en asista agot Konyor ole kaitit missing koweckoksei keswek. Naiy ile miten keswek che kemine kou
- Noton che mokiyomsie anan kekonor amun moche beek chechang asi korut. Korikab keswechuiton
- Koyomtos en chokinet kou Artocapus, heterophillus (jack fruit) Azadirachuta indica (neem) calamus Rattaus Durio zibethinus (duria) Theobrome (cacao) ak alak che chang .
- Nebo let anyun ibwat ile yon iibe keswek koba kabeti konyolu koyomiotin .
- Miten alake che kinuri en beek betusiek (1-2) asi komuch konur magatete asi
- Komong keswot kou kipkarkaryat chepkomon ak saunet.
- Keswek alak kebore asi komong tenderek . alak kindo koteben beek betusiek (1-2)
- Alak ketue ak kenut kou melia volkensis, melia azadarach ak che chang
- Keswek alak kimuchi kiyamsi betusiek (3-5) asi komuch komong tenderek kou sebesebe. Chepitet ak alak che chang
- Logoek che tinye magatete ne nyigis kimuchi kema en asista asi koter magatet anan ketui. Alk en logoek kimuchi ketil asi kobit ole bune beek asi korut keswot ak irb kometil ole rutunen

## **Nee ne kimokinigei asi keteren.**

- Miin keswek che ng'eriny asi iker kasarta neibe . Angot koib kasarta nebo wikit keib kasarta Kinya angot ko metinye kayanet ko onchu kosibutik ne tai ko iyai koborunet ak obchei ak Kondoikab kilasta asi onyuru walutik .
- Angot ko keswek che tinye makatet ne nyikis anan ko mengechen ko motinye kinde kerichek kou keleluet neem cassia ak kei apple kimuchi kemin kou noton
- Alage koboisien beek che loltos kou calliandra chebitet ak chepkomon ketorchin beek
- Ak kebakach kotgokoititegitun beek kelol. En saisiek 12-24 ko en keswek che kabwa barak ilolu Amun yachen choton
- Keswek tugul che kagetoret konyolu kemin en sait noton.



# TIST: Kayumetab kesuwék.

## Kesuwék tebutik ak Wolutik.

### 1. Miten ketik chegimuchi kemin ek kaa Ochon ketik choton?

Ketik chegororonen kochon kiinyortoi icheget ko kigorut. En TIST kemwoe kele kemin kou Logoek ak cheboo kipkaa ak alak cheimuchi kotar kenysisiek 20 ak kosir.

### 2. Kororonen ketik Tugul?

Ketik tugul komogororon, amun alak komokimuchi kerib amun tinye sumu alagei koebek chechang. Konyol ye gole ketik ichigil chenomegei ak ole imenye. Ketik cheu Chepkogutgei (Eucalyptus) ko bose beek en Emet.

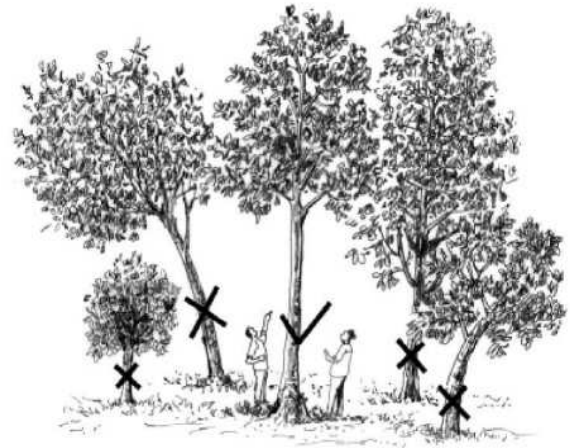
### 3. Tos tinye keswék ketik en kenyt?

Ee unoton en ketik alak. Akomising lger en ketik chemiten kaa. Alak Komuchi kotar kenysisiek 2-3.

### 4. Oionon ketik neimuchi kenyorunen keswék chegororonen?

- Lewen kesuwék chebo ketit nekararan
- Ketik nemiten inegen komat inemu kesuwék, motinye chekororonen.
- Ketit ne motinye iton komat ibut
- Cheng ketit ne miten kwenutab ketik cheninan chegergei.
- Iyumenkesuwék en kebeberuwék cheter ak cheter.

Source: Robbins, 2004.

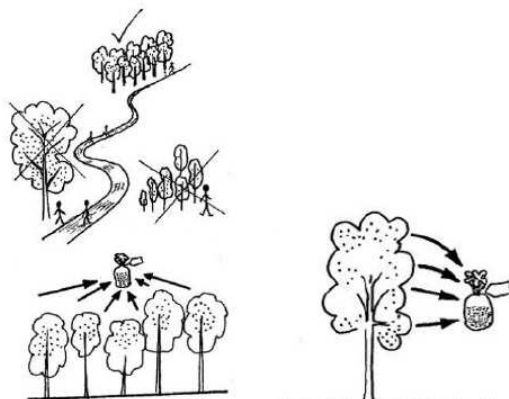


Lewen Ketik Chetinye Kesuwék Chegororon.

- Karan missing iyum kesuwék en ketik chechang kegetoton, ago che motinye kosibiny.
- Tiyengei Kesuwék cheimoche imin boisiet ne imoginigei kou;
- ❖ Kou chebo bogoinik komoche che kiteta, che motinye temenik chechang ak sogek
- ❖ Chebo tuga kemoche chechogu ago chetinye sogek chechang ak temenik chechang.
- ❖ Chebo logoek ,kotinye togek chegororon chetinye temenik che ngerinen ago chechogu.
- ❖ Lewen keswék chenomegei ak Ole imenye; Konamgei ak ngungunyek.
- ❖ Lewen ketik ne kongat amun ketit ne ngarngar komotinye kesuwék chegororon.

### 5. Kasarta ainon ne Keleweni Kesuwék?

- Rib kasarta kenyt ye rurio Logoek.
- Teben biik alak alan isochigen ak inye
- Bitunen waletabgei en Logoek konam alak kobotiyo anan koyatak motogoik kometo kesuwék.





- Ye inyoru chemiten nguong ko tnye koborunet kole kogongiyo.
- Nyoru chomchinet en nebo imbaret iyum kesuwek.
- Cheng motoget negararan nebo kesuwek ak isir torigit ak kainetab kesuwot.

Collection of *Sesbania sesban* with telescopic shears at Muguga site, Kenya



**6. Ole Komuchi Kiyumta Ano Kesuwek?**

- Nebotai ko Isuach ketit kel kolabait asi kobuti nguong kesuwek ak irib amun alagei ko kigochut susurik.
- Alage kelonye asi kinem logoek
- Imuchi iite Tantaruwet ak itumtum ketit.
- Alagei komogimuchi kenyor kesuwek amun ibe koristo koloe gitun-ketik kon;Aonet ,Nadi flame ak alak.
- Alagei koyoche ketorms ak ketor kesuwek
- Ketit angetugul kotinye Oret ne kimuchi kinemunen kesuwek.



- ✓ En kesuwekchuton miten cheimuchi koib koristo koboru kole mogorororen.
- ✓ Yon imoche igue igogorororon kesuwek imuchi inemu kesuwek (20-100) ak inde ole inyuot amta inde bek,Rib anyun en kila betu kotgoit wekisiek Oeng ingany Ole kimoguto kesuwek.

**7. Ole kimuchi kamwa kele kororonen kesuwek?**

- ✓ En Keret kotinye besiet amun alak komengechen alak kotinye itondo ne magergei ago tugul ko kesuwek chebo kot agenge.
- ✓ Ker kesuwot angenge ngo kongat anan kotinye sususrik.

*Sesbania sesban* – cleaning seed by blowing



*Tephrosia vogelii* – cleaning seed by flotation





**8. Komuchi Kemin anan Kagonor Kersuwek?**

- Kesuwek alagei komotinye Kagonor asi tu kemin .Kimine en kasarta amun tesetai kongoti alak kotinye Magatet neu neyoche kebetes asi kinem kesuwot.
- Ye igonori kesuwet ko mat inde sabebe amun igochi konun kesuwot.
- Inde kainet ak torigit lolet ne gende kesuwek.
- Mat kogage kesuwek amun tun komonyor bitet ne kararan.

**9. Igotos Kesuwek Tugul?**

- Tinye besiet kesuwek kosibgei ak terchinetab ketik alak kotore betusiek che ngerin ko alak koibe betusiek chechang.
- Ye imine kesuwek Komuchi alak komeiyo alagei kobegu en kabet.

**10. Kimuchi keminta ano kesuwek?**

- ❖ Kesuwek alak komuchib kemin ko moginde kabeti alak kindo motogoik asitun kemin.
- ❖ Kesuwek alak kotinyengei kasarta bek ak burgeiyet.
- ❖ En abogora k o kararan kegol kesuwet en kasarta ne momite Robta

❖ Tagenyoru Lesonit nebo kabeti en kasta nenyo

**11. Kinyorunen Ketik kasuwek kitiyo?**

- a) Ketik alagei kimuchi kenyor en tigitikab ketik kinemu a kemin.
- b) Miten kora chemotinye kesuwek ago kimuchi ketil ak ketumda en ngunguyek,alak kotinye chego toreti missing korut alak kobo logoek.

**Boisiet en tuiyetab kilasta.**

En yon miten tuiyetab kilasta kebchei biik koyob kobureito nebo biik (6-10) asi Komuchi kogo agetugul kesuwek chebo ketik nenin ne kararan negoi ago neimuci kowal itondab Emet .Ingolewen kodoindet ak Rubeiwot asi Komuchi kosir kou ni kainetab keti- kesuwot - Ole kimuch kenyorchi-Kigesto Ono – Konorenyin-Keribto- Kolenyin. En let anyun Kogon kurubit agetugul Karen्यान. Konor wolutichuton asi tun koik Konetisiek en tuiyet neisibu.

Cluster Name:						
Tree Name	Seed Description	Local collection point	Collection method	Storage method	Pre-treatment method	Sowing method